

Proceedings of the 3rd Annual International Conference  
held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021, Machakos University, Kenya



**MACHAKOS  
UNIVERSITY**

**BOOK OF PROCEEDINGS OF THE  
3<sup>RD</sup> ANNUAL INTERNATIONAL**

**DATES:**

**22<sup>ND</sup> - 25<sup>TH</sup> JUNE 2021**

**THEME:**

*Responding to Emerging Global Challenges  
through Research, Innovation and Technology  
for Sustainable Development*

**Supported by:**



***Soaring Heights in Transforming Industry and Economy***

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## MACHAKOS UNIVERSITY

### BOOK OF PROCEEDINGS OF 3RD ANNUAL INTERNATIONAL

DATE

22<sup>nd</sup> ~25<sup>th</sup> JUNE 2021

VENUE

MACHAKOS UNIVERSITY VIRTUAL PLATFORM

***THEME***

***Responding to Emerging Global Challenges through  
Research, Innovation and Technology for Sustainable  
Development.***

Editors

Dr. Wycliffe Amukowa (Editor-in-Chief)

Dr. Elijah Muange (Editor)

## *FUNDAMENTAL STATEMENTS*

### *Our Vision*

A Preferred University of Excellence in Scholarship and Service Delivery.

### *Our Mission*

Provide Scholarly Education through Training, Research and Innovation for Industrial and Socio-economic Transformation of our Communities.

### *Our Identity*

Machakos University is an Academic Institution Committed in Transmitting Knowledge, Skills and Attitude through Science, Technology and Innovation for the Benefit of Humanity.

### *Our Philosophy*

The Philosophy of Machakos University is to Provide Transformative Leadership in Teaching, Training, Research, Innovation, Industrial and Technology Transfer for Wealth Creation.

### *Core Values*

Integrity  
Accountability  
Professionalism  
Inclusivity  
Creativity  
Teamwork  
Equity

**CONFERENCE COMMITTEE**

- 1) Prof. Peter N. Mwita - Chairman
- 2) Prof. Mugendi K. M'Rithaa - Alternate Chair
- 3) Dr. Wycliffe Amukowa - Secretary
- 4) Prof. Fredrick Ogola - Alternate Secretary
- 5) Prof. Geoffrey Maroko
- 6) Prof. Henry Embeywa
- 7) Prof. Jones Agwata
- 8) Prof. Zachary Getenga
- 9) Dr. Eng. Charles Mwaniki
- 10) Dr. Richard Kimiti
- 11) Dr. Christabel Muhonja
- 12) Dr. Julius Nzeve
- 13) Dr. Cornelius Okello
- 14) Dr. Marther Ngigi
- 15) Dr. Larry Ndivo
- 16) Dr. Patricia Muendo
- 17) Dr. Mark Kimathi
- 18) Dr. Elijah Muange
- 19) Dr. Tindih Heshborne
- 20) Dr. Stanley Makindi
- 21) Dr. Peter Kibet Koech
- 22) Mr. Watson Kanuku
- 23) Mr. Daniel Mulinge
- 24) Ms. Consolate Awuor
- 25) Ms. Nancy Ingoshe
- 26) Ms. Elizabeth Mbatha
- 27) Ms. Linet Messo

## MESSAGE FROM THE VICE-CHANCELLOR



Machakos University has taken a frontline position in the dissemination of knowledge and technology transfer towards the achievement of sustainable development and the socio-economic transformation of our societies. This is the underlying goal of our series of Annual International Conferences. Against this backdrop, it is my pleasure to, once again, welcome you to another Machakos University Conference which is the 3<sup>rd</sup> Annual International Conference, having previously welcomed you to the 1<sup>st</sup> and 2<sup>nd</sup> conferences, respectively.

This 3<sup>rd</sup> Annual International Conference, under the theme: “**Responding to Emerging Global Challenges through Research, Innovation and Technology for Sustainable Development**”; comes at a time when the world is still reflecting on how to ensure the set socio-political, economic and technological development goals can be sustained in the wake of Covid-19 Pandemic.

The Conference will focus on research, innovation and technology-based solutions in responding to emerging challenges relating to pandemics (such as COVID-19). It will take a closer look on strategies for sustainable agriculture and food security; economic survival; inclusion and access to education, climate change and natural resources management; social and technological disruptions as well as enhancing Post COVID-19 recovery measures in lealth, hospitality and quality of life.

It is my belief that the researchers and scholars participating from various Universities, Industries and other high-end organizations will use this event as an opportune time to share ideas and experiences to provide solutions to existing global challenges, that will be of benefit not only to Kenya, but also to the entire globe in general so as to come up with development goals that are sustainable all through.

Finally, I wish to thank our Chief Guests, Keynote Speakers, Guest Speakers and all participants for finding time to be with us during this important occasion. I welcome you all to interact freely not only amongst yourselves, but also with the Machakos University fraternity and build collaborations that will outlive the Conference period.

Thank you and God bless you.

**Prof. Lucy W. Irungu, PhD**  
**VICE-CHANCELLOR & PROFESSOR OF ENTOMOLOGY**

**MESSAGE FROM THE CHAIRMAN, CONFERENCE COMMITTEE**



The quest for sustainable development is mired with challenges with the latest being the COVID-19 pandemic. Amidst these challenges, Universities play a key role in unravelling new knowledge, innovation, inventions and technologies that when transferred to our communities become a panacea to improved livelihoods. It is with this in focus that our 3<sup>rd</sup> Annual International Conference was conceived to drive the theme: **“Responding to Emerging Global Challenges through Research, Innovation and Technology for Sustainable Development”**. To achieve our goals, the Conference theme was sliced into the following sub-

themes:

1. Strategies for Promoting Sustainable Agriculture and Food Security During a Pandemic;
2. Economic Survival Through Responsive Entrepreneurship in the Era of Global Disruption;
3. Catalyzing Change for Inclusion and Access to Education During Pandemics;
4. Implications of Climate Change on Sustainable Environmental & Natural Resources Management;
5. Mitigating the Impact of Social and Technological Disruptions in a Global Pandemic;
6. Enhancing Post COVID-19 Recovery Measures in Health, Hospitality and Quality of Life for Sustainable Livelihoods through Science and Technology.

In strict compliance with the COVID-19 protocols, this Conference is taking place virtually and has attracted a wide range of participants from across the globe. Please do accept my heartfelt appreciations for finding time to research, write papers and presentations around our Conference theme. Your participation is indeed a confirmation of your commitment towards making the world a better place to live.

As it has become our tradition, one of the key post-conference activities will be to have papers presented during this Conference, peer reviewed and published in our Machakos University Journal of Science and Technology, besides being published in the Book of Conference Proceedings. I urge you to observe the timelines that will be provided by editor-in-chief.

Lastly, I thank all our sponsors: Konza Technopolis Development Authority, National Bank of Kenya and KCB Bank for their generous support. I also thank fellow Conference Committee members for working around the clock during the preparatory stage. Together we have made this 3<sup>rd</sup> Annual International Conference a success.

I wish you all a happy and exciting conference.

Thank you.

**Prof. Peter N. Mwita, PhD**  
**DEPUTY VICE-CHANCELLOR (RESEARCH, INNOVATION AND LINKAGES) &**  
**CHAIRMAN, CONFERENCE COMMITTEE**

**MEMBERS OF UNIVERSITY MANAGEMENT BOARD**



**Prof. Lucy Irungu**  
Vice-Chancellor



**Prof. Peter N. Mwita**  
Deputy Vice Chancellor  
(Research, Innovation & Linkages)



**Prof. Joyce Agalo**  
Deputy Vice-Chancellor  
(Academic & Students' Affairs)



**Prof. Douglas Shitanda**  
Deputy Vice-Chancellor  
(Administration, Finance & Planning)



**Dr. Wycliffe Amukowa**  
Registrar  
(Research, Innovation & Linkages)



**Prof. Ezara Ondari-Okemwa**  
Registrar  
(Academic & Students' Affairs)



**Dr. Susan Nzioki**  
Registrar  
(Administration & Planning)



**Ms. Aileen Nyatuga**  
Chief,  
Finance Officer

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## CHIEF GUEST-OFFICIAL OPENING



**AMB. SIMON NABUKWESI**

Amb. Simon Nabukwesi is the Principal Secretary, State Department of University Education and Research. He holds a B. Ed, M. Ed. in Education Planning and Management and MA in International Project Management. He is a PhD Candidate in International Project Management. In addition to this, he has a Diploma Level training in Institutional Management from Hiroshima University, Japan and a Pre-university Training from the National Youth Service (1986).

With this training, Simon has had a successful career as a High School Teacher, as a Deputy Principal and Principal in a span of twenty years (1989-2009). He has also served as Kenya's High Commissioner to Canada and Ambassador Plenipotentiary and Extra-ordinary to Cuba. His eleven (11) years of service as a diplomat included being the Director of Foreign Service Institute which he worked to transform into the Foreign Service Academy for training Junior Diplomats, Middle level Diplomats, Senior Diplomats and eight (8) Cohorts of Ambassadors whom he took through induction courses. The Foreign Service Academy served as a soft power tool for the government by training diplomats and ambassadors from the Eastern, Central and Southern Africa in addition to coordination of scholarships from friendly nations. This made members of the Association of Directors of Foreign Service Academies from the IGAD Region to vote Nabukwesi to be their chairperson, from 2016 to 2019 when he left the Academy to head Europe and Commonwealth Directorate in the Ministry of Foreign Affairs.

Amb. Nabukwesi was appointed to the position of Principal Secretary, State Department of University Education and Research with effect from 28<sup>th</sup> February, 2020. He is optimistic about working with all stakeholders to improve University Education and Research.

## CHIEF GUEST~OFFICIAL CLOSING



**PROF. WALTER O. OYAWA**

Prof. Walter Oyawa is a Professor of Civil Engineering, and currently the Director General, National Commission for Science, Technology and Innovation (NACOSTI). He is a holder of a PhD in Civil Engineering, and a holder of Executive MBA. He is a Registered Professional Engineer, a Lead EIA Expert with NEMA and a reviewer of several international journals.

In addition to his current position as Director General of NACOSTI, Prof. Oyawa has served in various senior leadership/management positions including having been the Principal/CEO of Multimedia University College, Deputy Commission Secretary at the Commission for University Education (CUE), pioneering Ag. Principal of the College of Engineering & Technology at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Director of a Research Centre-SMARTEC at JKUAT, Chairman of the Department of Civil Engineering at JKUAT, Board member of several boards, among others. He is endowed with vast experience in research/scholarly work, as evidenced by extensive publications in peer reviewed journals, several awards and research grants, keynote lectures and conference papers, and supervision of numerous postgraduate students. His research interest is in the area of sustainable construction materials and technologies.

## KEYNOTE SPEAKERS



AMB. DR. KIPYEGO CHELUGET

*Assistant Secretary General, Common Market for Eastern and Southern Africa (COMESA)*

Ambassador Dr Kipyego Cheluget was appointed COMESA Assistant Secretary General (Programmes) in November 2012. He has a wide experience in regional organisations, having served as IGAD' Chief Conflict Prevention, Management and Resolution officer in the late 90s before joining the East African Community as Deputy Secretary-General for Projects and Programmes from 2001-2007. Dr Cheluget was formerly Kenya's High Commissioner to Zambia and Malawi and Permanent Representative to COMESA. He is a long serving diplomat. He also served in various capacities at Kenya's Ministry of Foreign Affairs, including as Director, Foreign Service Institute, Asia and Australasia, Middle East, Research and as Deputy Chief of Protocol. He holds a PhD in Political Science and formerly lectured at Moi University. He spoke on: **"The Role of Science, Technology and Innovation in Sustainable Development of Africa"**



PROF. GRACE NJOROGE

*(Deputy Chief Executive Officer- Accreditation, Commission for University Education)*

Professor Grace Njoroge is a Professor of Applied Plant Sciences and currently Deputy Chief Executive, Accreditation at the Commission for University Education. She has over 15 years of senior organizational leadership, providing direction in organizational policy development and implementation. Her vast research work spans from health and food security, nutrition empowerment to utilization of natural resources for communities. Her qualifications include a Ph.D. in Applied Botany from Jomo Kenyatta University of Science and Technology, an MSc from Kenyatta University and Bachelors of Education Degree (Botany & Zoology) from Kenyatta University. She spoke on: **"Responding to Global Educational Challenges and the Quest for Access to Higher Education by Leveraging on Technology in On-line and Blended Learning."**



PROF. GERALD WANGENGE OUMA

*Senior Director: Institutional Planning, Monitoring and Evaluation-University of Pretoria*

Gerald Wangenge Ouma is a Professor of Higher Education and Senior Director: Institutional Planning, Monitoring and Evaluation at the University of Pretoria (UP). Prior to joining UP, he was an Associate Professor of Higher Education at the University of the Western Cape. Prof. Ouma has an extensive publications record, has participated in many higher education initiatives in Africa and internationally, and has served on various ministerial task teams and steering committees on various aspects of financing post-school education in South Africa. He holds a PhD in Higher Education Studies from the University of Cape Town, a Master of Education from Kenyatta University and a Bachelor of Education (First Class Honours) from Kenyatta University. Prof. Ouma spoke on: **"Towards Post-corona Futures: COVID-19, Rapid Digital Transformation and University Responsiveness."**

## GUEST SPEAKERS



**Prof. Bitange Ndemo:** Is an ICT Champion, academician and newspaper columnist. He currently serves as an associate Professor of Entrepreneurship at the University of Nairobi's Business School. He teaches and researches entrepreneurship and research methods, with most of his research work being focused on ICT within small and medium enterprises, and their influence on economic development in Kenya. He was the Guest Speaker for Sub-theme: **Economic Survival Through Responsive Entrepreneurship in the Era of Global Disruption.**



**Prof. Samson Gunga**

Prof. Gunga is a professor of Education and currently the Dean, School of Education, University of Nairobi. Presently, he is a Professor of Philosophy of Education at the University of Nairobi having specialized in the Philosophy of Mathematics Education at Master and Doctor of Philosophy levels through scholarships from Kenyatta University, University of Nairobi and the German Academic Exchange Programme (DAAD). He was the Guest Speaker for Sub-theme: **Catalyzing Change for Inclusion and Access to Education During Pandemics**



**Prof. Richie Moalosi**

Richie Moalosi is a Professor in the Department of Industrial Design and Technology at the University of Botswana. He has over 20 years of teaching experience at the university level. He works with small micro-enterprises, community-based organisations and creative communities to uplift their brands and product or service innovation capabilities as these are considered to be the next engine of economic growth in Botswana and Africa. He was the Guest Speaker for Sub-theme: **Mitigating the Impact of Social Disruptions in a Global Pandemic.**



**Dr. Oliver K. Kirui**

Dr. Oliver Kirui is a Senior Researcher and a Post Doc. fellow at the Centre for Development Research (ZEF) in University of Bonn, Germany. He holds a PhD in Development Economics. Oliver is currently carrying out research that would contribute to sustainable agricultural growth and food and nutrition security in developing and emerging economies. He was the Guest Speaker for Sub-theme: **Strategies for Promoting Sustainable Agriculture and Food Security during a Pandemic.**



**Dr. Pacifica Ogola**

Dr. Pacifica Ogola, is the Ag. Secretary, Climate Change Directorate, Ministry of Environment and Forestry, Republic of Kenya. She is also a PhD Fellow at the UNU Geothermal Training Programme and the University of Iceland She was the Guest Speaker for Sub-theme: **Implications of Climate Change on Sustainable Environmental & Natural Resources Management**



**Dr. Esther Munyiri**

Dr. Munyiri is the Director, Global Tourism Resilience and Crisis Management (GTRCM) at Kenyatta University. She holds First Class Honours in Tourism Management as well as Masters and PhD in Tourism Management. She was the Guest Speaker for Sub-theme: **Enhancing Post-Covid-19 Recovery Measures in Health, Hospitality and Quality of Life for Sustainable Livelihoods through Science and Technology.**

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**OFFICIAL OPENING AND KEYNOTE ADDRESSES**

<b>TIME</b>	<b>DAY 1: TUESDAY 22<sup>ND</sup> JUNE 2021</b>	<b>RESPONSIBILITY</b>
8:00-9.00	Log in and Registration	Secretariat and Committee Members
9.00-10.30	<b>OFFICIAL OPENING CEREMONY</b>	
	Opening Prayer	Dr. Julius Nzeve
	Welcoming Remarks by Prof. Peter Mwita, Deputy Vice-Chancellor (Research, Innovation and Linkages, Machakos University) who invites the Vice-Chancellor Machakos University.	Dr. Wycliffe Amukowa/ Prof. Jones Agwata
	Opening Address by Prof. Lucy Irungu, Vice-Chancellor, Machakos University. The Vice-Chancellor invites Chief Executive Officer, Konza Technopolis Development Authority, Eng. John Tanui to address the Conference	Prof. Peter Mwita, Deputy Vice Chancellor (RIL)
	The Vice-Chancellor invites Chairman Machakos University Council, to address the Conference	Prof. Lucy Irungu, Vice-Chancellor
	The Vice-Chancellor invites the Principal Secretary to address and officially 3 <sup>rd</sup> Machakos University Annual Conference.	Prof. Lucy Irungu, Vice-Chancellor
	<b>SPEECH AND OFFICIAL OPENING OF THE CONFERENCE BY THE CHIEF GUEST, AMB. SIMON NABUKWESI</b>	Prof. Lucy Irungu, Vice-Chancellor
10.30-11.00	<b>PHOTO SESSION &amp; HEALTH BREAK</b>	Dan Mulinge/ Secretariat
11.00-11.30	<b>“The Role of Science, Technology and Innovation in Sustainable Development of Africa”</b> Keynote Address by <b>AMB. DR. KIPYEGO CHELUGET</b> <i>(Assistant Secretary General, Common Market for Eastern and Southern Africa - COMESA)</i>	Prof. Douglas Shitanda Deputy Vice-Chancellor- Administration, Planning and Finance, Machakos University
11.30-12.00	<b>“Responding to Global Educational Challenges and the Quest for Access to Higher Education by Leveraging on Technology in On-line and Blended Learning.”</b> Keynote Address by <b>PROF. GRACE NJOROGE</b> <i>(Deputy Chief Executive Officer- Accreditation, Commission for University Education)</i>	Prof. Joyce Agalo, Deputy Vice-Chancellor- Academics and Student Affairs, , Machakos University
12.00-12.30	<b>“Towards Post-corona Futures: COVID-19, Rapid Digital Transformation and University Responsiveness”</b> Keynote Address by <b>PROF. GERALD WANGENGE OUMA</b>	Prof. Peter Mwita, Deputy Vice-Chancellor (Research, Innovation and Linkages, Machakos University)
12.30-1.00	<b>Plenary (Key Note Speakers)</b>	Prof. Mugendi M’Rithaa/ Prof. Fredrick Ogola
1.00-2.00	<b>LUNCH BREAK</b>	

**SUB-THEME 1: STRATEGIES FOR PROMOTING SUSTAINABLE AGRICULTURE AND FOOD SECURITY DURING A PANDEMIC**

DAY 2: WEDNESDAY, 23 <sup>RD</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM		
<b>MODERATOR:</b> Dr. Elijah Muange <b>SESSION CHAIR:</b> Dr. Marther Ngigi		
<b>GUEST SPEAKER:</b> Dr. Oliver Kirui, Senior Researcher Center for Development Research (ZEF), University of Bonn, Germany		<b>RESPONSIBILITY</b>
<b>TIME</b>	<b>PRESENTER</b>	Session Chair
8:00- 8.30	Log in and Registration	Session Chair
8.30-9.20	Guest Speaker Address and Plenary	<b>Dr. Marther Ngigi</b>
9.20-9.40	Philip Sitienei, Paul Kimurto, Isabel Wagara & Meshack Obonyo: <i>Occurrence of Aflatoxins in Groundnuts (Arachis hypogaea L.): A Case Study of Four Counties in Kenya.</i>	
9.40-10.00	Tomno Rose, Nzeve Julius, Mailu Stephen, Shitanda Douglas and Waswa Fuchaka: <i>Heavy Metal Contamination in Water, Soil and Vegetables in Urban Streams in Machakos Municipality, Kenya</i>	
10.00-10.20	Angelica M. Kimwele, Sophie A. Ochola, Mary N. Mugambi: <i>Implementation and Strategies for Nutritional Improvement of Home-Grown School Feeding Programme in Makueni County, Kenya.</i>	
10.20-10.40	Elijah N. Muange & Marther W. Ngigi: <i>Mixed Farming and its Impact on Food Insecurity and Dietary Quality in the Context of Varying Aridity in Rural Areas of Kenya.</i>	
10.40-11.00	Asige Mmaiti Lawrence & Obushe Dennis Omuse: <i>Effect of Land Utilization Patterns on Food Security in Narok East Sub-County, Narok County, Kenya.</i>	
11.00-11.30	<b>HEALTH BREAK</b>	
11.30-11.50	John Kennedy Musyoka, Hezron Nyarindo Isaboke & Samuel Njiri Ndirangu: <i>Analysis of the Factors Affecting Farm-Level Output of Mangoes among Small-Scale Farmers in Machakos County, Kenya</i>	<b>Dr. Alice Kosgei</b>
11.50-12.10	John Kennedy Musyoka, Hezron Nyarindo Isaboke & Samuel Njiri Ndirangu: <i>Determinants of quantity of Mango supply among small-scale farmers in Machakos County, Kenya.</i>	
12.10-12.30	Judy Wachira, Simon Nguluu and Josphert N. Kimatu: <i>Comparative Growth and Productivity Evaluation of Phoenix Oyster Mushroom (Pleurotus Spp.) on Residual Agro-Waste Substrates in Semi-Arid Lands of Kenya.</i>	
12.30-12.50	Martin Musembi Kasina, Marther Ngigi, Elijah Muange, Alice Kosgei, Julius K. Nzeve, Kioko Hellen Ndinda: <i>Modeling</i>	

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	<i>Production of Oyster Mushroom (Pleurotus ostreatus) for Food and Nutritional Security in Machakos County, Kenya.</i>	
12.50-1.10	<b>Patrick Andati, Eucabeth Majiwa, Marther Ngigi, Robert Mbeche, Josiah Ateka:</b> <i>Determinants of Adoption of Climate-Smart Agricultural Technologies among Smallholder Potato Farmers in Kenya.</i>	
1.10-2.00	<b>LUNCH BREAK</b>	
<b>DAY 3: THURSDAY, 24<sup>TH</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR:</b> Dr. Julius Nzeve <b>SESSION CHAIR:</b> Dr. Elijah Muange		
8.30-8.50	<b>Log in and Registration</b>	Session Chair
8.50-9.10	<b>Samuel O. Okeyo, Hezron N. Isaboke &amp; Samuel N. Ndirangu:</b> <i>Smallholder Farmers' Participation in Groundnuts Production in Siaya County, Kenya: A Socio-Economic Perspective.</i>	<b>Dr. Elijah Muange</b>
9.10-9.30	<b>Ogolla O. Fredrick, Muraya M. Moses, Onyango O. Benson:</b> <i>Tomato Foliar Fungal Disease Prevalence in Agro-ecological Zones of Kirinyaga County, Kenya.</i>	
9.30-9.50	<b>Mogaka M. Onyambu, Muraya M. Moses, Onyango O. Benson, Ong'au, M. Peterson, Ogolla O. Fredrick:</b> <i>Prevalence of Banana Xanthomonas Wilt in Nithi, Tharaka-Nithi County in Kenya.</i>	
9.50-10.05	<b>Paulson Letsholo &amp; Botumile Matake:</b> <i>Sustainable Animal Feeding Production System: A Case Study for a Stand-Alone Animal Feed-Mixer for Rural Subsistence Pastoral Farmers during COVID-19 Pandemic.</i>	
10.05-10.20	<b>Ong'au, M. Peterson, Muraya M. Moses, Onyango O. Benson, Mogaka M. Onyambu, Ogolla O. Fredrick:</b> <i>Occurrence of Bacterial Wilt Pathogen in Soils and Potato Tubers in Runyenjes in Embu County, Kenya.</i>	
<b>DAY 4: FRIDAY, 25<sup>TH</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR:</b> Dr. Elijah Muange <b>SESSION CHAIR:</b> Mr. Martin Kasina		
8:00-8.30	<b>Log in and Registration</b>	Session Chair
8.30-9.20	<b>Thomas Mbogo Mwangi, Samuel Njiri Ndirangu &amp; Hezron Nyarindo Isaboke:</b> <i>Analysis of Tomato Market Diversity among Rural Smallholder Farmers in Kirinyaga County, Kenya.</i>	<b>Mr. Martin Kasina</b>
9.20-9.40	<b>Thomas Mbogo Mwangi, Samuel Njiri Ndirangu &amp; Hezron Nyarindo Isaboke:</b> <i>Profitability of Tomato Production Systems among Smallholder Farmers in Kirinyaga County, Kenya.</i>	
9.40-10.00	<b>Karing'u Kelvin Njuguna, Hezron Nyarindo Isaboke &amp; Samuel Njiri Ndirangu:</b> <i>Smallholders' Choice of Avocado Marketing Channels in Murang'a County, Kenya</i>	
10.00-10.20	<b>Asige Mmaiti Lawrence &amp; Obushe Dennis Omuse:</b> <i>Patterns on Food Security in Narok East Sub-County, Narok County, Kenya.</i>	
10.20-10.40	<b>Christabel N. Muhonja, Eliud N. Wafula, Josiah Kuja, Eddy E. Owaga, Huxley M. Makonde and Julius M. Mathara:</b> <i>Lactic Acid Bacteria from African Fermented Foods: Potential Biological Control Agents for Mycotoxins in Kenya</i>	



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10:40-11:00	<b>Headmound Okari Isoe:</b> <i>Multiple Sophistication Strategy: Flying Beyond Competition Amid Global Disruptions and Radicalised Business Players</i>	
11:00-11:20	<b>Joseph Omondi Oketch, Woshington Okeyo &amp; Timothy Kiruhi:</b> <i>Economic Survival through Responsive Entrepreneurship in the Era of Global Disruption.</i>	
11:20-11:30	<b>HEALTHBREAK</b>	
11:30-11.50	<b>Nyile Erastus Kiswili, Ismail Noor Shale &amp; Anthony Osoro:</b> <i>Supply Chain Leagility and Performance of Humanitarian Aid Organizations in Kenya: Efficient, Effective and Quick Response to Disasters</i>	<b>Dr. Margaret Nganu</b>
11.50-12.10	<b>Evelyn Bosire, Gregory Namusonge &amp; Samson Nyang’au Paul:</b> <i>Influence of Innovativeness on the Performance of Youth-Led Micro and Small Enterprises in Nyanza Region, Kenya</i>	
12.10-12.30	<b>Denish Ateto Matunga, Patrick Karanja Ngugi &amp; Romanus Odhiambo:</b> <i>Relationship between Procurement Audit Practices and Implementation Level of Public Procurement Regulatory Framework in the Devolved Governments in Kenya.</i>	
12.30-12.50	<b>Masaga Barante, Robert Arasa &amp; Susan Nzioki:</b> <i>Risk Management Practices and Performance of Commercial Banks in Kenya</i>	
12:50-1:10	<b>Simon Kamuri:</b> <i>Understanding Pursuing as An Entrepreneurial Competence and The Relationship with Performance of Value-System Actors in Kenya’s Leather Industry</i>	
1:10-2.00	<b>LUNCH BREAK</b>	
2.00-2.20	<b>Benedict Mutinda Kimwaki, Patrick K. Ngugi &amp; Romanus Odhiambo:</b> <i>Relational Behaviour and Performance of Manufacturing Firms in Kenya.</i>	<b>Dr. Ann Kalei</b>
2.20-2.40	<b>Angelyne Muthoni Mwabu &amp; Justus Munyoki:</b> <i>A Critical Review of Literature on Product Differentiation Strategy and Brand Loyalty.</i>	
2.40-3.00	<b>Gatari Catherine Njoki, Noor Ismail &amp; Anthony Osoro:</b> <i>Preferences and Reservations Groups and Performance of State Corporations in Kenya</i>	
<b>DAY 3: THURSDAY, 24<sup>TH</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b>		
<b>MODERATOR: Dr. Susan Nzioki                      SESSION CHAIR: Dr. John Achuora</b>		
<b>TIME</b>	<b>PRESENTER</b>	<b>RESPONSIBILITY</b>
8:00-8.30	Log in and Registration	<b>Session Chair</b>
8.30-9.00	<b>Nderui Ndung’u &amp; Susan Were:</b> <i>Influence of Top Management Support on Procurement Regulatory Compliance Level in Public Universities in Kenya.</i>	<b>Dr. John Achuora</b>
9.00-9.20	<b>Fatuma Ali Rajab, Patrick Karanja Ngugi &amp; David Mburu Kiarie:</b> <i>Influence of Customer Relationship Management on Performance of Manufacturing Firms in Kenya.</i>	



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8:00-8.30	Log in and Registration	Session Chair
8.30-9.00	<b>Margaret Nganu, Margaret Musyoka &amp; Benedict Mutuku:</b> <i>Entrepreneurial Competencies and Performance of Dairy Cooperatives in Machakos County.</i>	<b>Dr. Ann Kalei</b>
9.00-9.20	<b>John Achuora, Robert Arasa &amp; Annfavour Kalei:</b> <i>SMEs' Supply Chain Resilience Reactive Strategies for Sustainable Food Supply during Pandemic Situations: Lessons for Kenya.</i>	
9:20-9:40	<b>Lillian K Nkoroi, Rose Njoroge &amp; Caroline Mutwiri:</b> <i>Knowledge acquisition through business support services and use among tenants to create businesses in selected University Incubation Centres in Kenya.</i>	
9:40-10:00	<b>Emmaboles Rubunda, Gregory S. Namusonge, Oluoch Oluoch:</b> <i>Influence of Trade credit on the Growth of Small and Medium Size Manufacturing Enterprises in Rwanda.</i>	
10:00-10:20	<b>Billiah Maende, Wario Guyo, Romanus Odhiambo:</b> <i>Influence of Communities of Practice on Employee Performance in Public Universities in Kenya.</i>	
10:20-10:40	<b>Polycarp Koome Kubai, Hazel Gachunga, Romanus Odhiambo:</b> <i>Transactional Leadership and Organizational Performance of Private Universities in Kenya.</i>	
10.40-11.00	<b>Dr. Margaret Nganu &amp; Kenneth Gor:</b> <i>Competitive Marketing Competencies of Dairy Cooperatives in Machakos County, Kenya.</i>	

**SUB-THEME 3: CATALYSING CHANGE FOR INCLUSION AND ACCESS TO EDUCATION DURING PANDEMICS**

<b>DAY 1: TUESDAY 22<sup>ND</sup> JUNE 2021: SUB-THEME VIRTUAL PLATFORM</b>		
<b>MODERATOR:</b> Dr. Peter Kibet Koech		<b>SESSION CHAIR:</b> Dr. Richard Kimiti
<b>TIME</b>	<b>PRESENTATION</b>	<b>RESPONSIBILITY</b>
2.00-2.20	<b>Areba George Ngwacho:</b> <i>Reimagining of Basic Education as A Remedy for Catalyzing Change for Inclusion and Access During Pandemics.</i>	Session Chair <b>Dr. Richard Kimiti</b>
2.20-2.40	<b>Billiah Gisore:</b> <i>Catalyzing Change for Inclusion and Access to Education during Pandemics.</i>	
2.40-3.00	<b>Daniel Oduor Onyango &amp; Michaela Mhagama:</b> <i>Contribution of Education Technology to Continuation of Teaching and Learning during Covid-19 Disruption.</i>	
3.00-3.20	<b>Michaela Mhagama &amp; Daniel Oduor Onyango:</b> <i>Covid-19 Pandemic and Implementation of World Bank Supported Education Initiatives in East Africa.</i>	
3:20-3:40	<b>Ariyo Ayodele Oluwakayode:</b> <i>Enhancing Health and Quality of Life: Teenage Pregnancy among Secondary School Students During Covid-19 Pandemic in Akure South Local Government Area Ondo State, Nigeria</i>	

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<b>DAY 2: WEDNESDAY, 23<sup>RD</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b>		
<b>MODERATOR:</b> Dr. Peter Kibet Koech		<b>SESSION CHAIR:</b> Prof. Henry Embeywa
8:00-8.30	Log in and Registration	Session Chair
<b>GUEST SPEAKER:</b> Guest Speaker: Prof. Samson Gunga, Dean, School of Education and Professor of Education, University of Nairobi:		
TIME	PRESENTATION	RESPONSIBILITY
8.30-9.20	<b>Guest Speaker: Prof. Samson Gunga, Dean, School of Education and Professor of Education, University of Nairobi:</b> <i>Resource mobilization through research in Kenya: Identification of online opportunities in higher education during and beyond Covid-19 pandemic</i>	<b>Prof. Henry Embeywa</b>
9.00-9.20	<i>Guest Speaker, Plenary</i>	
9.20-9.40	<b>Kanyi Christopher Munene:</b> <i>Use of Animation in Simplifying the Learning of Abstract Concepts of History and Government in Secondary Schools in Kenya.</i>	
9.40-10.00	<b>Ntimi Mtawa:</b> <i>Re-imagining higher education for social change and inclusion during post Covid-19 pandemic: Lessons from the Human Development and Capability Approach.</i>	
10.00-10.20	<b>Ezekiel Nyambega Omwenga:</b> <i>Problems and Prospects Emanating from Catalyzing Change for Inclusion and Access to Higher Education Institutions in Kenya During Covid-19.</i>	
10.20-10.40	<b>Florence Mmbwanga, Evelyn Etakwa-Simiyu &amp; Geoffrey Maroko:</b> <i>Challenges University Students Face in E-Learning as a Result of the Covid-19 Pandemic</i>	
10.40-11.00	<b>Monica Njeri Gachunga, Patrick Ngugi Karanja, Allan Njogu Kihara:</b> <i>Adoption of Information Communication Technology and Competiveness of TVET Institutions In Kenya.</i>	
11.00-11.30	<b>HEALTH BREAK</b>	
11.30-11.50	<b>Wycliffe Amukowa:</b> <i>Professors in Need of Education</i>	<b>Dr. Pamela Muriungi</b>
11.50-12.10	<b>Lornah C.N. Sirima:</b> <i>Effect of Covid-19 on SN Learners' Access to Training in TVETs.</i>	
12.10-12.30	<b>Peter Kibet Koech &amp; Kang'ara Hannah Wanjiku:</b> <i>Using E-Learning as a Tool of Enhancing Teaching and Learning in University Education: Lessons from Machakos and Chuka Universities.</i>	
12.30-12.50	<b>Bernard K. Rop and Wycliffe H. Namwiba:</b> <i>Evaluation Based Teaching as a Confidence Builder in Good Teaching Practice.</i>	
12:50-1:10	<b>Ezra Ondari Okemwa:</b> <i>Open Access Publishing and Knowledge Production in Sub-Saharan Africa: Opportunities and Challenges</i>	
1:10-2.00	<b>BREAK</b>	
<b>DAY 3: THURSDAY, 24<sup>TH</sup> JUNE, 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b>		
<b>MODERATOR:</b> Dr. Peter Kibet Koech		<b>SESSION CHAIR:</b> Dr. David Mulwa
8.00-8.30	Log in and Registration	Session Chair

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8.30-8.50	<b>Orucho Justine Amadi, Onyiko Kennedy Karani &amp; Joseph Misati:</b> <i>Awareness Level of Pupils on CSA in EMESA Sub Location, Kisii County.</i>	<b>Dr. David Mulwa</b>
8.50-9.10	<b>Elphas Luvaso Aliva:</b> <i>The Effectiveness of Closed-Circuit Television Camera in Management of Discipline in Public Secondary Schools in Kenya.</i>	
9.10-9.30	<b>Pamela K. Muriungi &amp; Mugendi K. M'Rithaa:</b> <i>Universal Design for Learning: Promoting Inclusive Education in An Empathic Manner.</i>	
9.30-9.50	<b>David M. Mulwa &amp; Stephen Munguti:</b> <i>Is Re-Admission Policy of Girls After Teenage Pregnancy in Schools Implementable Without Infringing on the Fundamental Rights of Children in Kenya?</i>	
9.50-10.05	<b>Rose Achieng, Nicholas Anyuor &amp; Joyce Agalo:</b> <i>Taking the Blended Teaching and Learning Journey: Implementation in Higher Education Institutions in Kenya.</i>	
10.05-10.20	<b>Ralitsa D. Debrah, Mugendi K. M'Rithaa &amp; Dick Ng'ambi:</b> <i>Design Courses and the 'New Normal': ePortfolios as a Pedagogic Innovation in Advancing University Education.</i>	
10.20-10.35	<b>Elphas Luvaso Aliva:</b> <i>Education in Emergency: Strategies for Access, Equity and Inclusion During Covid-19 Pandemic in Kenya.</i>	
10.35-10.50	<b>Elphas Luvaso Aliva:</b> <i>School Violence as a Social Problem in Kenya.</i>	
10.50-11.05	<b>Francis Kirimi, Jesca Muthee &amp; Zipporah Gichuhi:</b> <i>Innovative approaches for promoting resilience, inclusion and access to education amidst COVID-19 Pandemics in Kenya.</i>	
11.00-11.30	<b>HEALTH BREAK</b>	
11.30-11.50	<b>Kihara Daniel Wambugu:</b> <i>Appraisal of Education Systems Supporting Vulnerable Children during Covid-19 Disruptions in Public Secondary Schools in Kenya: A Case of Nakuru County.</i>	<b>Dr. David Mulwa</b>
11.50-12.10	<b>Damaris Mwikali Muasa, Fredrick Ogola &amp; Susan Nzioki:</b> <i>Influence of Principal Management Practices of Academic Progress Records on Students' Academic Performance in KCSE in Public Schools in Mashuru Sub-County.</i>	
12.10-12.30	<b>Ariyo Ayodele Oluwakayode, Adelusi Joseph Olusegun &amp; Kareem Sheida Itunu:</b> <i>Enhancing Health and Quality of Life: Teenage Pregnancy among Secondary School Students during Covid-19 Pandemic in Akure South Local Government Area Ondo State, Nigeria.</i>	
12.30-12.50	<b>Henry Etende Embeywa:</b> <i>Mentoring Postgraduate Students on the Use of Meta-Analysis Strategy for Research in Pandemic Times.</i>	
12.50-1.10	<b>Francis Mutua:</b> <i>Relationship between use of assistive technology on student-teacher related factors and performance of VI students in Kiswahili in Public Primary Teachers' Colleges in Kenya</i>	

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1.00-2.00	<b>BREAK</b>	
<b>DAY 4: FRIDAY, 25<sup>TH</sup> JUNE, 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR:</b> Dr. David Mulwa <b>SESSION CHAIR:</b> Dr. Peter Kibet Koech		
8.30-8.50	<i>Log in and Registration</i>	<b>Session Chair</b>
8.50-9.10	<b>Jacob Kyengo Muthoka:</b> <i>Influence of Government-Initiated Strategies on Inclusion of Vulnerable Children in Education During Covid-19 Pandemic in Public Secondary Schools in Nzau Sub-County of Makueni County, Kenya.</i>	<b>Dr. Peter Kibet Koech</b>
9.10-9.30	<b>Jeremiah Osida Onunga:</b> <i>Towards a Virtual Environment for Sharing Curriculum and Research Collaboration among Universities in Kenya during Covid-19 Pandemic.</i>	
9.30-9.50	<b>Kisilu Kombo &amp; Joshua M. Itumo:</b> <i>Covid-19 Pandemic and its Impact on the Lecturers' and Students' Performance at Kenyatta University, Kenya.</i>	
9.50-10.05	<b>Monica Njeri Gachunga, Patrick Ngugi Karanja, Allan Njogu Kihara:</b> <i>Influence of Resource Mobilization on Competiveness of TVET Institutions in Kenya.</i>	
10.05-10.20	<b>Kunga Gathage John, Henry Embeywa &amp; Peter Kibet Koech:</b> <i>The Effects of Inquiry-Based Science Teaching Approach on Task Competence of Secondary School Physics Students in Kitui County, Kenya</i>	
10.20-10.35	<b>Fellis Nthambi Mutune, Geoffrey Maroko &amp; Alice Kiai:</b> <i>Reflection on English Textbook in the Kenyan Classroom.</i>	
10.35-10.50	<b>H.E. Embeywa:</b> <i>Analogies, Scientific Visualization and Scientific Revolution: Implications for a New Pedagogy in Science.</i>	
10.50-11.05	<b>Kimiti Richard Peter:</b> <i>The Impact of Covid-19 Pandemic on the Implementation of the University Curriculum: A Case of Public Universities in South Eastern Kenya.</i>	

**SUB-THEME 4: IMPLICATIONS OF CLIMATE CHANGE ON SUSTAINABLE ENVIRONMENTAL & NATURAL RESOURCES MANAGEMENT**

<b>DAY 2: WEDNESDAY, 23<sup>RD</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR:</b> Dr. Julius Nzeve <b>SESSION CHAIR:</b> Prof. Jones Agwata		<b>RESPONSIBILITY</b>
<b>GUEST SPEAKER:</b> Dr. Pacifica Ogola, Director and Head of Climate Change Directorate, Ministry of Environment & Forestry		
<b>TIME</b>	<b>PRESENTATION</b>	<b>Session Chair</b> <b>Prof. Jones Agwata</b>
8.00-8.30	<b>Log in and Registration</b>	
8.30-9.20	<i>Guest Speaker and Plenary:</i>	
9.20-9.40	<b>Kipkiror Jepkemboi Loice, Kipsang Bernard Rop &amp; Wycliffe Habel Namwiba:</b> <i>The Recurrent Landslides of Lagam Escarpment, Kaben Location, Marakwet East, Kenya.</i>	
9.40-10.00	<b>Nancy Wanjala Barasa, Jones F. Agwata and Robert Kibugi:</b> <i>Influence of Climate Variability on the Livelihoods of Rural Women in Bungoma County, Kenya.</i>	

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10.00-10.20	<b>Steve N. Machan, Jones F. Agwata &amp; Nicholas O. Oguge:</b> <i>Environmental Factors Influencing the Sustenance of Camel Milk Value Chain in Isiolo County, Kenya.</i>		
10.20-10.40	<b>Ezekiel Kemboi, Stephen Anyango, Jones Agwata, Collins Odote:</b> <i>Factors Influencing Resilience of Pastoralists to Drought in Kajiado County, Kenya.</i>		
10.40-11.00	<b>Erick Oluoch Opondo, &amp; Obadia Kyetuza Bishoge:</b> <i>Implications of Climate Change on Sustainable Environmental and Natural Resources Management in Kenya.</i>		
11.00-11.30	<b>HEALTH BREAK</b>		
11.30-11.50	<b>Kinikonda Okemasisi:</b> <i>Implication of Climatic Change on Sustainable Environmental and Natural Resource Management: Individual and Collective Responsibility.</i>	<b>Prof. Jones Agwata</b>	
11.50-12.10	<b>Jones F. Agwata:</b> <i>Reflections on Policies and Institutional Mechanisms for Climate Change Management in Kenya</i>		
12.10-12.30	<b>Josphat M. Gikonyo, Stephen O. Anyango and Jones F. Agwata:</b> <i>Influence of Environmental Programmes on Students' Attitudes and Behavior in Addressing Environmental Issues in Murang'a County, Kenya.</i>		
12.30-12.50	<b>Jones F. Agwata:</b> <i>Potential Challenges of Drought Coping Strategies in Machakos County, Kenya.</i>		
<b>DAY 3: THURSDAY, 24<sup>TH</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR:</b> Dr. Veronica Okello <b>SESSION CHAIR:</b> Dr. Stephen Mailu			<b>Session Chair</b>
8:30-8.40	Log in and Registration		<b>Dr. Stephen Mailu</b>
<b>TIME</b>	<b>PRESENTATION</b>		
8.40-9.00	<b>Moses M. Mwanza, Elizabeth N. Ndunda, Geoffrey O. Bosire, Vincent O. Nyamori &amp; Bice S. Martincigh:</b> <i>Fabrication of Molecularly Imprinted Polymers Based Sensor for Determination of Polychlorinated Biphenyls in the Environment.</i>		
9.00-9.20	<b>Bessy Eva Kathambi &amp; Linda Maryanne Obiero:</b> <i>Implications of Covid-19 on Waste Management and Natural Resources Management in Urban Areas</i>		
9.20-9.40	<b>Bernard Kipsang Rop:</b> <i>Petroleum Synopsis of the North West-Kenya Rifts: Evidence and Issues.</i>		
9.40-10.00	<b>Bonface K. Maweu, Kithaka Samson Chabari &amp; James Kyalo Nguku:</b> <i>Assessment of Selected Physico-Chemical Parameters of Groundwater in Chuka Igambang'ombe Constituency, Kenya.</i>		
10.00-10.20	<b>Elizabeth N. Ndunda &amp; Moses M. Mwanza:</b> <i>Advances in Sensor Technology in Determination of Polychlorinated Biphenyls in the Environment.</i>		
10.20-10.40	<b>A.W. Muia, A. Kimisto &amp; O.O. Donde:</b> <i>Sludge Management Technologies for Sustainable Development: An Overview.</i>		

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10.40-11.00	Ndiritu James, Isaac W. Mwangi, and Jane I. Murungi <sup>3</sup> & Ruth Wanjau: <i>Equilibrium and Kinetics of Adsorption Of P-Nitrophenol (Pnp) From Model Aqueous Solution Using Raw and Quarternis Afrmomomum Melegueta Peels</i>	<b>Dr. Elizabeth Ndunda</b>
11.00-11.30	<b>HEALTH BREAK</b>	
11.30-11.50	Kitulu Linge, Nzeve Julius, Waswa Fuchaka, Kitur Esther & Shitanda Douglas: <i>Heavy Metals and Bacteriological Contamination of Mitheu Stream in Machakos Municipality, Kenya.</i>	
11.50-12.10	Mwalimu K. Musau, Douglas Shitanda, Michael Githinji & Caroline Mwende: <i>Use of PET Flakes as Coarse Aggregates Replacement in Concrete Paving Blocks.</i>	
12.10-12.30	Patrick Owiny, Jones Agwata & Kariuki Muguia: <i>Factors Influencing Public Participation in Environmental Impact Assessment of Nairobi-Thika Superhighway Improvement in Nairobi City County, Kenya.</i>	
12.30-12:50	Mwalimu K. Musau, Douglas Shitanda, Michael Githinji & Caroline Mwende: <i>Use of PET Flakes as Coarse Aggregates Replacement in Concrete Paving Blocks.</i>	

**DAY 4: FRIDAY, 25<sup>TH</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM**  
**MODERATOR:** Dr. Mark Kimathi      **SESSION CHAIR:** Dr. Veronica Okello

TIME	PRESENTATION	RESPONSIBILITY
8:00-8.30	Benson Wangombe Nganga: <i>Solar Water Desalination in a Vacuum of Infinite Volume.</i>	Session Chair <b>Dr. Veronica Okello</b>
8.30-9.20	Japheth M. Nzangya, Elizabeth N. Ndunda, Geoffrey O. Bosire, Bice S. Martincigh & Vincent O. Nyamori: <i>Synthesis of Molecularly Imprinted Polymers and their Application as Adsorbents in the Preconcentration of Polybrominated Diphenyl Ethers.</i>	
9.20-9.40	Gilbert K. Bett, Daniel Olago, Daniel Ichangi <sup>3</sup> and Bernard K. Rop: <i>Geochemical Evaluation for the Hydrocarbon Potential of Source Rocks in the Anza Basin, Kenya</i>	
9.40-10.00	A. Jean-Luc Ayitou: <i>Tailoring Non-linear Light-Initiated Processes for Solar Energy Conversion and Bio-Medical Applications</i>	
10:00-10:20	Michael Musembi: <i>The Effect of Various Fuels on the Yield and Photophysical Properties Zinc Zirconate Perovskite</i>	

**SUB-THEME 5: MITIGATING THE IMPACT OF SOCIAL DISRUPTIONS IN A GLOBAL PANDEMIC**

**DAY 1: TUESDAY 22<sup>ND</sup> JUNE 2021: SUB-THEME VIRTUAL PLATFORM**  
**MODERATOR:** Prof. Geoffrey Maroko      **SESSION CHAIR:** Dr. Larry Ndivo

TIME	PRESENTATION	RESPONSIBILITY
2.00-2.20	Abraham Kiprotich Murgor: & Bernard Kipsang Rop: <i>Origin, Spread and Impact of Islam on Nandi Traditional Religion and Culture: A case of Nandi County, Kenya.</i>	<b>Dr. Larry Ndivo</b>

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2.20-2.40	Joyce Akinyi Akach, Lilac Osanjo & Samuel Maina: <i>Co-Design: Catalyst for Inclusion in the Design Process.</i>	
2.40-3.00	Patrick Kasyula: <i>The contribution of Leadership and Governance in Managing Global Pandemic.</i>	
<b>DAY 2: WEDNESDAY, 23<sup>RD</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR: Dr. Evelyn Etakwa-Simiyu      SESSION CHAIR: Prof. Geoffrey Maroko</b> <b>GUEST SPEAKER: Prof. Richie Moalosi, Professor of Industrial Design, Dept. of Industrial Design &amp; Technology, University of Botswana</b>		
TIME	PRESENTATION	RESPONSIBILITY
8:00-8.30	Arrival, Registration and Entertainment	Session Chair
8.30-9.20	Guest Speaker Address and Plenary	Prof. Geoffrey Maroko
9.20-9.40	Wanyama Ogutu: <i>Proposed Workshop to Investigate the Effect of COVID-19 Pandemic on Children playing with Painting and Clay Modeling.</i>	
9.40-10.00	Wanyama Ogutu: <i>Play with Painting and Clay: A Re-Booth of Psychoanalysis Healing on a Child Affected by Covid-19.</i>	
10.00-10.20	Josephine Obonyo: <i>Mitigating the Impact of Social Disruptions in a Global Pandemic.</i>	
10.20-10.40	Wanjiru J. J. Mugai: <i>Benefits of Psychosocial Interventions on Traumatized Children Living in Difficult Environments in Mbeere North Sub-County.</i>	
10.40-11.00	Geoffrey M. Maroko: <i>Covid-19 is a War: Framing the Pandemic in an Evolving “New Normal.”</i>	
11.00-11.30	<b>HEALTH BREAK</b>	
11.30-11.50	Coletta Ruth Matayo, Lilac A. Osanjo: <i>Craft Design for Improved Livelihoods among Maasai Women in Kenya: A Case of the ‘Love Is’ Project in Kenya</i>	Dr. Larry Ndivo
11.50-12.10	Fellis Nthambi Mutune, Geoffrey Maroko <sup>2</sup> & Alice Kiai: <i>Reflection on English Textbook in the Kenyan classroom.</i>	
12.10-12.30	Geoffrey M. Maroko, Gladys N. Mokuu, Meshack O. Ondora & Augustus O. Nyakundi: <i>Managing HIV/AIDS Amid COVID-19: How to Un-do Things with Words.</i>	
<b>DAY 3: THURSDAY, 24<sup>TH</sup> JUNE, 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b> <b>MODERATOR: Dr. Evelyn Etakwa-Simiyu      SESSION CHAIR: Prof. Geoffrey Maroko</b>		
8.30-8.50	Log in and Registration	Secretariat
8.50-9.10	Orucho Justine Amadi: <i>The Role of a Social Worker in the Mitigation of Child Sexual Abuse in Kisii County</i>	Prof. Geoffrey Maroko
9.10-9.30	Larry Ndivo & Teresia Kaberia: <i>Transgressing Maxims of Politeness: Effects of Combative Language Used During Covid-19 Televised Updates in Kenya.</i>	
9.30-9.50	Justine Amadi Orucho & Orucho Mark Roders: <i>Attitudes, Perception and Effects of Euthanasia on Families in Wetlands in Kenya.</i>	

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9.50-10.10	Orucho Justine Amadi, Onyiko Kennedy Karani & Joseph Misati: <i>A Awareness Level of Pupils on CSA in EMESA Sub-Location, Kisii County.</i>	
<b>SUB-THEME 6: ENHANCING POST-COVID-19 RECOVERY MEASURES IN HEALTH, HOSPITALITY AND QUALITY OF LIFE FOR SUSTAINABLE LIVELIHOODS THROUGH SCIENCE AND TECHNOLOGY</b>		
<b>DAY 2: WEDNESDAY, 23<sup>RD</sup> JUNE 2021 VENUE: SUB-THEME VIRTUAL PLATFORM</b>		
<b>MODERATOR: Consolate Awuor                      SESSION CHAIR: Dr. Alice Nzioka</b>		
8:00-8.20	Log in and Registration	Session Chair
<b>GUEST SPEAKER: Dr. Esther Kagure Munyiri, Director, Global Tourism Resilience and Crisis Management Centre- East Africa, Kenyatta University</b>		
<b>TIME</b>	<b>PRESENTATION</b>	
8.20-8:50	Guest Speaker and Plenary	<b>Dr. Alice Nzioka</b>
8:50-9.10	Rose Achieng & Nicholas Anyuor: <i>Digital Media Strategies and Promotion of Domestic Tourism Post Covid-19: A Case of Western Circuit.</i>	
9.10-9.30	Antoneta Njeri Kariru & David Mwangi Ndungu: <i>Strategies to Overcome Damages Caused by Covid-19 in the Hotel Industry.</i>	
9.30-9.50	Winnifred Nduta, Ruth Kimanzi & Thomas Kilonzo.: <i>Covid-19 Recovery Strategies in the Hospitality &amp; Tourism Sector.</i>	
9.50-10.10	Janet K. Malla, Sophie Ochola, Irene A. Ogada & Ann Munyaka: <i>A Review of Dietary Intake and Nutritional Status of Children with Cerebral Palsy in Nairobi County.</i>	
10.10-10.30	Ginn Assibey Bonsu: <i>Cooking During the Covid-19 Pandemic in Africa: a Reverse Design Thinking Assessment.</i>	
10.30-10:50	Maré and Mugendi K. M'rithaa: <i>The Influence of Behaviour Centred Design Approaches on The Flame-Based Cookstove-Related Health and Wellbeing of Indigent South African Households</i>	
10:50-11:10	Mbaabu Silas Muguna, Tarsila Kibaara and Paul Maku Gichohi: <i>Effectiveness of NHIF in addressing Students' Healthcare in Public Secondary Schools in Meru County, Kenya</i>	
11:10-11:30	L. Rotich & S. Boit: <i>Effect of Mission Culture on Performance of Selected 5-Star Chain Affiliated Hotels in Kenya</i>	

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**CLOSING CEREMONY: VENUE: VIRTUAL PLATFORM**

<b>TIME</b>	<b>DAY 5: FRIDAY, 25<sup>TH</sup> JUNE 2021</b>	<b>RESPONSIBILITY</b>
11:30-12:00	Assembling	Dr. Wycliffe Amukowa
12:00-1:00	<b>OFFICIAL CLOSING PROGRAMME</b>	
	Conference Recap and Ways Forward: Prof. Mugendi K. M'Rithaa	Prof. Henry Embeywa
	Closing Remarks by Prof. Peter Mwita (DVC- Research, Innovation and Linkages, Machakos University)	Prof. Peter Mwita, DVC-RIL, MksU
	Closing Address, Prof. Lucy Irungu (Vice-Chancellor, Machakos University)	Prof. Lucy Irungu, VC, MksU
	<b>SPEECH AND OFFICIAL CLOSING OF THE CONFERENCE BY THE CHIEF GUEST, PROF. WALTER OYAWA</b>	
1.00	<b>PHOTO SESSION</b>	

Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021,  
Machakos University, Kenya



*The vice-Chancellor, Prof. Lucy Irungu welcomes you to Machakos University*

Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021,  
Machakos University, Kenya



**SUBTHEME 1: STRATEGIES FOR PROMOTING  
SUSTAINABLE AGRICULTURE AAND FOOD SECURITY  
DURING A PANDEMIC**

**Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021,  
Machakos University, Kenya**



*Machakos University supports agricultural technology transfer. In this photo, Deputy Vice-Chancellor was Chief Guest during the Machakos County 2019-ASK Show*

## Mixed Farming and its Impact on Food Insecurity and Dietary Quality in the Context of Varying Aridity in Rural Areas of Kenya

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### Abstract

Sustainability in agricultural production is key in ensuring food and nutrition security. Mixed farming has been touted as one of the farming systems for enhancing this sustainability. However, there is limited evidence on the effects of mixed farming on different indicators of food insecurity under different biophysical environments. This study investigates the impact of mixed farming on food insecurity and dietary quality in areas with varying degrees of aridity using nationally representative data from 10,817 households extracted from the Kenya Integrated Household Budget Survey 2015/2016. The study uses Food Insecurity Experience Scale (FIES) framework and household dietary diversity score (HDDS) to assess food insecurity and dietary quality, respectively. We applied matching techniques to estimate impacts. Our results show that food insecurity prevails, with mild food insecurity being the most prevalent, followed by moderate and severe levels. Food insecurity differs across the aridity gradient, increasing from the Non-ASAL to the Arid counties. Mixed farming reduced severe food insecurity in all areas, but impact of mixed farming on moderate and mild food insecurity varied with degree of aridity: in the Non-ASAL and Arid areas, all levels of food insecurity reduced for mixed farming adopters, while in Marginally semiarid areas, moderate and severe food insecurity reduced. In Largely semiarid areas, mixed farming reduced only severe food insecurity. The study further found that mixed farming increased overall HDDS, implying improvement in dietary quality, with the largest impact being in the drier areas. Our findings suggest that policymakers should support agro-pastoralists to scale up mixed crop-livestock farming as a strategy to sustainably improve food security and dietary quality.

**Key words:** *Mixed farming, Food Insecurity, Dietary quality, FIES, Aridity, Matching techniques.*

### 1. Introduction

There is increasing food insecurity globally that can be attributed to among others, stagnant agricultural productivity, climate change risk, the rising population, and degraded soil quality (Fraval et al., 2019; Bjornlund et al., 2020; Giller, 2020). Recent projections showed that the number of hungry people would hit 840 million by 2030, and the number of undernourished individuals 132 million by 2020 (FAO et al., 2020). This impedes achievement of the United Nations Sustainable Development Goal 2 (SDG 2) that proposes to end hunger and improve nutrition by 2030, as well as the African Union's Agenda 2063 (72(e)) that aims to eliminate hunger and food insecurity (African Union Commission, 2015; UN General Assembly, 2015).

Sustainable agriculture is essential for reducing hunger and malnutrition since about 70% of households depend on agriculture as their main source of livelihood. A high proportion of food in Africa is produced by smallholders farmers, yet they are the most susceptible to food insecurity, malnutrition and poverty (Fanzo, 2018). In fact, much of the discussion in SDG 2 focuses on Africa, which has the highest prevalence of undernourishment among all regions (19.1%), and twice the world average of 8.9% (FAO et al., 2020). Smallholder farmers provide a critical pathway for agricultural orientated interventions to improve food and nutrition security (Fanzo, 2018; Fraval et al., 2019).

Due to rainfall variability that makes farming unpredictable, and degrading natural resources like soils, smallholder farmers adopt farming systems that minimize risk (Bjornlund et al., 2020) under varying biophysical conditions. The type of farming system is dictated by the amount, timing and rainfall distribution and other agro-ecological conditions. This drives the preference for specialized systems (either crop or livestock systems), agro-pastoral systems based on aridity status and mixed crop-livestock systems in higher rainfall zones. However, due to climate change risk, farmers have adopted diversified agricultural systems as a risk minimizing strategy, to build resilient systems and to improve food security (Thornton & Herrero, 2014; Ngigi et al., 2020).

Mixed farming is one of the systems that can enhance both productivity and sustainability of food and agricultural production (Sneessens et al., 2016). Literature cites numerous benefits of mixed farming as compared to specialized crop or livestock enterprises. For instance, crop residues are used as animal feeds; animal manure could be used to fertilize soils and provide nutrients to crops; water and family labor are used more efficiently; and farm risks are spread over multiple crop and livestock enterprises (Wright et al., 2012; Thornton & Herrero, 2014). These and other benefits confer sustainability and resilience to farming systems especially in the advent of climate change. A study by de Moraes et al. (2014) showed that mixed systems not only led to environmental gains and ecological intensification but also increased yield and income of farmers, as compared to specialized or non-integrated livestock farming in Brazil. Similarly, Bell et al., (2014) showed that crop-livestock integration systems improve farm risk management, increase both crop and livestock productivity and reduce the cost of inputs such as inorganic fertilizers and animal feeds in Australia. Despite the documented advantages of mixed systems, largely crop or livestock farming systems are still widely practised (Ryschawy et al., 2012; Wright et al., 2012; Shahbaz et al., 2017).

Mixed farming is promoted as a key strategy in climate-smart agriculture (FAO, 2013) and is increasingly attracting the attention of researchers. Several studies have assessed the linkages between mixed farming systems and food and nutrition security but the findings are largely mixed. For instance, the study by Parvathi et al (2018) in Lao PDR found that while overall farm production diversity increased dietary quality through dietary diversification, mixed crop-livestock farming resulted in reduced diversity of household diets. Further, Musemwa et al., (2018) investigated the implications of farming and non-farming activities on food consumption and dietary quality in the Eastern Cape Province of South Africa, and found that while household dietary diversity (HDDS) of farmers practising mixed farming was significantly higher than that of non-farmers, it did not differ significantly with that of farm households specializing in crop or livestock farming systems. More recently, Mee et al., (2020) reported from their study in Myanmar's Yamethin District that households practising mixed farming recorded moderate food availability and low food utilization compared to those practising monoculture, which had low food availability and moderate food utilization. There was no difference in food access, with both farming systems reporting high food access.

We complement these studies by investigating the impact of mixed farming on food insecurity and dietary quality in the context of different biophysical environments with varying degrees of aridity using nationally representative data from rural areas of Kenya, where farming is the dominant source of livelihood. Aridity is a key constraint agricultural production (Bannayan et al., 2010; Murray, 2016; Goparaju & Ahmad, 2019), especially where agriculture is largely rain-fed. About 70% of Kenyans live in rural areas where they primarily engage in farming as the main economic activity. Kenya's pursuit of food and nutrition security especially in rural areas is challenged by the biophysical environment under which agricultural production is practised. Over 80% of the country's land area is classified as Arid and Semi-Arid Lands (ASALs), with significant crop and livestock farming activities (ASAL-APRP, 2016). However, low levels of agricultural productivity and high levels of poverty, food insecurity and malnutrition abound in these areas (FAO, 2020). Kenya has embraced climate smart agriculture that promotes mixed farming, but there are no

rigorous studies investigating whether and how impacts of mixed farming could be influenced by the biophysical environment. Hence, it remains largely unknown if impacts of this farming system would be beneficial across all environments. The purpose of this study therefore, is to assess impacts of mixed farming on food security and dietary quality among rural households in different biophysical environments characterized by varying degrees of aridity. The study hypothesizes that environmental differences influence food security and dietary quality impacts of mixed farming.

## 2. Methodology

### 2.1. Analytical Framework

The study adopts an impact evaluation framework that compares food security and dietary quality outcomes for mixed farming practitioners (adopters) against those of non-practitioners (non-adopters). Under this framework, mixed farming practice is considered to be a *treatment* ( $T$ ). Consequently, adopters of mixed farming are considered to be treated and therefore referred to as the *treated group* ( $T = 1$ ) while non-adopters are untreated and hence the *control group* ( $T = 0$ ). Impact of mixed farming can be thought of as the difference in the average value of the outcome variable between the treated and control groups (*average treatment effect, ATE*), computed as  $ATE = E[Y_i|T_i = 1] - E[Y_i|T_i = 0]$ , where  $E[Y_i|T_i = 1]$  is the average value of outcome variable for the treated group and  $E[Y_i|T_i = 0]$  is the average value of outcome variable for the control group. However, deriving the treatment effect directly in this manner is erroneous because assignment of households into mixed farming adopters and non-adopters was not random, but dependent on socioeconomic factors (Wu et al., 2010). Hence, the treatment effect computed would be under- or over-estimated due to *selection bias* (Angrist & Pischke, 2009).

To correct for potential selection bias, we used a non-parametric method known as propensity score matching (PSM) (Rosenbaum & Rubin, 1983). PSM enabled us to construct a group of households that did not practise mixed farming (control or counterfactual group) which is comparable to households that practised mixed farming (treatment or treated group). PSM was implemented by first computing a propensity score, equivalent to the probability that a household practised mixed farming, using a Logit model. Next, we used nearest neighbor matching algorithm (5 neighbors with a caliper of 0.2) to construct the treatment and control groups within the region of common support (Caliendo & Kopeinig, 2008). To assess the quality of matching, we tested for balancing of covariates using Stata's *pstest* command. Finally, impact of mixed farming was computed as the average treatment effect on the treated (*ATT*), by taking the difference in outcome variables (food insecurity variables described in 2.4.2 and dietary quality variable, HDDS, described in 2.4.3) between adopters and nonadopters of mixed farming in the matched sample. Separate PSM models were implemented for the non-ASAL, Marginally Semiarid, Largely Semiarid and Arid regions.

### 2.2. Study Area

Kenya's land mass is approximately 569,140 square kilometres (FAO, 2015). Of this area, ASALs occupy more than 80% and are residence to about 36% of the country's population, according to the country's Ministry of Devolution and the ASALs (2021). The country is administratively divided into 47 Counties, of which 18 are classified as non-ASALs and 29 as ASALs but with different degrees of aridity (see Figure 1)<sup>1</sup>. Among the ASAL Counties, 8 are

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<sup>1</sup> From figure 1, the **arid counties** are Garissa, Isiolo, Mandera, Marsabit, Samburu, Tana River, Turkana and Wajir; the **Largely Semiarid Counties** include Baringo, Embu, Kajiado, Kilifi, Kitui, Kwale, Laikipia, Machakos, Makueni, Meru, Taita Taveta, Tharaka Nithi and West Pokot, while the **Marginally semiarid Counties** are Elgeyo Marakwet, Homa Bay, Kiambu, Lamu, Migori, Nakuru, Narok and Nyeri. The **Non-ASAL**

arid (85-100% aridity), 8 are marginally semiarid (10-29% aridity) and 13 largely semiarid (30-84% aridity). Agriculture is the mainstay of the country, with different crop and livestock species being raised in each of the biophysical environments according to their adaptability.

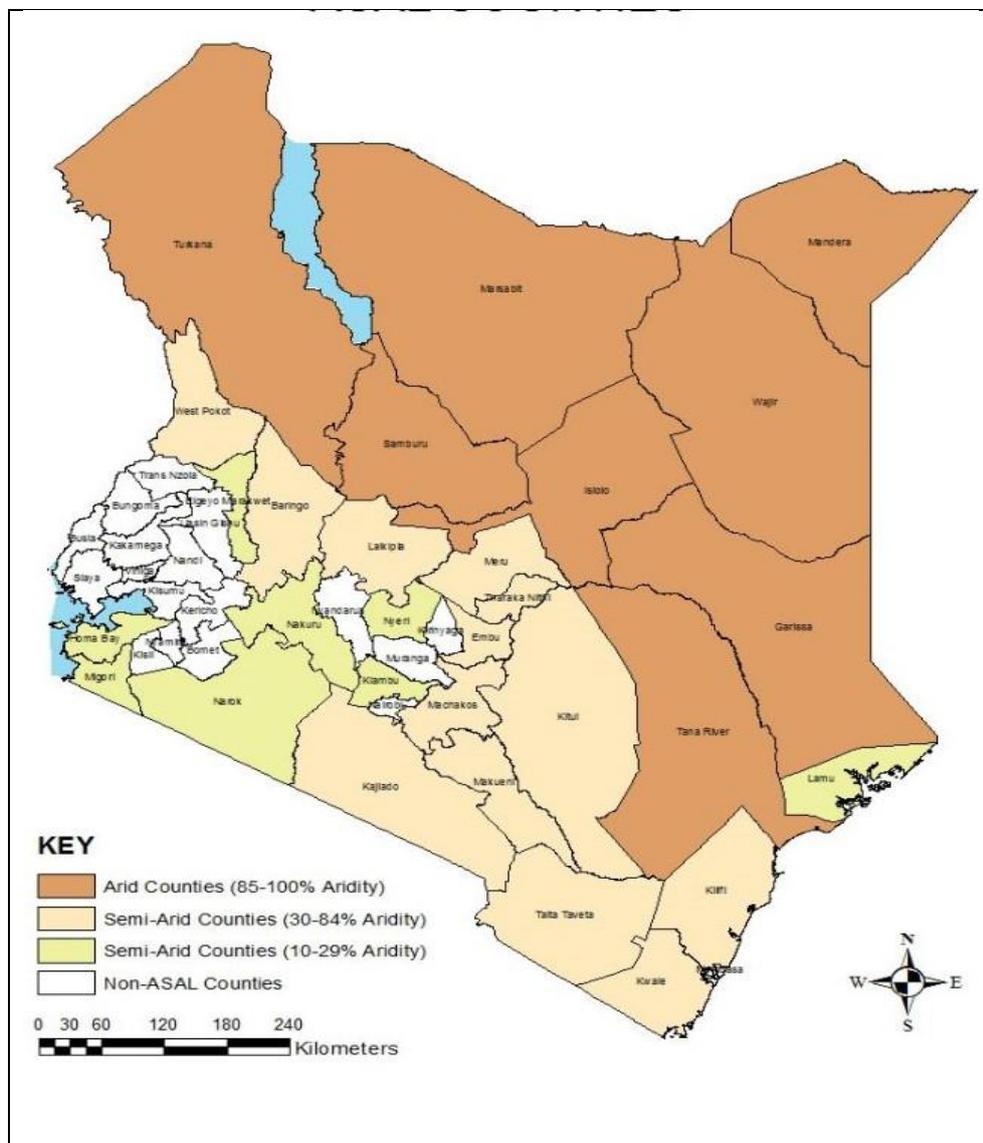


Figure 1: Map of Kenya showing degree of aridity by Counties

### 2.3. Data

This paper uses data from the Kenya Integrated Household Budget Survey 2015/2016, collected by the Kenya National Bureau of Statistics (Kenya National Bureau of Statistics, 2018). A stratified two-stage cluster sampling was used to select households for the survey from the all the 47 Kenyan counties. Data was collected from rural and urban strata in each county except Nairobi and Mombasa which are entirely urban counties. A total of 2,388 clusters were selected in the first stage of sampling, from which 10 households per cluster were selected in the second stage, making a final sample size of 21,773 households. Data was collected at both household and individual level (where applicable), on variables such as household demographic characteristics, housing conditions, education levels, household

**Counties comprise of** Bomet, Bungoma, Busia, Kakamega, Kericho, Kirinyaga, Kisii, Kisumu, Mombasa, Murang'a, Nairobi, Nyamira, Nyandarua, Nandi, Siaya, Transzoia, Uasin Gishu and Vihiga.

income and credit, ownership and use of information and communication technologies, farming activities and food and non-food consumption expenditure, among others. This study considered 10,817 rural households with adults aged 20 years or older, that had been used to analyze overnutrition among Kenyan adults (Muange & Ngigi, 2021). Distribution of the sampled households by ASALs category is shown in Table 1.

Table 1: Distribution of sampled households

<b>Aridity Category</b>	<b>No. of households</b>	<b>% of households</b>
Arid (85%-100% aridity)	1,599	14.8
Semiarid (30-84% aridity) – largely semiarid	3,207	29.6
Semiarid (10-29% aridity) – marginally semiarid	1,744	16.1
Non-ASAL	4,267	39.4
<b>Total</b>	<b>10,817</b>	<b>100.0</b>

## 2.4. Measurement of key variables

### 2.4.1. Mixed farming

Mixed farming, the practice of managing different kinds of crops and/or livestock by the same farmers, exists in different forms as highlighted by (FAO, 2001). In this study, households were asked to state if they practised crop or livestock farming during the 12 months preceding the survey and if so, the main crops grown and type and number of livestock kept. A household that had cultivated at least one crop and raised at least one livestock type was considered to have practised mixed farming.

### 2.4.2. Food insecurity

Food security is achieved when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life” (FAO, 2009). Food security is multidimensional, with one vital dimension being steady economic access to sufficient and quality food. Our study focused on this dimension and measured it using Food Insecurity Experience Scale (FIES) approach developed by the Food and Agriculture Organization of the United Nations (Ballard et al., 2013; FAO, 2017; Nord et al., 2016). FIES data is collected either from individual or household levels for a recall period of 30 days or 12 months and the approach is increasingly being applied in SSA (Wambogo et al., 2018). Following the FIES approach, we measured the severity of food insecurity based on economic access using eight questions with binary responses (Yes/ No) to capture self-reported experience of food insecurity and the perceived severity of food insecurity experienced over a 12 months period, as shown in Table 2.

Table 2: Food Insecurity Experience Scale questions and severity of food insecurity measured

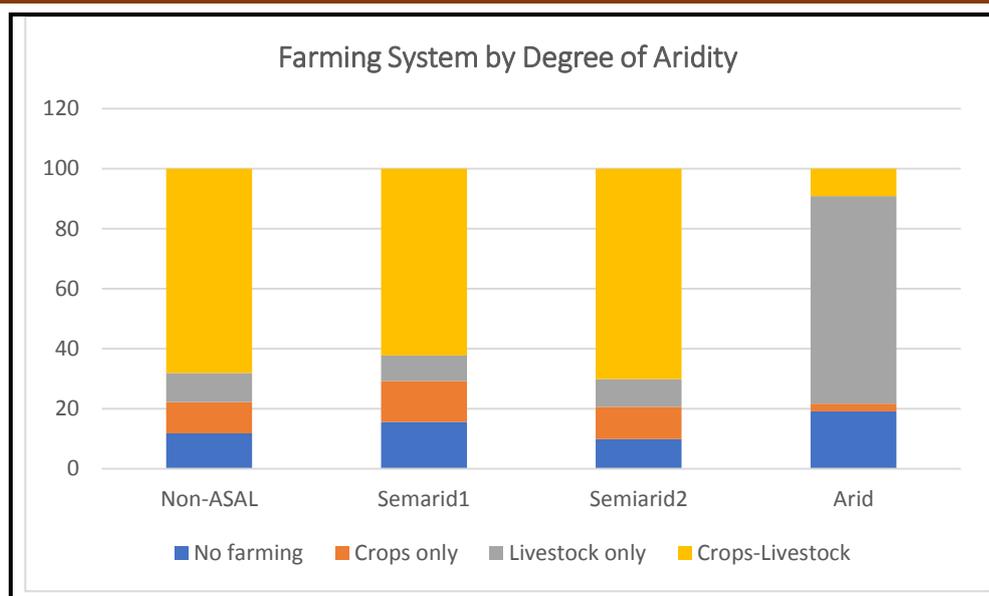
S/No	Question	Label	Severity of food insecurity
1.	In the last 12 months, did you worry that your household would not have enough food?	WORRIED	Mild
2.	In the last 12 months were you or any household member not able to eat the kinds of food you preferred because of lack of money?	HEALTHY	
3.	In the last 12 months, did you or any household member eat fewer kinds of food due to lack of money or other resources?	FEWFOODS	
4.	In the last 12 months, did you or any household member miss a meal because of lack of money or other resources to obtain food?	SKIPPED	Moderate
5.	In the last 12 months, did you or any other household member eat less than you thought you should because of lack of money or other resources?	ATELESS	
6.	In the last 12 months, did your household run out of food because of lack of money or other resources?	RUNOUT	
7.	In the last 12 months, were you or any other household member hungry but did not eat because of lack of money or other resources?	HUNGRY	Severe
8.	In the last 12 months, did you or any household member go without food for a whole day because of lack of money or other resources?	WHOLEDAY	

### 2.4.3. Dietary quality

We measured dietary quality using a household dietary diversity score (HDDS). Dietary diversity is a qualitative measure of access to a variety of foods, a good indicator of nutrient adequacy and extent to which households follow recommend nutritional practices, and a possible remedy to malnutrition (Torheim et al., 2004; FAO et al., 2019). HDDS was computed as a count of food groups consumed by the household during a 7-day recall period preceding the survey. We used the 12 groups of foods recommended by FAO and others to calculate the HDDS (Kennedy et al., 2011). The 12 groups are: cereals; white tubers and roots; vegetables; fruits; meat; eggs; fish and other seafood; legumes, nuts and seeds; milk and milk products; oils and fats; sweets; and spices, condiments, and beverages.

### 2.5. Characteristics of the sample

From the 10,817 rural households in our sample, 59.9% practised mixed farming. Further analysis revealed that mixed farming was practised by 9.9% of households in the *Arid* areas 70.8% of households in the *Largely Semiarid* areas, 62.8% of households in the *Marginally Semiarid* areas and 69.3% of the *Non-ASAL* households (Figure 2). The data shows that *Arid* areas of Kenya are least diversified in terms of crop-livestock mixed farming despite being highly risky for agricultural production. This could be explained by lack of adequate rainfall to sustain crop production in these areas. Surprisingly, the *non-ASAL* areas, despite having most conducive physical environment for farming, have high levels of mixed farming just like the *Largely Semiarid* areas that have unreliable rainfall.



Note: Semiarid1 = Marginally Semiarid; Semiarid2 = Largely Semiarid  
Figure 2: Farming System by Level of Aridity

Our data also reveals that overall, HDDS averaged at 8.74 out of 12 food groups, representing 72.83%. HDDS was highest in the *Marginally Semiarid* (9.23), followed by *Non-ASAL* (9.17), *Largely Semiarid* (8.90) and *Arid* areas (6.74). As shown in Table 3, HDDS differed across the degree of aridity and significantly between households practising and those not practising mixed farming, at 1% significant levels. This indicates that across the aridity gradient, mixed farming households consumed higher quality diets than those specializing in crop or livestock production.

Table 3: HDDS by mixed farming and degree of aridity

Variable	Practised Mixed Farming	Arid	Largely semiarid	Marginally Semiarid	Non_ASAL	All
HDDS						
	Yes	7.86	9.10	9.39	9.35	9.24
	No	6.23	8.42	8.98	8.75	8.01
	Difference	1.23***	0.68***	0.41***	0.60***	1.23***

Other characteristics of the sample (Table 4) show that a large proportion of the households had formal education, with just 25.8% having no formal education. About 70.4% of the respondents were married and 39.5% households were female-headed. Most household heads (96.8%) were religious, subscribing to different religions and denominations. The proportion of households owning mobile phone, television set, computer, and internet connection was 73.9%, 12.8%, 2.1% and 13.6% respectively. Distance from homestead to main road averaged at 57.1 km. Besides, the per capita annual non-food expenditure was KES 34,788 and mean number of rooms in main house (capturing wealth status of the households) was 2.3. As can be seen in Table 4, adopters and non-adopters of mixed farming differed significantly in all but two socioeconomic variables, implying lack of random assignment into adopters and non-adopters of the farming system.

Table 4: Description and characteristics of the sample

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Variable	Description	Adopters of mixed farming	Non-adopters of mixed farming	Sample
Education	Level of formal education completed			
None	No formal education (%)	16.48	39.72***	25.79
Primary	Primary school including pre-primary (%)	55.92	37.99***	48.74
Post primary	Secondary school and post primary school vocational training (%)	25.07	23.78***	18.79
College	Post-secondary certificate/diploma (%)	6.12	9.15***	5.22
University	Undergraduate/postgraduate degree (%)	1.78	4.71***	1.45
Married	Household head is married (%)	74.22	64.64***	70.38
Female	Household is female-headed (%)	36.93	43.07***	39.39
Mobile	Household owns mobile phone (%)	78.86	66.51***	73.91
TV	Household owns a television set (%)	15.39	9.04***	12.84
Computer	Household owns a computer (%)	2.02	2.17	2.08
Internet	Household has internet connection of any type (%)	15.45	10.77***	13.58
Religion				
None	Household head has no religious beliefs (%)	3.01	3.39	3.16
Catholic	Household head subscribes to Catholic faith (%)	23.90	22.12**	23.19
Protestant	Household head belongs to a protestant church (%)	55.66	39.79***	49.30
Other_christ	Household head belongs to another Christian denomination (%)	12.76	9.04***	11.27
Muslim	Household head subscribes to Islamic religion (%)	3.47	23.41***	11.46
Other	Household head subscribes to other religions (%)	1.20	2.24***	1.62
Age	Age of household head (years)	49.52	44.42***	16.08
Hhsize	Household size (number of members)	4.84	4.14***	2.52
Distance	Distance from homestead to main road (km)	14.54	68.68***	57.07
Expenditure	Per capita annual non-food expenditure (KSh)	35,478	33,756	34,788
Rooms	Number of habitable rooms in main house	2.65	1.78***	1.26

\*\*, \*\*\* Figure differs significantly from that of adopters at 5% and 1% level of significance, respectively

### 3. Results and discussion

#### 3.1. Descriptive statistics of food insecurity variables

We begin the presentation of study results by describing the severity of food insecurity as captured by the FIES questions (Table 5). The results show that overall, mild food insecurity was experienced by 65% to 72% of households, while moderate and severe food insecurity were experienced by 50%-61% and 28%-44% of households, respectively, depending on the question used to capture food insecurity experience. This implies that mild level of food insecurity was the most prevalent, followed by moderate and severe levels, respectively. Food insecurity experiences differed across the aridity gradient, increasing from the non-ASAL counties to the arid counties. Chi-square tests on all the FIES questions showed significant differences across regions, implying food insecurity experiences differed along the aridity gradient. In the largely semiarid and arid counties, food insecurity of mild, moderate and severe forms was experienced by more than 50% of the sampled households. These results show that there is still a long way to go in achieving zero hunger and food insecurity in Kenya, more so in the drier regions.

Table 5: Descriptive statistics of food insecurity experience by aridity

Variable	All	Non ASAL	Marginally Semi-arid	Largely Semi-arid	Arid
WORRIED	65.1	61.16	63.30	65.61	76.55
HEALTHY	71.9	69.08	72.08	73.06	77.22
FEWFOODS	68.5	65.07	66.34	70.57	76.11
SKIPPED	52.5	46.87	40.25	57.93	70.00
ATELESS	61.0	57.71	57.05	62.08	71.86
RANOUT	50.1	45.57	41.57	52.47	66.77
HUNGRY	44.1	39.08	35.89	46.54	61.85
WHLDAY	27.6	17.77	19.32	31.93	54.22

### 3.2. Impacts of mixed farming on food insecurity and dietary quality

Mixed farming impacts were estimated using the propensity score matching approach described in Section 2.1 above. Our analysis confirmed that adoption of mixed farming was indeed not random, but significantly influenced by the covariates described in Table 4, among others. As we show in Table 6, the pseudo-R-squared for the unmatched samples ranged from 0.14 to 0.25 in all models, implying that the variables explained well the probability of that a household practised mixed farming. After matching, the pseudo-R-squared fell to between 0.01 and 0.02, implying poor explanation of the probability of practising mixed farming, by the covariates. In addition, the mean bias reduced by between 72.8% and 90.6%, while the median bias also reduced by between 50.5% and 90.2%, implying that matching resulted in significant balancing of the observed covariates between the adopters and non-adopters of mixed farming. For brevity, we omit the results of the models used to compute propensity scores, and of the tests used to check the balancing of individual covariates before and after matching.

Table 6: PSM diagnostics – checking the quality of matching

	All		Arid		Largely semi-arid		Marginally semi-arid		Non-ASAL	
	UM	M	UM	M	UM	M	UM	M	UM	M
Pseudo R <sup>2</sup>	0.25	0.01	0.18	0.01	0.25	0.02	0.18	0.02	0.14	0.01
LR chi2	3690.30	94.27	174.87	2.99	972.01	113.57	421.96	56.78	742.63	82.01
Reduction in Mean Bias (%)	90.63		87.35		72.84		68.48		68.52	
Reduction in Median Bias (%)	90.21		87.00		50.52		65.85		62.96	

Note: UM – Unmatched (Before matching); M – Matched (After matching)

Results of PSM, showing impact of mixed farming on food insecurity and dietary quality, are presented in in Table 7. The results show at the national level (model 1), mixed farming reduced food insecurity experience at the mild, moderate and severe levels. The greatest reduction was in the severe level (7.5-8.4 percentage points) followed by moderate (4.4-6.6 percentage points) and mild (3.0-4.1 percentage points) levels. Disaggregated results show that mixed farming had significant negative impact on mild food insecurity experience mostly in the non-ASAL areas. Further, mixed farming reduced moderate food insecurity experience significantly in the Arid, Marginally semi-arid and Non-ASAL areas, but not in the Largely semi-arid areas, with larger impacts estimated in the Arid and Marginally semi-arid areas than in the Non-ASAL areas. Furthermore, mixed farming reduced food insecurity experience at severe levels in all areas across the aridity gradient. Reduction in the proportion of households experiencing hunger ranged from 6.6 percentage points in the Largely semi-arid areas to 10.4 percentage points in the Non-ASAL areas, while the decline in the proportion of households going without food for the whole day ranged from 5.5 percentage points in the Arid areas to 10.7 percentage points in the Largely semi-arid areas.

These results imply that while adoption of mixed farming by households would reduce severe food insecurity experience in all areas regardless of degree of aridity, impact on moderate and mild food insecurity depends on degree of aridity. The results show that while in the Non-ASAL and Arid areas, mixed farming reduces all levels of food insecurity experience, it only reduces moderate and severe food insecurity experience in Marginally semiarid areas, and severe food insecurity experience in the Largely semiarid areas.

Further results show that, mixed farming increased overall HDDS by 0.374, implying an improvement in dietary quality. Disaggregated analysis reveals that the largest impact was in the Arid areas (0.485), followed by the largely semi-arid areas (0.443), Non-ASALs (0.372) and Marginally semiarid areas (0.248). The results imply that the impact of mixed farming on dietary quality was largest in the drier regions of the country.

Table 7: PSM results – Impact of mixed farming on food insecurity and dietary quality

Variable	All (1)	Arid (2)	Largely semiarid (3)	Marginally semiarid (4)	Non- ASALs (5)
WORRIED	-3.24**	-7.77*	-4.34	-4.59	-3.43
HEALTHY	-3.00**	-4.33	-3.30	-2.94	-1.94
FEWFOODS	-4.12***	-5.99	-4.80	-4.99	-4.33**
SKIPPED	-6.62***	-9.94**	-4.38	-10.64***	-6.86***
ATELESS	-4.43***	-9.04**	-2.51	-7.31**	-3.40
RANOUT	-4.40***	-5.61	-4.41	-7.42**	-5.32**
HUNGRY	-7.46***	-8.79*	-6.61**	-9.89***	-10.41***
WHLDAY	-8.35***	-5.48	-10.72***	-9.89***	-8.73***
HDDS	0.374***	0.485**	0.443***	0.248*	0.372***

\*, \*\*, \*\*\* ATT is significant at 10%, 5% and 1% level, respectively

#### 4. Discussion

This paper investigated the impact of mixed farming on food insecurity and dietary quality in the context of different biophysical environments with varying degrees of aridity. The paper provides novel findings that mixed farming reduced severity of food insecurity as measured by FIES and improved HDDS hence dietary quality. Mild food insecurity was found to be the most prevalent, followed by moderate and severe levels. The severity of food insecurity increased with the degree of aridity and was highest for the Largely semiarid and Arid areas. Mutea et al. (2019) similarly showed that in Kenya the type of agro-ecological zone significantly influences household food security. However, their study indicated that households in non-ASAL areas (humid agro-ecological zone) were less food secure than those in semi-humid and semi-arid zones.

Further, the findings show that mixed farming reduced severe food insecurity in all areas. However, impact of mixed farming on moderate and mild food insecurity depends on degree of aridity. Evidence illustrates that production systems of farms in both developed and developing countries influence food security status, with mixed findings. Mixed farming could support the multidimensionality of food security through various pathways. Mixed farming improves food availability through self-supply of food commodities for household members. For instance, small livestock like goat and chicken could help a household overcome a poor crop harvest. Mixed farming supports household income through the sale of agricultural products, that improve economic access to adequate food. Lastly, mixed farming support farm sustainability that is critical under a changing climate that supports land productivity and income, hence supporting stability in the supply of food products. Poczta-Wajda et al. (2020) suggest that farms specialized in permanent crops and dairy production were more exposed to food insecurity than crop farms in Poland. The authors

argued that mixed farming improves farm sustainability that improves farm incomes which in turn positively impacted food security. A recent study in Myanmar's Yamethin District by (Mee et al., 2020) indicated that mixed farming improved food availability through self-supply and increase food utilization by household member as compared to those practising monoculture.

Lastly, mixed farming increased overall HDDS, implying an improvement in dietary quality. The largest impact was in the drier areas (Arid and largely semiarid areas), followed by Non-ASALs and Marginally semiarid areas. Musemwa et al. (2018) had similar findings that farmers practising mixed farming had a higher HDDS than households specializing in either crop or livestock production systems in the Eastern Cape Province of South Africa. Contrary findings were reported in Lao PDR where mixed crop-livestock farming resulted in reduced diversity of household diets (Parvathi et al 2018).

## **5. Conclusions and policy implications**

Food insecurity is globally rising and this that can be attributed to stagnant agricultural productivity, climate change, the rising population, and degraded soil. This impedes achievement of the United Nations Sustainable Development Goal 2 (SDG 2) as well as the African Union's Agenda 2063 (72(e)) that aim to eliminate hunger and food insecurity and improve nutrition. Sustainable agriculture could reduce hunger and malnutrition. Farmers, especially smallholders, adopt farming systems that minimize risk under varying biophysical conditions. Mixed farming is one of the systems with many benefits that can enhance both productivity and sustainability of food and agricultural production, by optimizing resource use. However, studies assessing the association between mixed farming and food and nutrition security produce mixed results, with positive, neutral or negative findings.

This study investigated the impact of mixed farming on food insecurity and dietary quality in the context of different biophysical environments with varying degrees of aridity. The study used nationally representative data comprising of 10,817 households, from rural areas of Kenya. The country promotes mixed farming as a climate-smart agriculture strategy, but rigorous studies investigating how impacts of mixed farming could be influenced by the biophysical environment, are rare. The study adopted an impact evaluation framework that compared food security and dietary quality outcomes for mixed farming adopters against non-adopters. We used propensity score method (nearest neighbor matching, with 5 neighbors and a caliper of 0.2) to remove potential selection bias, and construct treatment and control groups. Food insecurity was measured using the food insecurity experience scale (FIES) approach, while dietary quality was measured using household dietary diversity score (HDDS).

Results show that Kenya still has a long way to go in ending hunger and food insecurity. Food insecurity prevails, with mild food insecurity being the most prevalent, followed by moderate and severe levels. Food insecurity experiences differ across the aridity gradient, increasing from the Non-ASAL counties to the Arid counties. Mixed farming reduced severe food insecurity in all areas. Impact of mixed farming on moderate and mild food insecurity depends on degree of aridity: in the Non-ASAL and Arid areas, all levels of food insecurity reduced for mixed farming adopters, while in Marginally semiarid areas, moderate and severe food insecurity experience reduced. In Largely semiarid areas, mixed farming reduced severe food insecurity. The study further found that mixed farming increased overall HDDS, implying improvement in dietary quality. Largest impact was in the drier areas (Arid and largely semiarid areas), followed by Non-ASALs and Marginally semiarid areas.

Our findings suggest that policymakers should support agro pastoralists to fully adopt mixed crop-livestock farming as a way of improving food security status and dietary quality. Mixed farming can be promoted through awareness creation on different varieties and types of

crops and different kind of livestock species suitable for different aridity levels that farmers can adopt to improve food security, livelihoods and build resilient farming systems under changing climate. Besides, the development of agricultural markets in rural areas will support farmers to access to input and output markets essential for sustainable mixed farming systems.

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#### *Availability of data and material*

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## Effect of Land Utilization Patterns on Food Security in Narok East Sub-County, Narok County, Kenya

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### Abstract

Global food security is likely to remain a disaster globally for many years if the world cannot formulate methods to control the situation. By the year 2016, an estimated 120,000 people in rural areas and 30,000 in urban centers of Narok County were food insecure. This insecurity attributed to a mismatch in food availability, access and utilization. The purpose of this study was to establish effect of land utilization patterns on food security in Narok East sub-County. The study adopted human capability approach. A descriptive research design was adopted by the study. The target population comprised of 25078 households distributed proportionally in the 4 wards. A sample of 378 household heads was determined using Krejcie and Morgan's formula of 1970. Primary data was collected using a questionnaire and an interview guide. Data analysis was done using descriptive statistics of frequencies, percentages and inferential statistics of correlation, ANOVA and regression analysis. The results were presented using frequency and percentages, tables and charts. The relationship between the variables was tested at a significant level of 5%. Results show that there is a very strong positive and significant correlation between land utilization patterns and food security ( $r = .752^{**}$  and a  $p$ - value of 0.000). This implies that the relationship between the variables is very significant hence land utilization patterns have a strong influence on food security in Narok East sub-County. The study concludes that the null hypothesis that there is no relationship between land utilization patterns and food security was rejected because there is a very significant and statistical relationship between the two variables. The study will be beneficial to the farmers in the ASAL areas who have consistently experienced food security issues and also other key stakeholders in food security discourse in Kenya.

**Key words:** *Arid and Semi-Arid areas, Food security, Land utilization patterns, Narok East sub-County*

### 1.0 Introduction

Collectively, food insecurity reduces global economic efficiency by 2% –3% yearly (USD 1.4–2.1 trillion), with individual nation costs projected at 10% of GDP (Harrigan 2014). Global food security is likely to remain a problem worldwide for the next 50 years and beyond if the world cannot formulate methods to control the situation. Béné, (2020), further establishes that the number of hungry people worldwide is growing, reaching 1.1 billion in 2019.

Africa has been struggling in one form or another with food insecurity for almost half a century due to a number of factors including distribution obstacles, global climate change, lack of successful local agriculture and inability or disinterest to act by local officials (Warr, 2015). Ever since food aid to Africa began in the late 1950s, the predicament has been characterized as a supply affair. Inadequacy of successful and widespread agriculture in SSA led to the inability of local governments to provide enough food for their populations (FAO, 2011).

Only about 2% of arable land in Kenya is equipped for irrigation. Farmers struggle to gain access to adequate seed, fertilizer and other inputs (Poulton & Kanyinga, 2014). The effects of land use processes – a source of grave, albeit familiar, concern for many people in Kenya and in East Africa generally – present formidable threats to farmers. While most Kenya

households have worthy food utilization (88%), around four million individuals (12% of families) have unacceptable food utilization dynamics.

According to the global food security index of 2017, Kenya is food insecure and was ranked position 86 out of 113 countries. A snap review of Kenya's food balance sheet shows that Kenya imports most of the basic food commodities including wheat, Maize, Rice, Beans, Potatoes, sugar and Milk (M'Kaibi, *et. al*, 2017). The big four agenda on Food Security proposes that there is need for proper policy and strategic interventions with a view to mitigating the challenges the sector faces (PDU, 2018). However, one of the main challenges in the implementation of the Agenda four is inadequate budgetary allocation towards the realization of food security goal in Kenya.

According to Kivisi (2019), pre- and post-harvest crop losses, inadequate research-extension- farmer linkages to increase agricultural productivity, lack of mechanized methods of production as well as high costs and adulterated farm input like fertilizer, seeds, pesticides and vaccines are some of the main challenges the Big Four Agenda is currently facing in Kenya. To achieve food security and proper nutrition for all Kenyans, the government targets to increase production of maize from 40 million 90 kg bags annually to 67 million bags by 2022; rice from around 125,000 metric tons currently to 400,000 metric tons by 2022 and potatoes from the current 1.6 million tons to about 2.5 Metric Tons by 2022 (Gwada, Ouko, Mayaka, & Dembele, 2020).

Narok County has the proportion of households in pastoral livelihood zone with acceptable food consumption score has declined from 93 percent 2016 to 68 percent in 2018, while in the agro-pastoral livelihood zone, it has declined from 20 percent to three percent in the same duration, indicating declining household dietary diversity and food frequency. The mean coping strategy score is at 17 as of 2019 implying that households are employing severe coping strategies and engaging less in consumption-related mechanisms (Gwada, *et. al*, 2020).

According to the Kenya National Bureau of Statistics (2019), Narok County has a population of 1,153,273 with a population density of 47 persons per square kilometer. Narok County is largely divided into 4 livelihood zones namely mixed farming, agro pastoral, pastoral and formal employment. More than one third (33.8%) of the population in Narok County lives under poverty line (KNBS, 2019). The main economic activities in Narok County are tourism given the Maasai Mara game reserve, commercial farming (wheat), and livestock farming.

### **1.1 Statement of the Problem**

Food security remains one of the main concerns for the residents of Narok East sub County, Narok County (Kileteny and Wakhungu, 2019). The transition rate of food poor households to self-reliance of food supplies has largely remained inadequate (Gwada *et. al*, 2020). According to Kenya National Bureau of Statistics (2019), an estimated 120,000 people in rural areas and 30,000 in urban centers of Narok County remain food insecure. A good percentage of this population resides in Narok East which experiences high levels of drought throughout the year.

Kileteny and Wakhungu (2019), attributes food insecurity to low allocation of funds to the agricultural sector by Narok County government which has made it difficult to carry out the extension services to enhance farmer's knowledge in improving agricultural production. According to Action aid (2017), the County loses an estimated 40% of its produce due to poor post-harvest practices. Whereas it appears that there are many factors that determine the success or failure of food security initiatives in Narok County, the thrust of this study was to establish the extent to which land utilization patterns affect Food Security in Narok East sub-county.

### **1.3 General Objective of the study**

The general objective of the study was to assess effect of land utilization patterns on food security in Narok East Sub-County, Narok County, Kenya

### **1.4 Hypothesis of the Study**

The study was guided by the following hypothesis;

**HO<sub>1</sub>:** There is no relationship between land utilization patterns and food security in Narok East sub-County, Narok County, Kenya

## **2.0. Literature Review**

### **2.1 Human Capability Approach**

This is an economic theory pioneered by Sen (1981) and advanced by Nussbaum (2001) and mainly focuses on what people are capable of doing. According to Sen (1981), pertinence of real freedoms in assessing an individual's advantage in the community and ensuring that such freedoms can be fully distributed for the whole community to enjoy available resources and opportunities is very key under this theory. The focus of the theory is mainly on advocacy for better livelihood among people in the society (Singh, *et. al.* 2017).

The approach further affirms that for peoples' capabilities to be at the center of development, there is need for them to own both movable and immovable property like land for their own utilization. Policies should be put in place on land ownership, land tenure systems and these policies should be pro-poor to enable them flourish in all dimensions of life. Despite improving the capacity of farmers to enhance food security, there is need for entitlement to these resources because ownership of resources enhances confidence hence increased investment and productivity.

### **2.2 Land utilization patterns on Food Security**

According to Baltisen and Betsema (2016) on "Linking Land Governance and African Food Security: Outcomes from Uganda, Ghana and Ethiopia," land governance in Uganda is characterized by the inconsistency between relatively progressive legislation and only limited implementation. Baltisen and Betsema, (2016) further assert that women's position on land and inheritance also remains weak, both legally and in practice, undermining their livelihoods and social status.

In their study on 'Influence of Livelihoods on Household Food Security in Pastoral Areas of Narok County, Kenya,' Kileteny and Wakhungu (2019), established that livelihoods are conceptually seen as comprising different types of capital that can profit individuals and, in particular, human, social, cultural, physical and natural resources possessed by and are at the disposal of individuals. Pastoralists have developed various adaptation mechanisms within this volatile, fragile, and complex climate to maintain an ecological balance between themselves and the natural environment (Hashim, *et. al.*, 2016). In this case, land use is very poor due to inadequate government incentives, harsh climatic conditions and the very tastes and preferences of the indigenous people living in the larger Narok County. This dilemma is further compounded by the use of low yield levels to raise inputs for both food and cash crops, resulting in low crop income levels (Dietz, *et. al.*, 2014). Food security in the home is based on the premise that households can meet most of their food needs through their own production and/or market purchases.

According to Omari (2016), one of the main aspects considered for the analysis in a study on "Stakeholder Issues Influencing Implementation of Food Security Projects in Msambweni District, Kenya" was the extent at which land ownership influences food security projects in Msambweni District. The results stated that land ownership was found to be a determinant of food security for households. Relatively land-rich households almost all met 80 per cent of their calorie requirements. The study further suggested that a household with a greater

holding of land was found to be in a better food security position than that of land-poor households.

### 2.3 Indicators of Food Security

Accessibility to food is a measure of the capacity to secure privileges that are characterized as the set of assets a person needs to get access food (FAO, 2011). Food security had been majorly connected to national food production and worldwide trade until the 1970s, however, since then the idea has extended to incorporate access to food for households and individuals. According to Sanchez *et. al.* (2009), food accessibility is established by the physical amounts of food that are produced, stored, prepared, supplied and exchanged.

Food availability is a measure of the capacity to ensure privileges, which are characterized as the set of assets that a person needs obtaining access to food (FAO, 2011). Food accessibility is the net residual sum after production, the quantity of stocks and imports and the deduction of exports for every item included in the food balance sheet (World Bank, 2018).

Zuberi and Thomas (2011), further note that high food market costs are commonly an impression of deficient accessibility; persistently high expenses force needy individuals to lower consumption underneath the minimum needed for healthy and active living, and may prompt food changes and social unrest. Rising water, land and fuel shortage is likely to put greater pressure to food upheavals, even without climate change.

### 3. Research Methodology/Materials and Methods

The study adopted a descriptive research design. This approach guided the study to gather both quantitative and qualitative analytical data. Quantitative data was collected from farmers (household heads) while qualitative data was collected from agricultural extension workers from Narok East sub-County, Kenya. The number of Households in Narok East sub-County is 25,078 (KNBS, 2019). 5 Agricultural Extension workers were used as key informants in the study. For this study, the sample was computed using sample size formula developed by Krejcie and Morgan (1970) as shown below:

$$n = \frac{\chi^2 \times N \times P(1-P)}{(ME^2 \times (N-1)) + (\chi^2 \times P \times (1-P))}$$

Where;

$n$  = sample size;  $\chi^2$  = chi-square for the specified confidence level at 1 degree of freedom = (3.841) from tables;  $N$  = population size;  $P$  = population proportion (0.50 in the table)

$$\begin{aligned} n &= \frac{3.841 \times 25078 \times 0.5 \times 0.5}{0.05^2 \times (25078 - 1) + 3.841 \times 0.5 \times 0.5} \\ &= 24081 / (63.65) \\ &= 378 \text{ Households} \end{aligned}$$

An ordered questionnaire was adopted for this study as the principal instrument for data collection. For the Agricultural extension workers, an interview guide was used in the study. A total of 5 copies was produced for the study. For the pilot test, 10% of sample was selected and used and hence 38 farmers and 1 ward agricultural extension worker were used to establish the validity and reliability of research instruments. The pilot study was done in Narok West sub-County, Narok County. In order to establish the overall validity of the research instrument for the study, Coefficient of Validity index was established as follows;

$$\text{CVI} = \frac{\text{Level of agreement between any of the two questionnaires} \times 100\%}{\text{Number of items in the questionnaire}}$$

$$\begin{aligned} &= 23/31 \times 100\% \\ &= 0.7419 \\ &= 0.74 \end{aligned}$$

For this study, a reliability index of 0.837 was established. Questionnaires were analyzed using descriptive statistics of frequencies, means and percentages. Descriptive statistics used the Excel software for data analysis. Analysis was done and used to check the essence of the connection between dependent and independent factors while regression and ANOVA were used to test the model's fitness to explain the connection between variables.

#### 4 Research Findings and Discussions

##### 4.1 Findings of the Study

The findings of the study were presented in this section after, data analysis for the purpose of tabulation and interpretation.

##### 4.1.1 Response Rate

The study distributed a total of 378 questionnaires and only 299 were returned and used for the analysis. Table 4.1 shows the response rate.

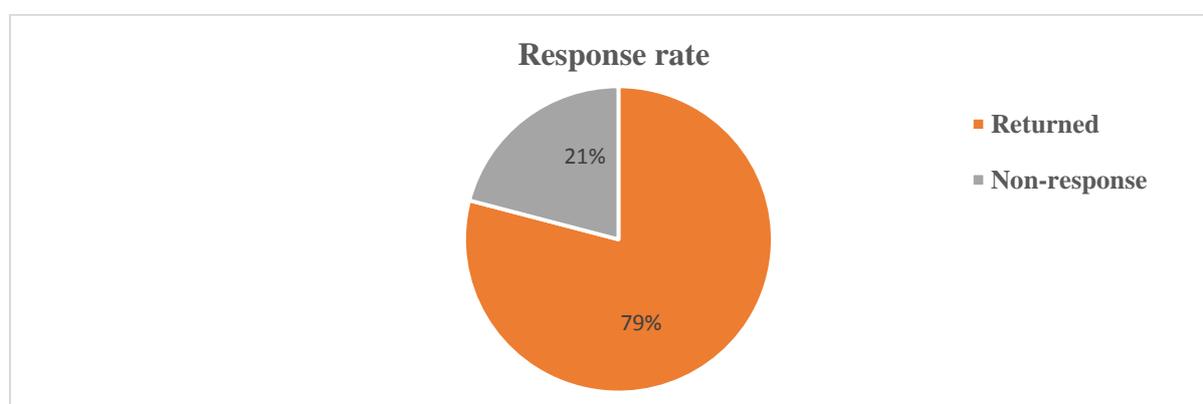


Figure 4.1: Response Rate

Figure 4.1 shows a 79% response rate, which was considered appropriate. According to Marton (2006), a response rate of above 70% is considered appropriate for a descriptive study. The interviews were conducted successfully and all the five officers who were targeted were interviewed.

##### 4.1.2 Demographic Data

Demographic variables are important in any descriptive survey because they have an influence on the response and the overall results of the study. For this study the demographic variables considered were; gender, education level, size of household, crops grown, land ownership titles, size of the land under crop cultivation and level of income.

In regard to gender of the respondents the study sought to establish the distribution of male and female respondents who participated in the study. Gender has an influence on the factors influencing food security in any country because of the differing perspectives between men and women. The response was presented in figure 4.2.

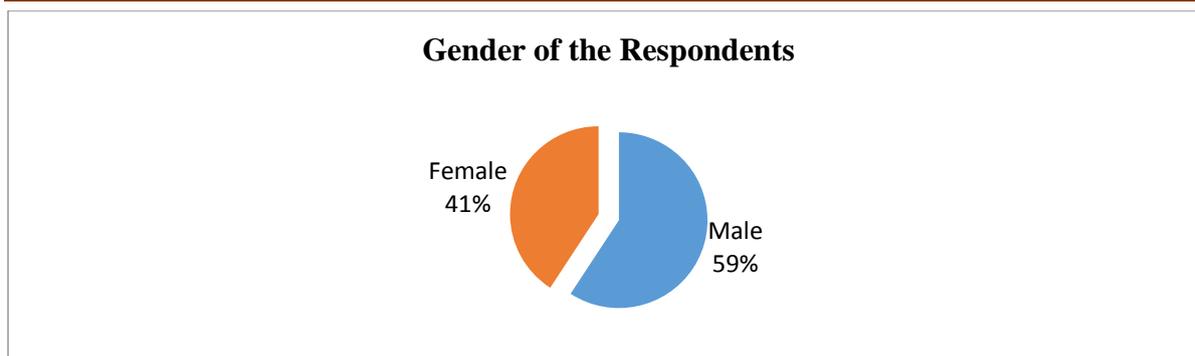


Figure 4.2: Gender of the Respondents

The results presented have indicated that 62% of the respondents were male compared to 38% female, though the margin was not very large to have influence on the overall findings of the study. This implies that most of the households that participated were headed by the male. Similar findings were noted by Alawode, Olaniran and Abegunde (2020), in their study on effect of land use and land market on food security status of farming households in South-Western Nigeria noted that majority of the farmers were male.

The study also sought to assess the response on the level of education of the respondents. The results are presented in Figure 4.3.

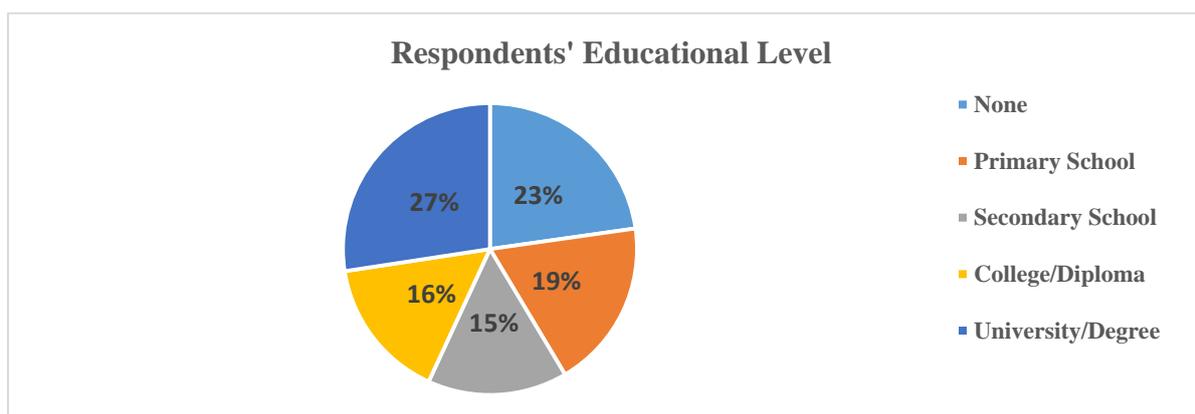


Figure 4.3: Education Level of Respondents

The results show that most of the respondents (27.8%) had attained university /degree level of education, 22.7 % had not attained any formal education, and 18.7% had only attained primary education while 15.7% and 15.4% had attained secondary school level and college / diploma respectively. Alawode, Olaniran and Abegunde (2020), noted that most of the farmers who have no good formal education can be contributing to low productivity and hence food insecurity in many developing nations.

The study also sought to find out the average house hold size among the target population. This was important for this study as it helped to assess the implication of the size of the house hold on food security in the area. The results are presented in Figure 4.4.

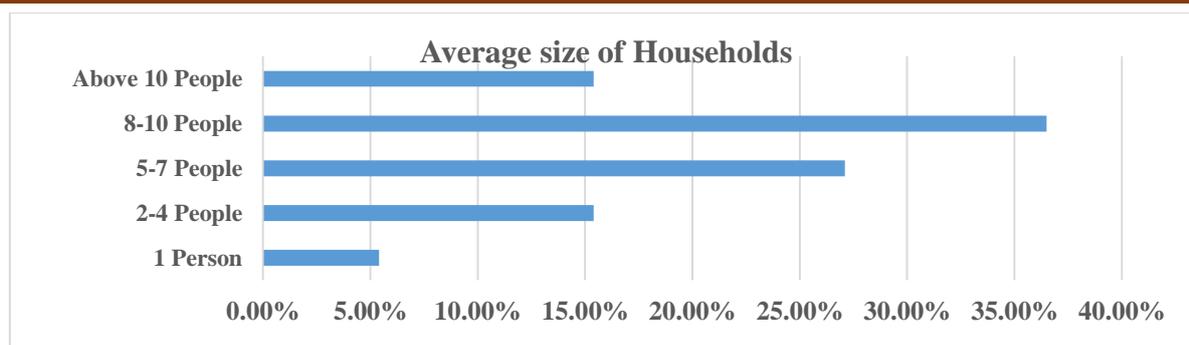


Figure 4.4: Average Size of Households

The study shows that majority of the households in the sub-County (36.5%) had an average of 8-10 persons followed by 27.1% who had an average of 5-7 persons, 15.7% had an average of above 10 persons while 15.4% had an average of 2-4 persons. This shows that most households were large and hence their demand for food was relatively higher a fact that could compromise food security in the area.

The study also sought to find out the type of crops grown in the study area. The results are presented in figure 4.5.

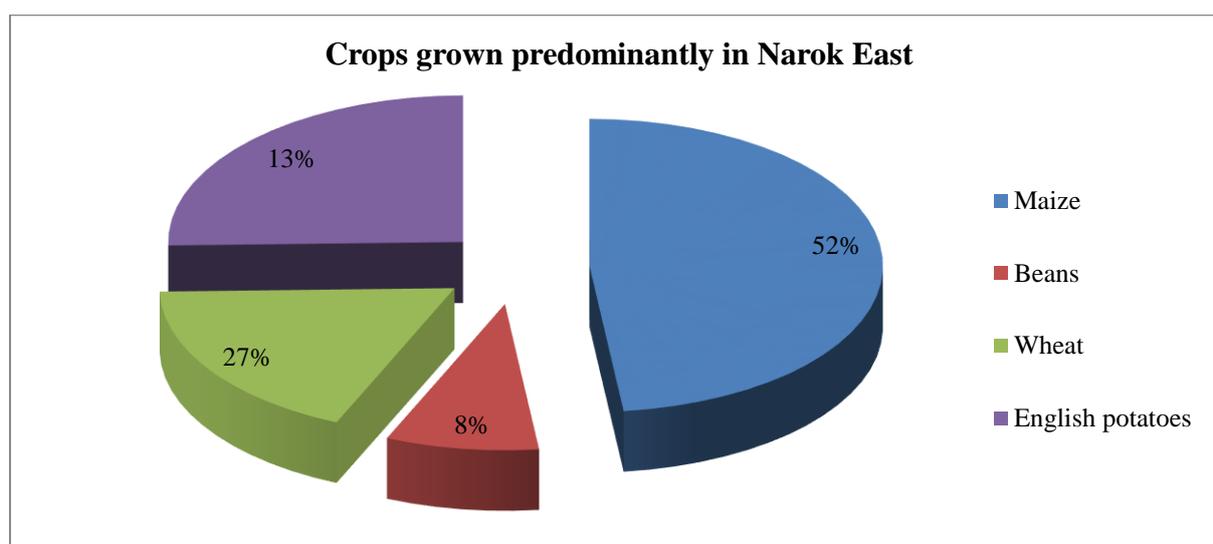


Figure 4.5: Response on types of crops grown in Narok East sub-County

The results show that most households (52 %) are involved in the growing of maize, followed by 27% who grow wheat. The study further establishes that 13% grow English potatoes and only 8 % grow beans. The results indicated that most farmers grow maize and wheat which are long duration crops and might affect the food security in the area.

In terms of the land ownership title, the study sought to find out whether the households owned the land and whether they had legal ground to the land. The results are presented in Figure 4.6.



Figure 4.6: Response on Land Ownership

The results in figure 4.6 show that most (52.5%) of the respondents indicated that the land they possess was inherited, 17.7% indicated that they had communally owned land, 17.1 percent indicate that land was legally owned while only 12.7% indicated that the land was leased. Land ownership has an implication on the level of development one can be able to undertake on the land and this might have an influence on the food security in the area. This agrees with the findings of Alawode, (2013) who noted that the extent to which land ownership is acquired and acquisition has an influence on the way the land is used for agricultural production. The researcher further established that in rural areas, land can be acquired or transferred through inheritance, gift, purchase, loan, pledge and allocation by family head, local chief or any land custodian.

In regard to the size of the land under crop production the response of presented in Figure 4.7. The results show that 43.1% of the households had at least 5 acres of land under crop cultivation followed by 29.8% who had more than 10 acres, 20.1% had only 2 acres and 7.0 % had less than 2 acres under crop cultivation. This show that majority of the households had relatively large pieces of land for use in crop farming. This implies that the available land under crop farming is large enough to enhance food production.

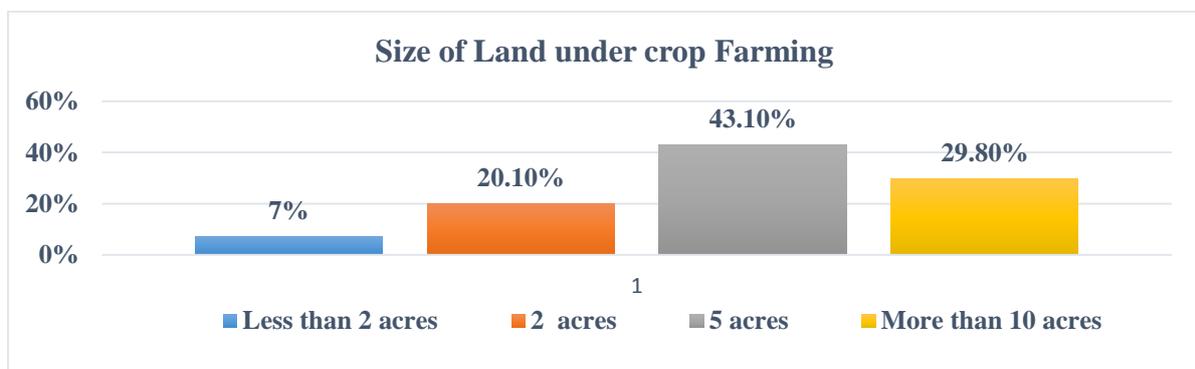


Figure 4.7: Size of Land under Crop Farming

This agrees with the findings of Alawode, Olaniran and Abegunde (2020), who noted that land tenure system and the extent of competition by non-agricultural land users remain a major factor determining the extent of use of most agricultural lands in the rural areas in most African countries.

The study also sought to establish the number of years that respondents had been engaged in farming. The results are presented in figure 4.8

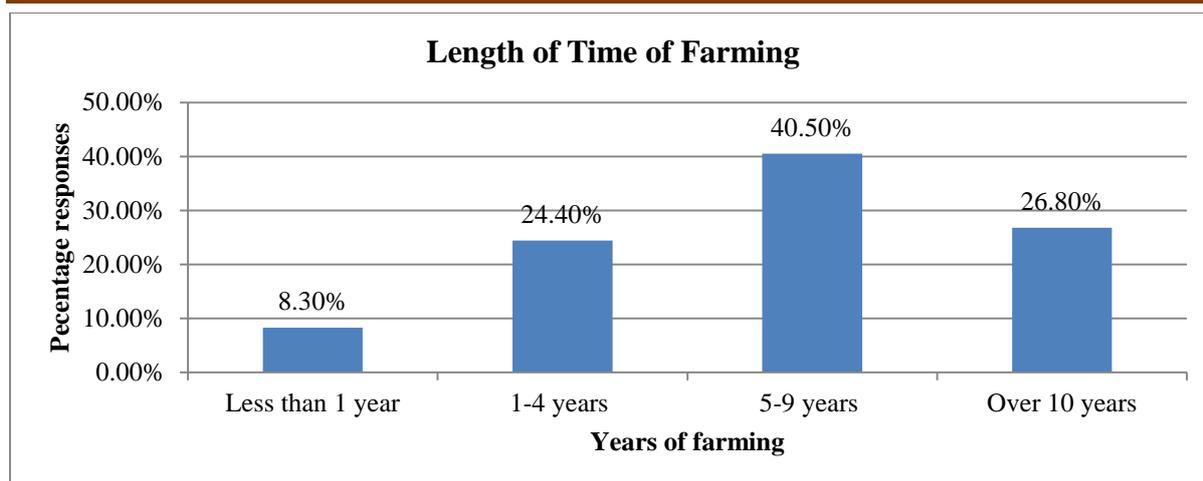


Figure 4.8: Years of Farming

The results show that majority of the respondents (40.47%) have been practising farming for between 5-9 years followed by 26.76% who have been in farming for over 10 years and 24.4% who have been in farming for between 1-4 years. The result shows that most of the respondents have been in the farming activities for more than 5 years. This implies that they have accumulated experience and understand how the farming activities influence food production and hence food security in the area.

The last demographic variable was to assess the level of income of the households. The results are presented in Figure 4.9.

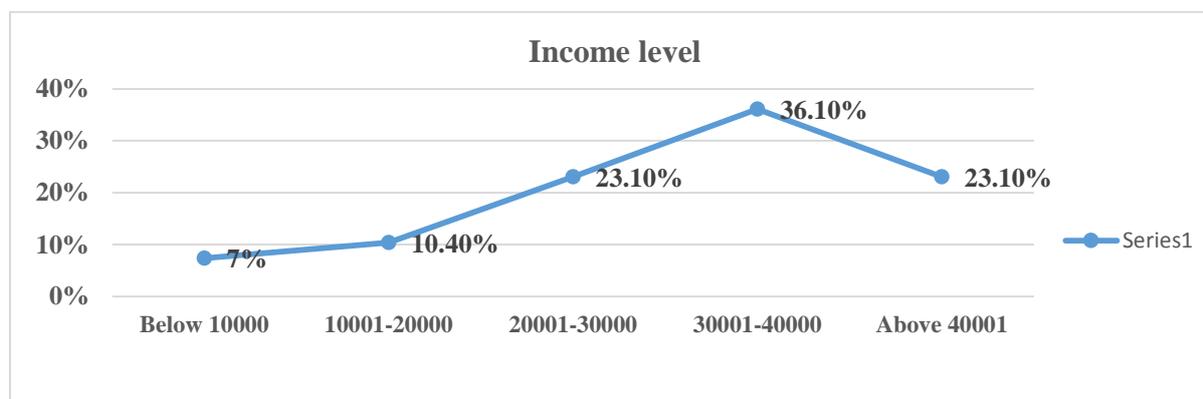


Figure 4.9: Response on the Level of Income

The results show that majority of the respondents (36.1%) earned between Ksh 30,001 to 40,000, 23.1 % earned between Kshs 20,001 and 30,000 while another 23.1% earned above Kshs 40,001. Only few 10.4% and 7.4% earned between Kshs 10,001 and 20,000 and below Kshs 10,000 respectively. This implies that most households have average income that might not be enough to support their farming activities. The results agree with the findings of Chen and Ravallion (2008, who noted that over 1.4 billion people in the world live on less than US \$1 a day which is the international poverty line.

#### 4.3 Analysis for the Descriptive Statistics

This section presents the descriptive analysis of the results where the mean, percentages, standard deviation are discussed. In this section **SD** will stand for *Strongly Disagree*, **D** - *Disagree*, **NS**- *Not Sure*; **A** - *Agree*, **SA**- *Strongly Agree*, and **S.D.**- *Standard Deviation*

##### 4.3.3 Extent to which land utilization patterns affect Food Security

The objective of the study sought to establish the extent to which Land utilization patterns determine food security Narok East Sub-County. The results of the study were analyzed

descriptively using percentages, means and standard deviation in order to make deductions on how the respondents gave their response to various statement items describing the extent to which land utilization patterns determine food security in the study area. The results were presented in Table 4.1.

Table 4.1: Land utilization patterns and Food Security

Statement	SD	D	NS	A	SA	M	S. D
Food security has been determined by land utilization patterns in Narok East Sub-county	1.7%	6.0%	4.7%	19.7%	67.9%	4.46	.952
Land sub-division has determined food production in Narok East Sub-county	0	10.4%	3.0%	13.4%	73.2%	4.49	.967
The number of acreage on farming determines food security in Narok East Sub-county	0	3.7%	5.0%	21.4%	69.9%	4.58	.753
Mechanization practices have an implication on food security in Narok East Sub-county	0	34.8%	13.4%	19.1%	32.8%	3.50	1.267
Most farmers have indigenous ways of utilizing land for promoting food security in Narok East Sub-County, Narok County	1.0%	30.1%	20.4%	14.0%	31.4%	3.54	1.314
Land use is a prerequisite on food security in Narok East Sub-county	1.7%	0	4.0%	23.7%	70.6%	4.62	.721

The results show that most of the respondents (67.9%) strongly agreed, 19.7% agreed while only 1.7 % strongly disagreed while 6.0% disagreed with the statement that food security has been determined by land utilization patterns in the study area. Results further indicate that 4.7% of respondents were not sure as to whether food security has been determined by land utilization patterns in the study area. The results are further confirmed by the mean value of 4.46 and a standard deviation of .952. This implies that land use pattern in the study area is a determining factor of food security. This was confirmed by the interview results where Agricultural extension officers noted that the available land has been subdivided to smaller portions making productivity of food limited.

On whether land sub-division has determined food production in Narok East sub-County. The results indicated that 73.2% of the respondents strongly agreed with the statement, 13.4% agreed while 10.4% disagreed. A further 3% of respondents were not sure with the statement. The mean response was noted as 4.49 with a standard deviation of 0.967. This implies that and sub division has an influence on food production and hence affects food security in the area.

The study also sought to establish whether the number of acreage on farming determines food security in Narok East Sub-county. The results show that most of the respondents (69.9%) and 21.4% strongly agreed and agreed with the statement while only 5% were not sure of the statement. A further 3.7% of the respondents disagreed as to whether number of acreage on farming determines food security in Narok East Sub-county The mean response of the study 4.58 and a standard deviation of 0.800 indicate that majority of the respondents agreed with the statement. This implies that the number of acreage under farming affects the production of food and hence is a determinant of food security in the study area.

On whether mechanization practices have an implication on food security in the study area, the results indicated that majority of the respondents (32.8%) strong agreed, 19.1% agreed

while 34.8% disagreed and 13.4% were not sure with the statement. The mean response was 3.50 with a standard deviation of 1.267 indicating that most of respondents agree that mechanization practices have an implication on food security in the study area. This implies that mechanization practices have an implication on food security as they improve food production. Response from the extension officers further indicated that there is shortage of agricultural machinery which is critical in improving food productivity.

The study also established that majority respondents (31.4%) and 14.0% strongly agreed and agreed respectively that most of the farmers have indigenous ways of utilizing land for promoting food security. 30.1% of respondents disagreed with the statement while 20.4% were not sure as to whether farmers have indigenous ways of utilizing land for promoting food security. A further 1% of the respondents strongly disagreed farmers have indigenous ways of utilizing land for promoting food security. The mean response of 3.54 and standard deviation of 1.314 indicates that most of the respondents agreed with the statement. This implies that the way the farmers utilize their land especially the traditional way affects their production in the study area.

The study also sought to assess whether land use is a prerequisite on food security in Narok East Sub-county. Majority of the respondents (70.6%) strongly agreed, while 23.7% agreed. Further analysis indicated that 1.7% of the respondents strongly disagreed while 4.0% were not sure as to whether land use is a prerequisite on food security in Narok East Sub-county. The results further indicated that the response of 4.62 and standard deviation of 0.721 shows that majority of the respondents agreed with the statement. The results therefore indicate that land use is a determinant of food security in the study area.

#### **4.3.5 Indicators of Food Security**

The respondents were also required to rate the various indicators of food security which formed the dependent variable. These indicators were food availability, food utilization and food access. The results were analyzed descriptively using percentages, means and standard deviations in order to make deductions on how the respondents analyzed the various statement items describing the extent at which the study area is food secure. The results were presented in Table 4.2 as shown below.

The results indicate that most of the respondents (73.6%) strongly agreed, 14.7% agreed while 1.7% and 2.3% strongly disagreed and disagreed respectively that food availability determines food security at household level in Narok East Sub-county. Further analysis however revealed that 7.7% of the respondents were not sure as to whether food availability determines food security at household level in Narok East Sub-county. The mean response was 4.56 with a standard deviation of 0.862 confirmed this statement. This implies that availability of food was a determinant of food security in Narok East sub-County.

Table 4.2: Response on the Indicators of Food Security

<b>Statement</b>	<b>SD</b>	<b>D</b>	<b>NS</b>	<b>A</b>	<b>SA</b>	<b>M</b>	<b>S. D</b>
Food availability has determined food security at household level in Narok East Sub-county	1.7%	2.3%	7.7%	14.7%	73.6%	4.56	.862
Food utilization determines food security at house hold level in Narok East Sub-county	0	12.7%	1.0%	23.1%	63.2%	4.37	1.009
Food security is determined by food access at household level in Narok East Sub-county	5.7%	4.0%	17.1%	13.4%	59.9%	4.18	1.189

Households have access to food whenever they need it in Narok East Sub-county	6.4%	12.7%	2.0%	11.0%	67.9%	4.21	1.319
Food is utilized by farmers to meet their dietary needs at household level in Narok East Sub-county	0	6.4%	7.0%	23.7%	62.9%	4.43	.877

The study also sought to find out whether food utilization determines food security at house hold level in the study area. The results show that most of the respondents (63.2%) strongly agreed, 23.1% agreed while 12.7% disagreed that indeed food utilization determines food security at house hold level in the study area. However, 1% of the respondents still were not sure as to whether food utilization determines food security at house hold level in the study area or not. The mean response was 4.35 with a standard deviation of 1.009 implied that food utilization is a determinant of food security in the sub-county. This means that if the available food is well utilized at household level, then it will have an influence on food security Narok East Sub-county generally.

The results also show that most of the respondents (59.9%) strongly agreed while 13.4% agreed that Food security is determined by food access at household level in Narok East Sub-county. Only 4 % and 5.7% of the respondents disagreed and strongly disagreed with the statement food security is determined by food access at household level in Narok East Sub-county. However, 17.1 percent of the respondents were not sure as to whether food security is determined by food access at household level in Narok East Sub-county. The mean response was 4.21 with a standard deviation of 1.189 confirms that majority of the respondents agreed with the statement but still a good number of respondents still are of a different opinion. This implies that food security is determined by food access at the house hold level in the study area if all other factors are held constant.

It was also noted that majority of the respondents (67.9%) and 11 % strongly agreed and agreed with the statement that households access to food whenever they need it. Further analysis indicated that 12.7% and 6.4% of the respondents strongly disagreed and disagreed with the statement that households' access to food whenever they need it indicates food security in the area. However, 2% of the respondents are not sure whether households access food whenever they need it. The mean of 4.43 and a standard deviation of 1.319 confirm this argument. However, the extension workers further revealed that generally majority of the households have no access to food. Further analysis from interviews reveals that most households in Narok East Sub-county are generally food insecure since access to food in the study area has been hampered by other factors like inadequate roads and the purchasing power of residents.

Furthermore, the study also sought to examine whether food is utilized by farmers to meet their dietary needs at household level in Narok East Sub-county. The findings of the study indicated that 62.9% of the respondents strongly agreed and 23.7% agreed with the statement above. Further analysis indicated that 7% of the respondents were not sure of whether food was utilized by farmers to meet their dietary needs in the study area. The study further established that 6.4 % of the respondents disagreed with the statement above. This was further supported with a mean of 4.43 and a standard deviation of 0.877 which shows that majority of the respondents agreed with the statement above

#### 4.4 Analysis of Inferential statistics

The study sought to assess whether there was a statistically significant relationship between the variables. The analysis was done at three levels, determining the factor loading, Pearson's correlation and regression analysis.

#### 4.4.1 Correlation Analysis for Land utilization patterns on Food Security

The study sought to establish the nature of the relationship between land utilization patterns and food security. This was tested using correlation coefficients as suggested by Cohen, West and Aiken, (2003). The relationship between the two variables was considered significant if the p value was less than 0.05. It was considered to be weak if the correlation ( $r$ ) < 0.5 and it was considered to be strong if the correlation ( $r$ ) was > 0.5. The results are presented in Table 4.3.

Table 4.3: Pearson Correlation analysis between land utilization patterns and food security

		Land utilization patterns	Food Security
<b>Land utilization patterns</b>	Pearson Correlation	1	.752**
	Sig. (2-tailed)		.000
	N	299	299

\*\* . Correlation is significant at the 0.05 level (2-tailed).

The results further show that there is a very strong positive and significant correlation between land utilization patterns and food security ( $r = .752^{**}$  and a  $p = 0.000$ ). This implies that the relationship between the variables is very significant. This supports the work of Alawode, Olaniran and Abegunde (2020), who established that land use patterns adopted by the farmers has a significant positive effect on the food security status of the household, implying that adoption of an appropriate and use pattern enhances the food security status of farming households.

#### 4.4.2 Test of hypothesis

The study used analysis of variance test to either accept or reject the null hypothesis. It also helps in checking whether the model fit is appropriate in making inference to the entire study population. The study established the model fitness by comparing the F- calculated and F-critical values. The results are shown in Table 4.4.

Table 4.4: ANOVA Relationship between land utilization patterns and food security

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.671	1	114.671	385.455	.000 <sup>b</sup>
	Residual	88.356	297	.297		
	Total	203.027	298			

The results show that the F-statistic was very significant at 5% level of significance, implying that the model is a good predictor of the relationship between land utilization patterns and food security. The results shown in Table 4.4 shows that the F- calculated was greater than F-critical values. The F-calculated ( $F_{0.05, 1, 297}$ ) was 385.455 which was much greater than F-Critical, ( $F_{0.05, 1, 297}$ ) of 3.878. Since F-calculated, was greater than F-Critical, then the null hypothesis that there is no relationship between land utilization patterns and food security was rejected and the study concluded that the model is a good predictor of the relationship between land utilization patterns and food security.

Table 4.5: Model Summary

Independent variable	R	R-Square	Adjusted Square	R Std. Error Estimate	of the P-value
Land utilization patterns	.752 <sup>a</sup>	.565	.563	.545	.000 <sup>b</sup>

**Dependent variable: Food Security**

For land utilization patterns and food security, results show that the correlation is very strong, positive and significant ( $R = 0.752$ ;  $p$ -value = 0.000). Further analysis was done using the R square which indicates the proportion of variance in the dependent variable that can be explained by a unit change in the independent variable. The results show that a unit change in land utilization patterns can explain 56.5% change in food security ( $R^2 = 0.565$ ). This implies that land utilization patterns is a significant determinants of food security in Narok East Sub-County.

The results were further analyzed to develop the simple linear regression models for the four objectives. The results were presented in Table 4.6.

Table 4.6: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.517	.198		2.614	.009
Land utilization patterns	.913	.047	.752	19.633	.000

From table 4.6, the data indicates that the simple linear regression can be modeled as follows for this variable;  $y = 0.517 + 0.913x + 0.198$ . The model is statistically significant given that the  $t$ - statistic (19.633) is more +2 and  $p$ -value <0.05.

#### 4.8 Analysis of Variance

The ANOVA was used to check the ability of the regression model to be used to predict the relationship between the variables. Using the F-statistic and the mean square differences the results were computed and presented in Table 4.7.

Table 4.7: ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	126.910	4	31.728	122.546	.000 <sup>b</sup>
	Residual	76.117	294	.259		
	Total	203.027	298			

The results show that the F-statistic was very significant at 5% level of significance implying that the model is a good predictor of the change in the food security in the sub-County. In order to establish whether the model was fit for use in further prediction the F-statistic computed was compared to the F-critical values. The result for F-calculated showed  $F_{(0.05, 4, 294)} = 178.701$  compared to the F-Critical,  $F_{(0.05, 4, 294)}$  which was 2.403. Since F calculated is greater than F-Critical at  $F_{(0.05, 4, 294)}$ . Therefore, the study concluded that the model is a good predictor of the relationship between the dependent and independent variables. This is further supported by the  $p$ -value of 0.000 which is very significant at 5% level of significance.

#### 4.9 Regression Coefficients

The study further sought to determine the regressions model based on the coefficient beta values. The results were presented in Table 4.8.

Table 4.8: Regression Coefficient

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
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**Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021,  
Machakos University, Kenya**

	B	Std. Error	Beta		
(Constant)	-1.000	.312		-3.204	.002
Land utilization patterns	.744	.056	.612	13.308	.000

The results show that the standardized coefficients of beta values explain the contribution of independent variables to the dependent variable. From the results shown, the study established that the contribution of land utilization patterns to food security accounts to 61.2%. The contribution is statistically significant given that the t-statistic of 13.308 is greater than + 2 and the *p*-value of < 0.05.

## **5. Summary, Conclusions and Recommendations**

### **5.1 Summary of the Findings**

#### *5.1.1 Demographic variables*

The response rate was 79% which was accepted as appropriate for further analysis of the study results. The study established that 62% of the households were headed by the males which implied that men were the main decision makers at the household unit in the study area. In regard to level of education, it was established that there was varied levels of education where some had degrees while others had the basic education. The study further assessed the size of the house hold in the study area and established that majority households (36.5%) had an average of 8-10 persons. The study further established that most households (52%) in the study area are involved in maize production. On land ownership, the study established that most respondents (52.5%) indicated that the land was mainly inherited or communally owned which might be a contributing factor to the state of food security in the study area.

It was also established that the size of land under crop cultivation was at least 5 acres in comparison to the actual size of the land. This implies that most households had committed a small proportion for food production hence contributing to the food security issues in the study area. The study further noted that most of the respondents had been in the farming practice for between 5-9 years hence it implies that they have accumulated experience and understand how the farming activities determine food production in the study area. The study also established that at least 36.1% of the respondents earned between Ksh 30,001 to 40,000, indicating an average income which was not enough to sustain increased demand for food production in Narok East.

#### **5.1.2 Extent to which Land utilization patterns Determine Food Security**

The objective study sought to establish the extent to which Land utilization patterns determine food security Narok East sub-County. The study established that most respondents agreed that food security is determined by land utilization patterns in the study area. This implies that the various activities dedicated towards utilizing the available land may be directed towards food production or otherwise. This was also informed by the response from the Agricultural extension officers who noted that land utilization patterns affected the food production in the study area since it cannot be controlled by the County. Farmers are the key stakeholders who determine how they want to utilize their land.

The study also established that land sub-division affected food production in Narok East sub-County. Land sub-division affected the number of acres under production which in turn affected the amount of food produced and hence food insecurity. The results also showed that mechanization practices have an implication on food security as they improve food production. However, most respondents indicated that the necessary machinery were very limited in the study area and this affected their ability to enhance production. Response from the extension officers further indicated that there is shortage of agricultural machinery which is critical in improving food productivity. Inadequacy in the machinery has adversely

affected land preparation, planting and harvesting hence compromising food production as farmers end up preparing land and planting when the planting season is long overdue.

Further analysis established that land use is a prerequisite on food security in Narok East sub-County. Based on the inferential analysis, the study established that there was a very strong positive and significant correlation between land utilization patterns and food security in the Narok East sub- County. The null hypothesis that there is no relationship between land use and food security was rejected because the ANOVA model indicated a very significant and statistical relationship between the variables.

## **5.2 Conclusions**

The main objective of this study was to analyze influence of factors that determine household food security in Narok East sub-County. The findings of the study revealed that most of the households in Narok East sub-County were food insecure. Furthermore, the study concluded that there was a strong relationship between land utilization patterns and food security in the study area. In general, as food insecurity still remains prevalent among farming households in the study area. Further analysis revealed households with higher acreage of land under farming were able to achieve comparable levels of food security as compared to those who did farming on a small parcel of land. Also, adoption of appropriate land use techniques also impacted positively on the food security of the households that took place in farming activities in the study area.

## **5.3 Recommendations**

The study further provided key recommendations as follows;

First, Narok County Government should establish alliances/collaboration with all sectors in the agricultural sector in order to develop programs for improving food security and income generation among the households in order to boost the income of farmers at the micro level.

Secondly, the study recommends that the County government should build a platform to promote dialogue and cooperation among relevant institutions and establish programs in all sectors with the aim of developing an extension and information services network for households in Narok County.

The County Government should discourage land sub-division in order to free more land for food production and hence food security in the study area. Policies on land use should be formulated in order to discourage farmers from utilizing land for aspects that is not food production.

The County Government should formulate a reasonable crop production system is necessary to improve land use efficiency. Therefore, there is need to improve the agricultural sector by using suitable crop strains, developing technology and implementing a reasonable strategy. Additionally, Research and development needs to be promoted and supported by Narok County government so as to ensure continued research and dissemination of research findings to the household level so as to benefit farmers at the micro level.

## **5.4 Areas for further study**

The current study proposes the following areas for further studies;

Further studies on land utilization patterns needs to be conducted in other ASAL counties to compare the findings. This will enable the current study to be inferred to the larger research universe since this will further establish the gaps that are inherent in the current study and universalize the findings

There is also need for further studies that will focus a multi stakeholder approach including the farmers, seed distributors/companies, private agricultural extension workers, NGOs in

the field of Agriculture and the National Government in order to build more literature on food security in Narok County specifically and in the Country generally.

There is need of assessing other factors that determine food security in the study in Narok East sub-County other than the aforementioned as it will enable more research to be done and help farmers in achieving their farming objectives.

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## Analysis of the Factors Affecting Farm-Level Output of Mangoes Among Small-Scale Farmers in Machakos County, Kenya

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### Abstract

The study examined the factors affecting farm-level output of mangoes among small-scale farmers in Machakos County, Kenya. Data was obtained from a sample of 352 small-scale mango farmers that were proportionately selected from six wards of the study area. A structured interview schedule was used for data collection. Both descriptive and inferential statistics were employed in data analysis. The stochastic Cobb-Douglas production function results indicated that active family and hired labour, pesticides, and manure were the inputs that influenced mango output with 0.463 return to scale. This indicates a decreasing return to scale of mango output in the study area. In addition, household size, mango farming income, farm size, amount of credit, and extension contacts were the factors that had a positive effect on mango farm-level output, while cost of pesticides and cost of manure precipitated a negative effect. The study recommends to the Ministry of Agriculture in collaboration with County Government to strengthen the extension contact between farmers and agricultural extension agents by making frequent visits to mango farmers and organizing training programs to encourage them to apply good management practices for improved production. Furthermore, small-scale mango farmers access to functional input markets will enhance farm-level mango output.

**Keywords:** *Mango, farm-level output, Cobb-Douglas production*

### Introduction

Mango is the second most important fruit in the tropics and subtropics after banana. It is commercially grown in more than 90 countries worldwide and consumed in both fresh and processed forms (Mujuka et al., 2020). Globally, India is the largest producer of mango, accounting for 50% of the total output. Kenya is among the leading producers of mangoes in Africa (United States Agency for International Development, 2018). Mango production targets fresh fruit markets and the processing industry. Additionally, its fruit flavor and high nutritional value have placed it in a higher popular position as a source of income to farmers, traders, and international markets (Bundi et al., 2020).

Diversification into horticultural produce is becoming more attractive to small-scale rural farmers across the globe. This is because the worldwide production of fruits has grown faster compared to cereal crops and the total value of the horticultural crops traded at present is more than double that of cereals (Mariyono, 2020). As a result of this, farmers involved in horticultural production usually earn much higher farm incomes as compared to cereal producers, and their per capita income is also five times higher than cereal producers (Ayalew, 2015). Mango tree has been classified as a permanent horticultural crop which means it occupied the field for a long period and does not have to be replanted for several years after each harvest (Horticultural Crop Directorate, 2018). Despite this, its potential has not been fully exploited due to constraints such as pest and diseases, poor agronomic practices and glut during peak seasons.

In Kenya, the area under mango cultivation has been increasing over the years to 46,364 hectares in 2017 and 49,098 hectares in 2018 respectively (Horticultural Crop Directorate, 2018). Statistics show that mango cultivation contributes approximately 5% of the

Agricultural Gross Domestic Products (GDP) and 2% of the national GDP, employing a considerable number of the seasonal labour force (Ministry of Agriculture Livestock and Fisheries, 2018). Kenya is dominated by two type of mango varieties the local and the exotic or improved (Githiomi et al., 2019). The latter are usually grafted on local mangoes and are grown for consumption and processing. Most of the local varieties tends to have high fibre content and this characteristic make its unpopular for processing. In addition, the local varieties are left to grow naturally without much of the crop husbandry. Research on mango production in Kenya has concentrated much on varietal introduction of high yielding varieties which have different qualities that are suitable for either fresh consumption and processing (Gichungi et al., 2020). Despite the adoption of these mango varieties by small-scale farmers the farm-level output has been declining (MoALF, 2018) and the factors leading to this remains unknown.

Mango farming is faced by numerous challenges ranging from lack of clean planting materials, poor agronomic practices to price fluctuations which in turn leads to low level of mango output hence leading to food insecurity and low income for the small-scale farmers. In Machakos County, the ecological conditions form an essential prerequisite for good growth and development of mango tree, however the potential for this crop is under-utilized with only 5,593 hectares (Ha) under mango production (MoALF, 2018). However, the County experiences lack of improved mango technologies, inadequate processing technologies and unreliable supplies. Hence production of mangoes for domestic consumption and market supply is low. Further, this problem has resulted from small-scale farmers relying on the local mango varieties which are of small sizes, highly perishable and have higher fibre content (MoALF, 2018). Therefore, failure to address these problems will lead to loss of livelihoods, enhanced poverty and food insecurity in the area. It is against this background that, the study focuses on the factors that affect farm-level output of mangoes among small-scale farmers in Machakos County.

### **Methodology**

The study was carried out in Machakos County, Kenya. The County is located on latitude 0°45'S and longitude 36°45'E. It is bounded in the West, North, East, South, South West and North West by Nairobi and Kiambu, Embu, Kitui, Makueni, Kajiado, Muranga, and Kirinyaga respectively. The County covers an area of 6,208km<sup>2</sup> and has a population of 1,421,932 (Kenya Bureau of Statistics, 2019). In addition, the study area receives a bimodal rainfall pattern, with the long rains experienced in March to May, while short rains are received between October and November. The average annual rainfall ranges between 500 to 1300 mm per annum and temperatures range between 18°C -25.7°C (Government of Kenya, 2018). These conditions are suitable for mango farming.

The study employed two-stage stratified sampling to collect data from 352 mango-farming households in Machakos County. Firstly, the six major mango producing wards in the County (Mbiuni, Makutano/Mwala, Masii, Muthetheni, Wamunyu, and Kibauni) were purposively selected. Secondly, a location was randomly selected from each of the six wards. Further, a Sub-location was selected from each location and finally, a village was randomly selected from each Sub-location. To obtain the number of mango-farming households to be interviewed in each village probability proportionate to size technique was applied. In this case, the total number of mango-farming households in each village was divided by the total number of households in the selected villages then multiplied by the sample size. The interval between the households to be interviewed was estimated by dividing the total number of households in the village by the required number of mango-farming households.

This study applied Production theory to explain the quantitative relationship between the selected factors and the level of mango output. In economics, this theory explains the technical relationship between the physical inputs and output. It describes the laws of

proportion, represents the technology of the firm, and includes all the technically efficient methods of production. According Daniel and Afofum, (2019), a production function expresses a functional relationship between quantities of inputs and outputs. It shows how and to what extent output changes with variation in inputs during a specified period. The general production equation adopted was as shown in (equation 1).

$$Y = f(x_1, x_2, x_3 \dots x_n) \dots \dots \dots 1$$

Where  $Y$  represents mango output,  $x_1$  is land,  $x_2$  is labour  $x_3$  is the amount of capital used in production and  $x_n$  represents other factors that influence the farm output.

The production function shows the maximum amount of mango produced using alternative combinations of land, labour, and capital. Output  $Y$  is also the total physical product (TPP). The marginal physical product (MPP) of an input is the additional output produced by employing one more unit of that input while holding all other inputs constant. The log linearized Cobb-Douglas production function was applied in this study to express this production relationship. This model was most suitable for this study because it provides parameters that are easy to estimate and interpret. The model was expressed in the form shown below;

$$Y = f(X) = AX_1^{\beta_1} + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4, \beta_1 \dots \beta_4 > 0 \dots \dots \dots 2$$

Where  $Y$  is the quantity of mangoes produced (kgs);  $X_1$  is the active family labour (man-days),  $X_2$  is hired labour (man-days),  $X_3$  is the amount of manure applied (kgs) and  $X_4$  is the amount of pesticides applied (litres).

Considering the natural logarithm of the above equation, the production function was expressed as;

$$\ln Y = A + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \varepsilon \dots \dots \dots 3$$

Apart from the above measurable inputs used in mango production, there were other factors that influenced the amount of output obtained and were included in the model and presented as;

$$\ln Y = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 \dots + \beta_n \ln X_n + \alpha_1 z_1 + \dots \alpha_1 z_n + \varepsilon \dots \dots \dots 4$$

Where  $Y$  is the mango output,  $\beta_0$  is the vertical intercept,  $X_1$  to  $X_n$  are quantities of inputs used.  $\beta_1$  to  $\beta_n$  are the inputs co-efficient of the regressor or multiplier that describes the size of the effect the inputs have on the dependent variable  $Y$ .  $\alpha_1$  is the coefficient for socio-economic and institutional factors and  $z_1$  to  $z_n$  are the socio-economic and institutional factors.  $\ln$  is natural logarithm and  $\varepsilon$  is the composite error term.

## Results and Discussion

### Farm and Farmers Characteristics of the Sampled Respondents

The descriptive statistics demonstrated that the majority (73%) of the respondents were male farmers. This implies that the male-headed households in the study area dominate in mango farming. In addition, the mean age of the respondents was 57.82 years indicating that elderly people involved more in mango farming activity compared to the youths who engage in other off-farm activities. The results also indicated an average household size of six members. On

average, the sampled household head years of schooling (education) was 10 years. Education empowers a farmer to make informed decisions on production, marketing, and identify value addition opportunities where they exist.

The mean number of years spent in mango farming (farming experience) was 16.66 years. This indicates that most of the farmers had engaged in the farming of mangoes for many years and thus they had a good experience in mango farming. The mean of the total land size owned by the respondents was 2.5 hectares. In addition, the average farm size under mango farming was 1.29 hectares, which implies there is room for expansion of the mango enterprise.

The mean household income among the mango farmers was KES 25599.43 per month. Moreover, the average number of extension contacts between extension officers and mango farmers was 2.0 visits per year. This indicates that farmers in the study area received information regarding mango production and market supply. The average amount of mango produced by the farmers in the study area was 3011.20 kilograms per harvesting season. The results further indicate that the apple variety was predominantly (80%) grown by small-scale farmers in the study area, followed by Tommy variety (56%), Kent variety (29%), and Vandyke variety with 10%.

Table 1: Selected Farm and Farmers' Characteristics of the Sampled Farmers

Variables	Mean	Std. Dev
Gender (1=male, 0=female)	0.73	0.02
Age (years)	57.82	11.65
Household size	6.0	1.65
Education (years )	10.00	2.29
Farming experience(yrs)	16.66	9.09
Total farm size (hectares)	1.29	0.55
Household income (KES)	25599.43	25547.15
Extension contact (visits)	2.0	1.20
Quantity produced (kgs)	3011.20	1833.50
Mango varieties (Yes)		
Apple	0.80	0.12
Tommy	0.56	0.47
Kent	0.29	0.46
Van dyke	0.10	0.30

#### Maximum Likelihood Estimates of Stochastic Cobb-Douglas Regression Analysis

The Cobb-Douglas production function was estimated using the maximum likelihood estimation procedure in STATA software version 13. The outcome of the analysis is presented in Table 2. The sum of the  $\beta$  coefficients ( $\sum_{i=1}^4 \beta_i$ ) indicates the return to scale of a given production function (Martinho, 2017). A summation of  $\beta$  coefficients that is less than one ( $\sum_{i=1}^4 \beta_i < 1$ ), indicates decreasing returns to scale (DRS), while summation equal to one ( $\sum_{i=1}^4 \beta_i = 1$ ) indicates constant return to scale (CRS) and that greater than one ( $\sum_{i=1}^4 \beta_i > 1$ ) indicates an increasing return to scale (IRS). The sum of the estimated parameters of inputs used in mango production was found to be 0.463 which is less than one (Table 2), implying that mango output was found to be less than the proportion at which the inputs are increased (decreasing return to scale)

The results also indicate that a value of sigma squared ( $\sigma^2$ ) which denotes the goodness of fit and correctness of the distributional form assumed for the composite error term which had

a value of 0.0600 and was significant at 1% level. The value of Log-likelihood and that of Wald chi-square show that the specified model fits stochastic frontier estimation. Further, a lambda ( $\lambda$ ) value of 6.4092 was significantly different from zero, thus indicating deviations between actual and predicted mango output in the study area resulted from differences in production and management practices and not random variations.

Results in Table 2, shows the effects of inputs on mango output. The estimated parameters in the production function expressed positive coefficients. This implies that if more inputs were applied in equitable proportions, mango production would increase by the total value of associated coefficients. In terms of inputs used in mango production, the results revealed that active family labour and hired labour had a significant influence on the amount of mango produced. This can be explained by the fact that mango production is a labour-intensive activity and requires extensive management practices such as pruning, spraying as well as harvesting and this requires available and active labour. These findings are consistent with Dessale, (2018) that active family labour and hired labour were the key inputs that significantly influenced amount of farm output obtained by the farmers. In addition, labour was found to positively influence agricultural output among small-scale farmers (Kloss and Petrick, 2018; Ombuki, 2018).

The amount of pesticide and manure applied had a positive and significant influence on mango production. The results of the study show that one-unit increase in the amount of pesticide and manure increases the amount of output by 0.1818 and 0.0684 units respectively. Mango farmers in the study area apply farmyard manure to improve soil fertility, which in turn leads to improved quality and production while pesticides help to control fruit-fly pest, which is destructive to mango fruits. This study agrees with the findings by Ntakayo et al. (2016) that the amount of pesticides and organic fertilizer (manure) applied influence apple and mango output among small-scale farmers respectively.

Table 2: The results of the effects of inputs on mango output

Variables (inputs)	Parameter	Coef.	Std. Err.	Z	P-value
Constant	$\beta_0$	6.8241	0.1331	1.2800	0.0000
Ln family labour(man-day)	$\beta_1$	0.1272	0.0650	1.9600	0.0500**
Ln hired labour(man-day)	$\beta_2$	0.0860	0.0390	2.2100	0.0270**
Ln pesticides(litres)	$\beta_3$	0.1818	0.0236	7.6900	0.0000***
Ln manure (Kgs)	$\beta_4$	0.0684	0.0118	5.7900	0.0000***
Log-likelihood		-221.3531			
Wald chi2(4)		276.1900			
Lambda		6.4092	0.0403	158.8800	0.0000
Sigma squared $\sigma^2$		0.0600			0.0000

(\*\*\*, \*\* shows significant variables at 1% and 5%, respectively); Ln = natural logarithm.

### Factors Affecting Mango Production among Small-scale Farmers

Results in Table 3 shows the effects of selected socio-economic and institutional factors on mango farm-level output. The table gives statistical parameters that indicate various aspects of the analyzed data. These parameters include the alpha ( $\alpha$ ) coefficients, p-values (levels of significance), and the Variance Inflation Factor (VIF). The  $\alpha$  coefficients show the effects that given changes in the independent variables would have on the dependent variable. Multicollinearity test was done after model estimation. Multicollinearity problem occurs due to a linear relationship among the independent variables and therefore the separate effect of the independent variables on the dependent variables becomes difficult to identify because of the strong relationship between them (Martinho, 2017). Multicollinearity exists when the Variance Inflation Factor (VIF) of an independent variable exceeds 10 or less than one, none of the independent variables had VIF values less than 1 or greater than 10, implying that

there was no Multicollinearity problem (Table 3). The R-squared was 0.862 implying that the independent variables explained about 86% of the total variations in the mango output with the remaining 14% been due to uncontrollable factors in the model.

Table 3: Factors affecting mango farm-level output among small-scale farmers

Variables	Param eter	Coef.	Std. Err	Z	P-value	VIF
Gender(1=male,0=female )	$\alpha_1$	~ 0.0748	0.080 9	~ 0.9200	0.3550	1.09
Household age(yrs.)	$\alpha_2$	0.5410	0.338 6	1.6000	0.1100	4.13
Household size	$\alpha_3$	0.3875	0.180 7	2.1400	0.0320**	2.29
Level of education (yrs.)	$\alpha_4$	0.3161	0.232 9	1.3600	0.1750	3.05
Mango farming income(KES)	$\alpha_5$	0.1851	0.063 9	2.9000	0.0040***	1.04
Annual household income	$\alpha_6$	0.0625	0.030 1	2.0700	0.0780	1.53
Farm size (Ha)	$\alpha_7$	0.9170	0.166 4	5.5100	0.0000***	2.15
Amount of credit used (KES)	$\alpha_8$	0.1191	0.040 5	2.9400	0.0030***	1.24
Cost of pesticides (KES)	$\alpha_9$	~ 0.1888	0.060 7	~ 3.1100	0.0020***	5.95
Cost of manure (KES)	$\alpha_{10}$	~ 0.0934	0.033 3	~ 2.8000	0.0050***	6.07
Extension contact(visits)	$\alpha_{11}$	0.4726	0.091 1	5.1900	0.0000***	1.05
Constant	$\alpha_0$	~ 5.5208	1.827 5	~ 3.0200	0.0030	

\*\*\*, \*\* show significant variables at 1% and 5% levels; Prob>F=0.0000; R-squared=0.862; Mean VIF=2.69

An increase in household size by one-person increases mango output by 0.3875 units. The plausible explanation is that mango production is a labour-intensive activity and the size of the household determines labour required to undertake mango production and management activities, which in turn increases the level of output. These findings concur with Abubakar and Sule, (2019) results that one of the factors influencing the level of production and productivity of small-scale farmers is the household size. This contradicts results by Muyanga and Jayne, (2019) that large household size brings competition of resource and results to sub-division of land resulting to small-sizes allocated for crops this in turn reduces the amount of agricultural output.

Mango farming income was positive and significant at 1% level of significance. This indicates that an increase of mango income by one unit increases mango output by 0.1851 units. The plausible explanation is that income from mango farming determines the farmer's ability to access important resources and inputs such as manure, pesticides, and payments for labour, which are the key factors in agricultural production. These findings are in line with Alam et al. (2017) that income from mango farming had a significant influence on production among small-scale farmers.

An increase in farm size by one hectare increases mango output by 0.9170 units. The credible explanation for this is that mango farmers in the study area allocated land to mango farming

considering it as an income generating enterprise. Due to this farmers considered mango to be an important commercial crop and were interested in increasing land under mango production to create room for more improved varieties thus increasing the level of output. These results are in line with Alam et al. (2017) results that land allocated to mango farming (farm size) had a significant influence on the level of mango output among small-scale farmers. In contrary, previous studies have argued that smaller farms are more efficient than larger ones resulting to inverse relationship between farm size and production (Desiere, 2016; Daudi and Omotayo, 2018). This is because small farms are easily manageable by the poor resource-constrained small-scale farmers. However, this is not applicable to permanent fruit trees like mangoes that occupy large space thus farmers require huge piece of land in order to increase the number of trees and thus increased yield.

The amount of credit used by the farmer had a positive influence on mango production at 1% level of significance. The positive  $\alpha$  coefficient shows that an increase in the amount of credit accessed by one unit increases mango output by 0.1191 units. This can be attributed to the fact that credit is critical in financing of inputs such as manure, fertilizers, pesticides, and herbicides hence increasing the chances of high production. Similarly, access to farm credits was among the essential factors needed for agricultural production, and with it, farmers were able to secure farm inputs such as; farm equipment, fertilizer, and hired labour thus increasing the level of agricultural output among small-scale farmers (Mohammed et al., 2016; Udoka et al., 2016).

As expected, the cost of pesticides had a negative influence on mango output. An increase in the cost of pesticides by one unit reduced the amount of mango output by 0.1818 units. The study found that the cost of pesticides was higher than what farmers can afford to buy and this lead to massive destruction of the fruits by fruit-fly pest thus leading to reduced level of production. Findings by Mrema, (2017) was that an increase in cost of pesticides and herbicides reduces production among small-scale farmers. The cost of manure was found to have a negative significant influence on mango production. An increase in the cost of manure by one unit reduces the amount of mango output by a factor of 0.0934. Information obtained from farmers who did not keep livestock was that, the cost of manure was higher and thus they could not afford and this had side negative effect on soil fertility leading to decreased yield. These results are in line with findings by Tun et al. (2020) that an increase in the cost of manure reduces the amount of agricultural output in the dry zone of Myanmar.

The extension contacts positively influenced mango output at 1% level of significance. The positive  $\alpha$  coefficient indicates that an increase in the extension contact increases mango output by 0.4726 units. The positive impact signifies that effective and efficient extension contact between farmers and extension officers is very crucial in agricultural production as it determines how efficient improved production practices will be delivered to the farmers within their location and how these practices shall be adopted by the targeted farmers. Contrary to these findings Ntakayo et al. (2016) established that the number of extension visits had no significant influence on apple production among small-scale farmers. The reason behind this was that farmers did not appropriately apply techniques delivered by extension agents such as use of improved production technologies such as pruning and spraying among others.

### **Conclusions and Recommendations**

The study concludes that, active family, hired labour, pesticides, and manure were the inputs that influenced mango output with a 0.463 return to scale. Further, household size, mango farming income, farm size, amount of credit, and extension contacts were the factors that exhibited a positive effect on mango production among small-scale farmers, while the cost of pesticides and cost of manure precipitated a negative effect on mango production. The area of land allocated to mango enterprise by small-scale farmers determines the number of

trees owned and this reflects the level of output. Extension contact between the farmers and extension officers is vital as it determines how efficient improved mango production practices will be delivered to the farmers within their location and how these practices shall be adopted by the targeted farmers.

This study recommends to the Ministry of Agriculture in collaboration with the County Government and other private sectors to strengthen the extension contact between farmers and agricultural extension agents by making frequent visits to mango farmers and organizing training programs to encourage them to apply good management practices for improved production. Furthermore, small-scale mango farmers access to functional input markets will enhance farm-level mango output.

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## Determinants of Quantity of Mango Supply among Small-Scale Farmers in Machakos County, Kenya

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### Abstract

In Kenya, mango production is mainly practiced by small-scale farmers as a source of income, form of employment, food and nutrition. Farmers are able to produce more than the amount required to satisfy consumption at the household level. However, there exists a weak linkage with the markets, and thus the opportunity to diversify the farmers' livelihood from mango production is limited. This study was conducted to evaluate the factors influencing the quantity of mangoes supplied to the market among small-scale farmers in Machakos County, with the aim enhancing the farmers' market participation. Primary data was obtained using a semi-structured interview schedule. Two-stage sampling technique procedure was used to obtain a sample comprising 352 small-scale mango farmers. The two-stage least square regression model was used to determine the effect of selected factors on quantity supplied to the market. The results revealed that the quantity of mangoes produced, market prices, market access, extension contact, amount of credit accessed positively and significantly influenced the quantity of mangoes supplied. While the age of household head precipitated a negative effect on quantity supplied. Based on these findings, the researcher recommends enactment of appropriate policies by the policy makers to facilitate extension contact, access to credit and market outlets to enhance farmers' market participation.

**Keywords:** *Mango production, quantity supplied, market participation, two-stage least square regression*

### 1. Introduction

Mango (*Mangifera indica L.*) is the second most important fruit in the tropics and subtropics after banana. It is commercially grown in more than 90 countries worldwide and consumed in both fresh and processed forms (Mathooko *et al.*, 2013). India is the largest producer of mango, accounting for 50% of the global output. Kenya is among the leading producers of mangoes in Africa (United States Agency for International Development, 2018). Mango production targets fresh fruit markets and the processing industry. Additionally, its fruit flavor and high nutritional value have placed it in a higher popular position as a source of income to farmers, traders, and international markets (Rodriguez *et al.*, 2012). The quantity of agricultural produce supplied to market depends on various activities along the value chain such as planning for the production, grading, transport, distribution, pricing, sending information from the farm to the market (Jemal *et al.*, 2019). Currently, most of the developing countries have sought to improve their production and marketing of agricultural produce to accelerate economic growth, create employment and alleviate poverty (Asfaw *et al.*, 2010; Jemal *et al.*, 2019). Small-scale farmers participation in marketing of their produce enables them to increase their household income and ability to purchase necessities in return (Schneider and Gugerty, 2010; Holzapfel *et al.*, 2014). However, in the absence of well-functioning markets, agricultural production can experience a lot of problems more so to the perishable horticultural produce like mango fruits (Kassa *et al.*, 2017).

Supply of agricultural produce to the market is usually thought to be only in large scale farming and economists tend to ignore the fact that small-scale farmers and poor farm households participate in the market either because they produce some surplus or sell to earn

income for purchase of necessities (Martey *et al.*, 2012). In Kenya, brokers form the largest group of mango sellers and they operate majorly in an environment of uncertainty and avoid entering into formal contracts with the farmers. This creates fear among the farmers but still, they sell their products to them to avoid high transaction costs that are experienced along the marketing chain (Msabeni *et al.*, 2012). In the case where the markets have been subverted by brokers, farmers organize themselves into marketing groups or cooperatives to access the market. This gives them more bargaining power for their produce over brokers, who often manipulate and control the prices in the marketing system which in turn increases farmers' income as well as the quantity of produce supplied to the market (Shiferaw *et al.*, 2011; Panda and Sreekumar, 2012).

Diversification into horticultural produce is becoming more attractive to small-scale rural farmers across the globe. This is because the worldwide production of fruits has grown faster compared to cereal crops and the total value of the horticultural crops traded at present is more than double that of cereals (Pingali, 2015; Mariyono, 2020). As a result of this, farmers involved in horticultural production usually earn much higher farm incomes as compared to cereal producers, and their per capita income is also five times higher than cereal producers (Ayalew, 2015). The Horticultural Crops Directorate (2018) has classified mango as a permanent horticultural crop which means it occupied the field for a long period and does not have to be replanted for several years after each harvest. Most permanent crops produced by smallholder farmers are marketed by the non-public entrepreneurs who operate in the marketing value chain and distributes the products to terminal markets (Kassa *et al.*, 2017). Thus, the marketing chains are well known, however, smallholders specifically face high costs in accessing markets, inadequate and uncoordinated crop market information systems.

In Kenya, the area under mango cultivation has been increasing over the years to 46,364 hectares in 2017 and 49,098 hectares in 2018 respectively (Horticultural Crop Directorate, 2018). Statistics show that mango cultivation contributes approximately 5% of the Agricultural Gross Domestic Products (GDP) and 2% of the national GDP, employing a considerable number of the seasonal labour force (Ministry of Agriculture Livestock and Fisheries, 2018). Literature shows that small-scale fruit farmers have been excluded from the marketing value chain due to lack of economies of scale, poor linkages to market, inadequate market information and dissemination as well as other socio-economic and institutional factors (Senyolo *et al.*, 2018). For instance, farming experience, farm gate price, and the quantity produced were the factors found to influence the quantity of mangoes, banana, and avocado supplied among small-scale farmers (Tadesse *et al.*, 2011; Pamphile *et al.*, 2018). Besides, household heads education level, market price, extension services, training, and middlemen affects the quantity of fruits and vegetables supplied to the market (Wollo and Mba, 2015; Jaji *et al.*, 2018; Jemal *et al.*, 2019). In Kenya, marketing of mango fruits is not well organized. It is estimated that the price of mango is low at the farm-level while postharvest losses could be of up to 30% which is a disincentive to production (Muthini, 2015).

Machakos County is the second leading producer of mangoes in Kenya after Makueni with 803,533 trees and an output of 67,320 metric tons (MT), which is valued at Kenyan shillings (KES) 835,580,274 (MoALF, 2018). Moreover, 40-60% of the population in the county engage in the mango value chain. Several studies carried out in the County have focused on assessment of mango farmers choice of marketing channels and also the impact of market participation on mango farmers (Mwagangi, 2012; Muthini, 2015). There is limited understanding though, about the factors that influence the quantity of mango supply. This paper, therefore, focuses on bridging the said knowledge dearth in Machakos County, Kenya. Our contribution to the gap is two fold. First we evaluate and expand the scope of socio-economic and institutional factors that influence the supply of mangoes. Secondly we apply

the Two-stage least square (2SLS) regression model that has not been widely used in similar studies for analysis.

## 2. Materials and methods

### 2.1 Description of the study area

The study was carried out in Machakos County, Kenya. The County is located on latitude 0°45'S and longitude 36°45'E. It is bounded in the West, North, East, South, South West and North West by Nairobi and Kiambu, Embu, Kitui, Makueni, Kajiado, Muranga, and Kirinyaga respectively. The County covers an area of 6,208km<sup>2</sup> and has a population of 1,421,932 (Kenya Bureau of Statistics, 2019). In addition, the study area receives a bimodal rainfall pattern, with the long rains experienced in March to May, while short rains are received between October and November. The average annual rainfall ranges between 500 to 1300 mm per annum and temperatures range between 18°C -25.7°C (Government of Kenya, 2018). These conditions are suitable for mango farming.

### 2.2 Sampling methods and procedures

The study employed two-stage stratified sampling to collect data from 352 mango farming households in Machakos County (Table 1). Firstly, the six major mango producing wards in the County (Mbiuni, Makutano/Mwala, Masii, Muthetheni, Wamunyu, and Kibauni) were purposively selected. Secondly, a location was randomly selected from each of the six wards. Further, a sub-location was selected from each location and finally, a village was randomly selected from each Sub-location. To obtain the number of mango farming households to be interviewed in each village probability proportionate to size technique was applied. In this case, the total population of mango farming households in each village was divided by the total number of mango farming households in the selected villages then multiplied by the sample size. The interval between the households to be interviewed was estimated by dividing the total number of households in the village by the required number of households as shown below.

$$M = \frac{n}{N} * 352 \dots\dots\dots 1$$

Where  $M$  is the number of mango-farming households to be interviewed,  $n$  is the number of mango-farming households in the village, and  $N$  is the total number of mango-farming households in the six villages randomly selected. The second step involved identifying the first household randomly and the interval between the households. This was estimated by dividing the total number of mango-farming households in the village by the required number of households from the village ( $\frac{n}{M}$ ).

Table 1: Summary of mango farming households interviewed in each selected village

Wards	Location	Sub-location	Village	No.of farmers	Sample size
Kibauni	Ikalasaa	Kamuthwa	Kyeni	47	39
Makutano	Makutano/Mwala	Mathunthini	Misuuni	70	59
Mbiuni	Mbiuni	Kabaa	Kabaa	53	44
Masii	Masii	Mbaani	Kawaa	109	91
Muthetheni	Miu	Kikulumi	Makulumu	78	65
Wamunyu	Wamunyu	Kaitha	Kaitha	65	54
<b>Total</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>422</b>	<b>352</b>

### 3. Theoretical framework

This study also appealed to market supply theory to explain the relationship between the selected factors and the quantity of mango supplied to the market. Supply is the willingness and the ability to sell a good and service. This theory assumes that the supply of goods depends on the market price as well as the cost of producing goods using an additional unit (Richard *et al.*, 2011). The greater the difference between the two values the greater the willingness of producers to supply the good. The willingness to supply the goods depends on the price of that good and the wage rate. In this case, the majority of small-scale mango farmers targeted valuable markets that offer higher prices, this is determined by the quantity of mangoes produced. That is, the oversupply of mango produce to the market reflected in low prices and vice versa. This concept was represented in an individual's seller supply function equation as shown below;

$$Q_x^S = f(p_x, w, \dots, n) \dots \dots \dots 2$$

Where  $Q_x^S$  is the quantity supplied of mangoes,  $p_x$  is the price per unit of mangoes produced and  $w$  is labour and  $n$  represents factors such as the quantity of mangoes produced, household head age, market prices, market access, extension contact and amount of credit which had a significant influence on the quantity of mangoes supplied.

To determine the influence of the selected socio-economic and institutional factors on the quantity of mango supplied to the markets, a supply function represented in form of a stochastic two-stage least square (2SLS) multiple regression model was used to estimate the effect of selected factors on the quantity of mangoes supplied to the market. In the first stage of the 2SLS model, mango output was regressed over all the selected independent variables including the instrumental variables. The first stage equation is given as;

$$Y_{1i} = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 \dots \dots \alpha_n X_n + \varepsilon \dots \dots \dots 3$$

Where,  $Y_{1i}$  is the predicted quantity of mangoes produced by household  $i$ .  $\alpha_0$  is the intercept,  $\alpha_1$  to  $\alpha_n$  represents the parameter estimates of the independent variables included in the equation and  $\varepsilon$  is the error term.

In the second stage of the 2SLS model, the quantity of mangoes supplied was regressed over independent variables which includes the endogeneous variable (predicted quantity of mangoes produced) and the exogeneous variables (variables used in first stage model excluding the instrumental variables). The second stage of the 2SLS equation is given below;

$$Y_i = \beta_0 + \delta_{Y_{1i}} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \dots \beta_n X_n + \varepsilon \dots \dots \dots 4$$

Where  $Y_i$  is the dependent variable (quantity supplied to market),  $\beta_0$  is the vertical intercept showing values of  $Y$  when variables  $X_1$  to  $X_n$  are considered to be the factors affecting quantities of mangoes supplied.  $\delta_{Y_{1i}}$  is the endogeneous variable (predicted quantity of mangoes produced),  $\beta_1, \beta_2 \dots \beta_n$  are the coefficients of independent variables, while  $X_1, X_2 \dots X_n$  are the independent variables and  $\varepsilon$  is the error term.

### 4. Methods of data analysis

The study employed both descriptive and inferential statistics. Descriptive analysis consist of means and standard deviations. Further, two-stage regression model was used to analyze the determinants of the quantity of mangoes supply. The data was analyzed using STATA version

13 software. Multicollinearity, heteroscedasticity and endogeneity tests were done after model estimation. Multicollinearity problem occurs due to a linear relationship among the independent variables and therefore the separate effect of the independent variables on the dependent variables becomes difficult to identify because of the strong relationship between them (Gujarati, 2003). Multicollinearity exists when the Variance Inflation Factor (VIF) of an independent variable exceeds 10 or less than one, none of the independent variables had VIF values less than 1 or greater than 10, implying that there was no multicollinearity problem (Appendix 1).

Heteroscedasticity test was done to ensure the regression model assumption that the residual should have a constant variance was not violated. The heteroscedasticity problem occurs when the variance of error term is not constant and affects the elasticity of output of linear regression models since the parameter estimates of such a model are likely not to be the best linear unbiased estimator. The Breusch-Pagan test was employed to check for the presence of heteroscedasticity. The chi<sup>2</sup> (1) value was 0.11 and the probability value was 0.7367. Since the probability was greater than chi<sup>2</sup> (1) in the Breusch-Pagan test the null hypothesis (Constant variance) was accepted and no heteroscedasticity problem in the data set (Appendix 2). The Durbin and Wu-Hausman tests were employed to check for the endogeneity problem. The results show Durbin (score) chi<sup>2</sup> (1) = 0.3939 with (p-value = 0.03) and Wu-Hausman F (1,331) = 0.3707 with (p-value = 0.02). Since all the p-values were significant at  $p \leq 0.05$ , the null hypothesis of exogeneity of predicted quantity of mango produced was rejected at 5% level of significance (Appendix 2). This indicated the presence of endogeneity problem. Therefore, two stage least square model was used to address the endogeneity problem.

Two Stage Least Square (2SLS) model uses two separate stages during analysis in order to avoid endogeneity problems (Woodridge, 2010). Endogeneity exists when the explanatory variable correlates with the structural error term of the data set in the model. In such a situation, the disturbance term is not random hence inconsistent estimation implying that, the coefficient estimates of the independent variable fail to converge to the true value of the coefficient as sample size increases. Endogeneity problem occurs due to omission of variables, measurement error in variables, and simultaneous causality (Woodridge, 2010). In order to obtain consistent estimation, application of instrumental variables (IV) estimation is recommended because to cut correlation between the error term and independent variables. The instrumental variables should meet two requirements; uncorrelated with the error term and strongly correlated with endogenous regressor (quantity produced). In this case land size, pesticides and manure were used as the instrumental variables. The validity of the instrumental variables was tested at this stage. The F-statistics results was found to be 77.38%. The rule of thumb indicates that F less than 10 indicates invalid instrumental variables. For this case, F-value was greater than the critical value hence this indicated valid instrumental variables.

## **5. Results and discussion**

### **5.1 Descriptive statistics**

The results show that, majority (73%) of the respondents were male farmers (Table 2). This implies that mango farming in the study area is dominated by male farmers. Besides, the mean age of the respondents was 57.82 years. This indicates that elderly people dominate in mango farming. Furthermore, the mean of household size was 6.0. On average, the sampled household years of schooling (education) was 10 years. Education enables farmers to make well-versed decisions and detect market opportunities where they exist. The mean number of years spent in mango farming (farming experience) was 16.66years. This indicates that most of the farmers had a good experience in mango farming. The average farm size was found to be 1.29 hectares. This shows that farmers have adequate land for mango production.

The mean household income among the mango farmers in the study area was (KES 25599.43). Moreover, the average number of extension contact was found to be 2.0. This implies that small-scale farmers in the study area had access to information regarding mango production and marketing. The mean of the predicted amount of mango produced by the farmers in the study area was 3011.20 kilograms.

Table 2: Farm and farmers characteristics of the sampled farmers

Variables	Mean	Std. Dev
Gender (1=male, 0=female)	0.73	0.02
Age (years)	57.82	11.65
Household size	6.0	1.65
Education (years )	10.00	2.29
Farming experience(yrs)	16.66	9.09
Total farm size (hectares)	1.29	0.55
Household income (KES)	25599.43	25547.15
Extension contact (visits)	2.0	1.20
Quantity produced (kgs)	3011.20	1833.50

Source: Authors (2020)

### 5.2 First stage regression results for 2SLS model

The results of the first stage for 2SLS model are presented in Table 3. In this stage the quantity of mangoes produced was analysed over the independent variables including the instrumental variables. The results shows that land size, manure and pesticide had the strongest correlation with predicted quantity of mango produced hence qualified to be used as the instrumental variables in the study. Land size had a positive and significant effect on quantity of mangoes produced at 1% level of significance. The results indicate that an increase in land size by one unit increased the quantity produced by 0.5011 units. In addition, manure had a positive and significant effect on quantity of mangoes produced at 1% level of significance. The results also indicated that an increase in the amount of manure by one unit increases the quantity produced by 0.5747 units. Pesticides had a positive and significant effect on the quantity of mangoes produced at 5% level of significance. The results show that an increase in pesticide application to mango trees by one unit increases the quantity produced by 0.6047 units.

Table 3: Factors affecting quantity of mangoes produced

Variables	Coef.	Standard error	t	P-value
Gender (1=male, 0=female)	-0.0474	0.0524	-0.90	0.366
Household head Education (level)	0.0324	0.0651	0.50	0.618
Distance to nearest market (Km)	-0.0234	0.0569	-0.41	0.680
Distance to motorable road (Km)	-0.0654	0.0716	-0.91	0.362
Household age (yrs)	0.1211	0.0579	2.09	0.034
Household size	0.1300	0.1108	1.17	0.242
Land size (hectares)	0.5011	0.0460	10.90	0.000***
Farming experience(years)	0.2675	0.0818	3.27	0.001
Market prices (KES)	-0.2252	0.1388	-1.62	0.106
Family labour (Man-days )	-0.1797	0.0841	-2.14	0.033
Hired labour (Man-days)	0.0175	0.0358	0.49	0.626
Manure (kgs )	0.5747	0.2038	2.82	0.005***
Market information	-0.1616	0.1940	-0.83	0.406
Market access	0.1040	0.0555	1.87	0.062
Training (1=Yes, 0=No)	0.0463	0.0366	1.27	0.206
Off-farm income (KES)	0.2002	0.0781	2.56	0.011
Group membership	0.3599	0.0757	4.75	0.000

Pesticides (Kgs)	0.6047	0.2838	2.13	0.037**
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Source: Authors (2020); (\*\*P ≤ 0.01, \*\*P ≤ 0.05)

### 5.3 Determinants of market supply of mangoes among small-scale farmers

The second stage of 2SLS regression model presented the determinants of the quantity of mangoes supplied (Table 4). The dependent variable (quantity supplied to the market) was determined as the amount of mangoes sold from the yield after considering household consumption, the amount purchased for sale and amount given or received as gifts but was sold during harvesting season. The independent variables are hypothesized to explain the change in the quantity supplied. Based on the results, the coefficient of determination  $R^2$  was 0.9225 indicating that a combination of independent variables used in the regression model explained 92.25% of the variation in the dependent variable with the remaining 7.75% been due to uncontrollable factors in the regression model.

The regression coefficient of quantity of mangoes produced was positive and significant at 1% level of significance. The results indicate an increase in amount of mangoes produced by one unit resulted to an increase in market supply of mangoes by 0.8944 units. The credible explanation of this is that farmers who produce more output are expected to supply more to the market than those who produce less. The higher the farmer produces, the more likely the household would supply. These results agree with Tadesse, (2011) and Ayalew, (2015) that the quantity produced positively influenced the amount of market supply of fruits.

Age of household head had a negative and statistically significant influence on quantity supply of mangoes. The relationship shows that an increase in the age of the farmer by one year reduces the quantity of mangoes supplied to the market by 0.1455 units. This may be explained by the fact that majority of the youths in the study area have increased the quantity of mango marketed through use of available modern technology platforms such as Mkulima Young online. These results are consistent with the findings of (Geoffrey *et al.*, 2014; Megerssa *et al.*, 2020) that young people participate much and supply more produce to the market compared to the older people because they are more receptive to new ideas and are less risk averse than older people.

Market price had a positive and significant influence on the quantity supplied at 1% level of significance. The results indicate that, an increase in market price by one unit resulted to an increase in the quantity supplied by 0.1741 units. This positive relationship reveals that the probability of quantity of mangoes supplied is higher when the market price of mangoes is high. The results further point out that higher market prices would enhance the farmer willingness to produce more and in effect increase the quantity of mangoes sold to the market by small-scale farmers. These results are in line with Birachi *et al.* (2011) and Jaji *et al.* (2018) findings that an increase in price had a positive influence on the quantity of beans and pineapples supplied to the market respectively.

In this study, market access was considered as the availability of local markets that are adjacent to the mango farmers and where they meet with the buyers to sell their produce. Market access showed a positive and significant influence on market supply of mangoes by 0.0571 units. Majority of small-scale mango farmers in the study area sell their produce to local markets and particularly during market days. This is explained by the fact that, these markets are the meeting points of various buyers and mango sellers where there is free haggling which determines prices rather than selling to the brokers at the farm gate. These results corroborate with Sebatta *et al.* (2014) and Osmani and Hossain, (2015) that farmers who have access to market usually produce and supply more to the market than their counterparts without such opportunities.

The coefficient of extension contact was positive and significant at 5% level of significance. This implies that an increase in contact between the extension officers and farmers increases the quantity supplied by 0.1919 units. Extension contact improves the ability of mango farming household to acquire new technologies and capacities of production, further improve productivity and in turn increases the market supply. Similarly, extension contact was found to influence the quantity of produce supplied to the market among small-scale farmers (Siziba *et al.*, 2011; Tedesse *et al.*, 2011; Abrha *et al.*, 2020). Contrary, Tegegn, (2013) and Wosene *et al.* (2018) found that the frequency of extension service had a negative effect on the quantity supplied to the market as farmers who access extension service do not appropriately apply the techniques and advice suggested by the extension agents.

Amount of credit accessed with respect to marketing was positive and significant at 1% level of significance. The results show that an increase in the amount of credit accessed by one unit increases mango market supply by 0.1925units. Farmers who have access to credit would increase their financial capacity as it assists to make proper decision regarding purchasing of mango farming inputs e.g seedlings, manure, pesticides and labour that increases mango production and quantity of market supply. These results are in line with studies by (Bongiwe and Micah, 2013; Tesfaw, 2014; Mahlet, 2015; Girmalem *et al.*, 2019) that access to credit influenced the quantity of cabbage, pepper, potato and mangoes supplied to the market respectively.

Table 4: Determinants of the quantity of mango supplied to the market (2SLS results)

Variables	Coef.	Robust S.E	Z	P-value
Quantity of mangoes produced (Kgs)	0.8944	0.03918	22.8300	0.0000***
Gender (1=male, 0=female)	-0.0125	0.0241	-0.5200	0.6020
Household head education level	0.0242	0.0299	0.8100	0.4190
Distance to nearest market (Km)	0.0056	0.0262	0.2100	0.8300
Distance to motorable road (Km)	-0.0317	0.0330	-0.9600	0.3380
Household head age (Yrs)	-0.1455	0.0512	-2.8400	0.0040***
Household size	-0.2476	0.1325	-1.8700	0.0620
Farming experience (Yrs)	0.0325	0.0390	0.8300	0.4050
Market prices (KES)	0.1741	0.0644	2.7000	0.0070***
Family labour (Man-days)	0.0323	0.0393	-0.8200	0.4100
Hired labour (Man-days)	-0.0179	0.0164	-1.0800	0.2780
Market information	0.0943	0.0894	1.0600	0.2910
Market access	0.0571	0.0258	2.2100	0.0270**
Training (1= Yes, 0=No)	0.0161	0.0169	0.9600	0.3390
Off-farm income (KES)	0.0340	0.0368	0.9300	0.3550
Group membership	0.0272	0.0375	0.7300	0.4680
Farm size (hectares)	0.0310	0.0288	1.0700	0.2830
Extension contact (No. of visits)	0.1919	0.0962	1.9900	0.0460**
Amount of credit (KES)	0.1925	0.0270	7.1200	0.0000***

Source: Authors (2020); (\*\*\*) $P \leq 0.01$ , (\*\*) $P \leq 0.05$ ; Prob > chi2 = 0.0000,  $R^2 = 0.9225$

## 6. Conclusions and Recommendations

In Kenya, tropical fruits such as mangoes play a great role in the household economy. Machakos County has good potential for mango production but with less market-oriented activities. Despite the economic importance of mango fruit in the study area, there has been limited studies relating to marketing. Mangoes have a relatively high value in the domestic markets. However, a lot of the mango produce has often been used for domestic consumption with little reaching the market due to multiple factors. This study established that the quantity of mangoes produced, market prices, market access, extension contact and amount of credit accessed positively influenced the quantity of mangoes supply, while the age of the household head precipitated a negative effect. The study recommends to the farmers to increase the quantity of mangoes produced by applying modern methods of farming and management practices which in turn reflects increased supply to the market. In addition, there is need to increase extension contact between mango farmers and extension agents so as to update farmers knowledge and skills with improved production and marketing system. It is also crucial to support mango farmers with adequate financial support through greater access to affordable credit for production and marketing purpose

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## Appedices

### Appendix 1: Test for Multicollinearity problem for the explanatory variables

Variable	VIF	1/VIF
Household age (yrs)	6.97	0.143
Farming experience(years)	5.12	0.195
Training (1=Yes, 0=No)	4.94	0.202
Market information	4.01	0.249
Extension contact (No.of visits )	3.85	0.260
Group membership	3.27	0.306

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Distance to nearest market (Km)	2.50	0.400
Education (level)	2.38	0.420
Family labour (man-days )	2.34	0.427
Market prices (KES)	2.30	0.436
Household size	2.25	0.444
Distance to motorable road (Km)	2.14	0.467
Off-farm income (KES)	1.63	0.612
Market access	1.58	0.633
Farm size (hectares)	1.37	0.728
Amount of credit (KES)	1.35	0.741
Gender (1=male, 0=female)	1.10	0.912
Hired labour (Man days )	1.09	0.917
<b>Mean VIF</b>	<b>2.79</b>	

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Appendix 2: Test for Heteroscedasticity and endogeneity

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**Heteroscedasticity test**

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance

Variables: fitted values of quantity sold

chi2(1) = 0.11

Prob > chi2 = 0.7367

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**Endogeneity test**

Durbin (score) chi2(1)= 0.3939 (p = 0.03)

Wu-Hausman F(1,331)= 0.3707 (p= 0.02)

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## Prevalence of Banana Xanthomonas Wilt in Nithi, Tharaka-Nithi County in Kenya

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### Abstract

Banana (*Musa* spp.) is a nutrient rich crop that is grown in small and large scale across the globe. It is rich in carbohydrates, vitamins and minerals thus, may serve as the source of nutrition in low resourced regions such as Tharaka Nithi County, Kenya. However, banana production in many areas is faced with biotic constraints such as banana Xanthomonas wilt (BXW) disease caused by *Xanthomonas campestris* p.v *musacearum*. The pathogen attacks photosynthetic leaves and young fruits, reducing palatability and marketability. There is currently scanty information on prevalence of BXW in Nithi region of Tharaka Nithi County. Additionally, it remains unclear whether farmers in the region are knowledgeable on occurrence of BXW disease, symptoms and management practices. The prevalence of BXW was assessed through survey method in five villages (Kiang'onde, Marima, Mitheru, Kibumbu and Giampampo) in Nithi. Percentage BXW prevalence in the studied villages was not significantly different ( $p > 0.05$ ). However, slightly higher BXW prevalence value of 21.14% was recorded at Giampampo village and was lower at Mitheru 11.24%. There was significant relationship ( $X^2 (8, N = 46) = 19.93, p = 0.0034$ ) between banana variety grown and occurrence of banana diseases. There was significant relationship ( $X^2 (8, N = 46) = 31.165, p = 0.0053$ ) between banana variety grown and susceptibility to diseases. The relationship between years of growing banana in the same farm and occurrence of banana diseases was significant ( $X^2 (6, N = 46) = 8.761, p < 0.0001$ ). The relationship between occurrence of banana diseases and season of the year was significant ( $X^2 (8, N = 46) = 32.4591, p < 0.0001$ ). The relationship between occurrence of banana diseases and management option in Nithi was significant ( $X^2 (4, N = 46) = 6.9758, p = 0.0025$ ). Majority of the farmers (92%) were unaware of existence of BXW in the region. Farmers expressed lack of knowledge on methods of managing BXW diseases in their banana farms with majority not being able to identify common diseases of banana. Based on these observations, there is need to educate farmers on best banana farming practices, disease identification and management.

**Key words:** *Banana, Xanthomonas-wilt, Tharaka-Nithi, Kenya*

### 1.1 Introduction

Banana (*Musa* spp.) is one of the most grown food crops in the world, taking the fourth position after maize, rice and wheat (FAOSTAT, 2018). Banana is an important dietary source of carbohydrates and vitamins (Tripathi *et al.*, 2010; Dotto *et al.*, 2020), and other nutrients including potassium, proteins and fats (Joan *et al.*, 2012; Serrem *et al.*, 2020). Further, banana is a source of income for many rural households (Kamal *et al.*, 2014; Voora *et al.*, 2020). India is the largest producer of bananas in the world with 31 million metric tons per annum (p.a) followed by China with about 12,075,238

metric tons per annum and Philippines with 8,645,749 tons p.a (Tripathi *et al.*, 2010; Dale *et al.*, 2017; Greenfield, 2020). In Kenya, bananas are produced by small and large-scale farmers, mainly for the local market and household consumption (Okoko *et al.*, 2019). Regionally, Meru County takes the first position in banana production (19%), Kirinyaga county takes the second position (14%). Embu takes the third position (12%). Other banana producing counties include: Tharaka

Nithi (6%), Bungoma (5%), Kakamega (5%), Kisii (6%), Nyamira (5%), Taita Taveta (9%) Migori and Homa Bay Counties (5%), Muranga at 7% (Agwara, 2017).

Despite its nutritional and economic importance, the production of bananas is threatened by a variety of biotic and abiotic factors that include pests and diseases (Orr and Nelson, 2018; Nansamba *et al.*, 2020). Some of the diseases that constrain banana production in world are *Fusarium* and *Xanthomonas* wilts (Dale *et al.*, 2017). Banana *Xanthomonas* wilt (BXW) is caused by *Xanthomonas campestris* p.v. *musacearum* (Kwach, 2012). Fruit symptoms include internal discoloration and premature ripening while the inflorescence gradually wilt and yellow accompanied by shrivelling of male buds and bracts (Dale *et al.*, 2017). The disease may cause up to 100% banana yield loss resulting from reduced photosynthesis activity (Tushemereirwe *et al.*, 2003; Ochola *et al.*, 2015).

The BXW is a major constraint in banana production globally and has been reported in African countries such as Uganda, Tanzania as well as Kenya (Ocimati *et al.*, 2013a; Blomme *et al.*, 2014; Nakato *et al.*, 2018). In East Africa, economic losses due to BXW range from \$2 to \$8 billion (Abele and Pillay, 2007; Nkuba *et al.*, 2015). In Kenya, BXW is widely spread and has been reported in Teso, Bungoma and Busia, Bumula, Yala, Bondo, Siaya, Mumias, Butere, Kisumu and Mt Elgon areas (Tripathi *et al.*, 2007; Mbaka *et al.*, 2009; Onyango *et al.*, 2012; Kwach *et al.*, 2012; Geberewold and Yildiz, 2019). However, information on the occurrence and distribution of the disease in other regions of Kenya, such as Tharaka Nithi County is limited. Knowledge of BXW occurrence in the County can be useful in development of its management strategies (Tripathi and Tripathi, 2009). The objective of this study was to determine the prevalence of BXW and gather information on farmer's knowledge and disease management practices in selected villages in Nithi region of Tharaka Nithi County in Kenya.

## 2.0 Materials and methods

### 2.1 The area of study

The study on banana *Xanthomonas* wilt was carried out in Tharaka Nithi County in Kenya within Nithi region which comprise of Maara and Chuka Igambangombe Sub Counties. Tharaka Nithi County borders Embu, Nyeri, Kitui and Meru Counties (Fig. 1). Tharaka Nithi County is divided into 4 sub counties that is: Maara, Tharaka North, Tharaka south and Chuka Igamba N'gombe. The study was specifically carried out Chuka Igambang'ombe with altitude of 5200m and in Maara with an altitude of 600 m (Jaetzold *et al.*, 2007).

### 2.2 Sampling procedure and sample size

Study on *Xanthomonas* wilt of banana in the farms was done using cross sectional survey method. Selected banana farmers and farms were visited once and information regarding banana varieties grown, occurrence of banana diseases in the farm, banana variety susceptible to diseases, duration for which banana have been growing in the same farm, season in which banana diseases is common, disease management method used by the farmer and lastly, farmers knowledge on banana *Xanthomonas* wilt was also enquired. Farm survey on selected farms for the actual occurrence of *Xanthomonas* wilt of banana was done using transects laid across the farm. The villages surveyed included Maara village, Mitheru village, Giampampo village, Kibumbu village and Kiangondu village. The questionnaires were administered to the 46 farmers. Out of 46 farmers 15 farms were randomly picked for actual farm survey for BXW with three farms in every village. The five villages

above were selected purposefully for the study since they are main banana producing areas in Maara and Chuka Igambang'ombe Sub-Counties with farms measuring 0.5 acres and above were estimated to be 100.

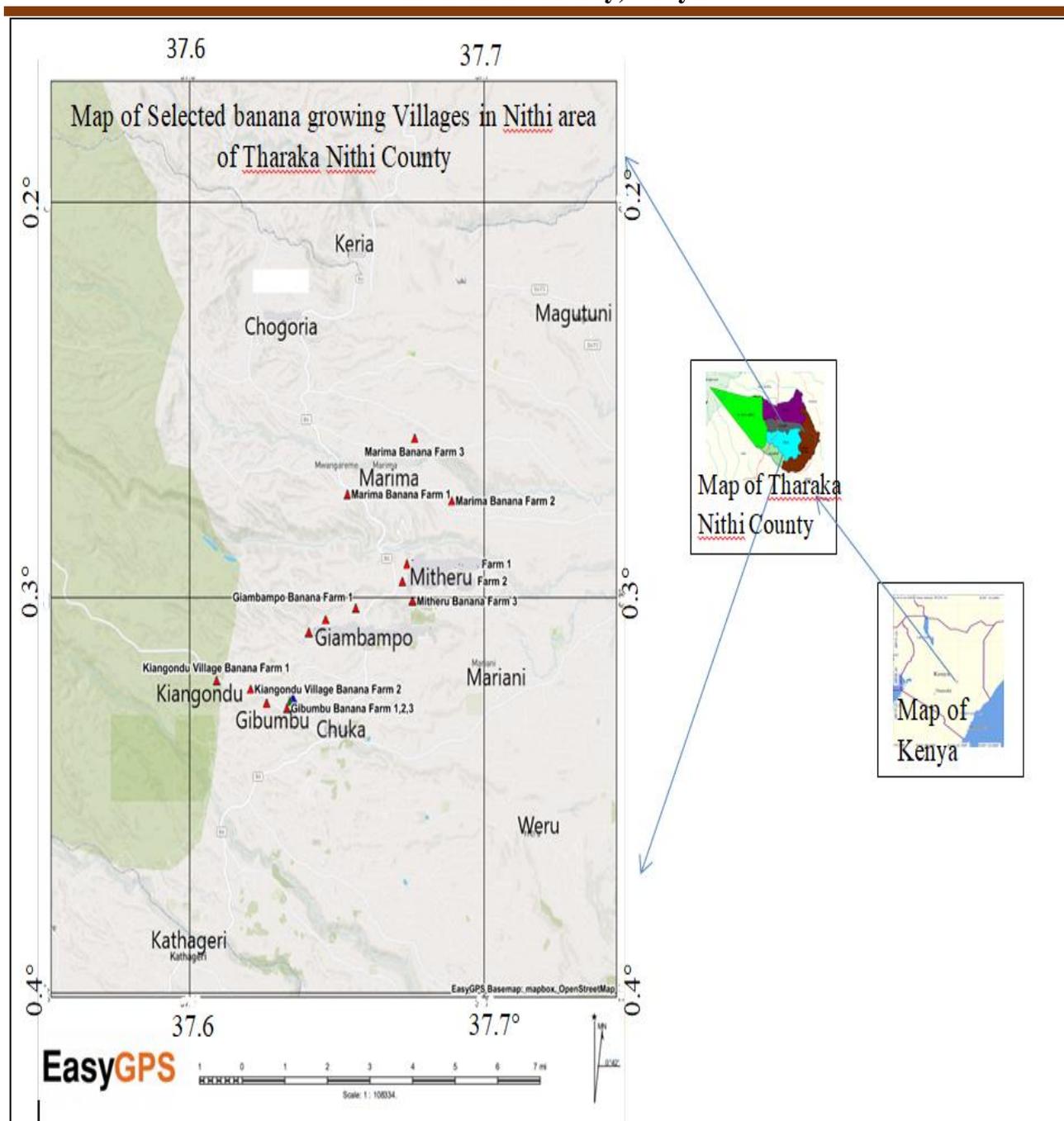


Figure 1: Map of Tharaka Nithi County showing study area

### 2.3 Evaluation of prevalence of banana *Xanthomonas* wilt

Symptoms of BXW were identified and disease was scored on scale of 1-7 (Muhinyuza *et al.*, 2007; Hashim and Mabagala 2016): where 1 = no symptom, 2 = yellowing leaves, 3 = wilted leaves, 4= dry male buds with no wilting symptoms, 5 = wilted banana leaves on banana mat and dry male bud, 6 = heavily wilted leaves, drying or dried male bud and premature fruit ripening and 7 = yellow leaves necrosis. A banana mat includes the parent plant and its suckers (Stool). The Global Positioning

System (GPS) was used to mark the altitude, latitude and longitude of locations where sampling was done. Percent disease prevalence was calculated using the formula below.

$$\text{Disease prevalence} = \frac{\text{Number of individual ratings}}{\text{Total number of ratings}} \times 100$$

Total number of banana assessed      Maximum  
scale

## 2.4 Data analysis

Data obtained on prevalence of *Xanthomonas* wilt was subjected to one way analysis of variance in SAS version 9.4 and significance means separated using least significance difference at 5% probability level. Prevalence data were log transformed ( $\log_{10}$ ) to meet the requirement for analysis of variance. Data collected using questionnaire on diseases aspects were analysed using Chi-square test of independent at 5% significant level. The Chi-square test was used to test the relationship between banana varieties grown and occurrence of banana diseases.

## 3.0 Results

### 3.1 Prevalence of banana *Xanthomonas* wilt

There was no significant difference ( $p > 0.05$ ) between the five villages with respect to BXW prevalence. Prevalence at Giampampo was 21.14% followed by Kiang'onde village 17.54%. Mitheru village had the least prevalence of 11.24% (Table 1). The overall mean for the prevalence was 15.09% and only 3 villages (Giampampo, Marima and Kiang'onde) recorded prevalence above the overall mean (Table 1).

**Table 1: Prevalence of *Xanthomonas* banana wilt in selected villages in Nithi**

Village	BXW Prevalence (%)
Giampampo	21.14
Kiang'onde	17.54
Marima	15.49
Kibumbu	12.14
Mitheru	11.24
Mean	15.095
LSD ( $p \leq 0.05$ )	1.743
CV (%)	30.856

The banana infected by *Xanthomonas* produced yellow pigmented exudates on cutting the pseudostem, the leaves were yellowish in colour while the banana bunch had poorly developed banana fruits (Plate 1).



Banana *Xanthomonas* wilted plant



*Xanthomonas* effect on banana bunch



*Xanthomonas* Yellow exudates on pseudostem

Plate 1: Observed symptoms of banana *Xanthomonas* wilt

### 3.2 Varietal effect on disease occurrence

There was significant relationship ( $\chi^2 (8, N = 46) = 19.93$ , Cramer's V = 0.4654,  $p = 0.0034$ ) between banana variety grown and occurrence of banana diseases in Nithi. Twenty five percent (25%) of the respondents who grow mainly Kiganda and Israel banana variety reported disease occurrence in their farm. Twenty percent (20%) of the respondents who grow mainly Kampala banana variety reported

disease occurrence in their farm. Seventy-five percent (75%) of farmers who could not tell the variety of banana they grow reported occurrence of diseases in their farm. Lastly, seventy six percent (76%) of farmers who grows mixed varieties reported occurrence of banana diseases in their farms (Figure 2).

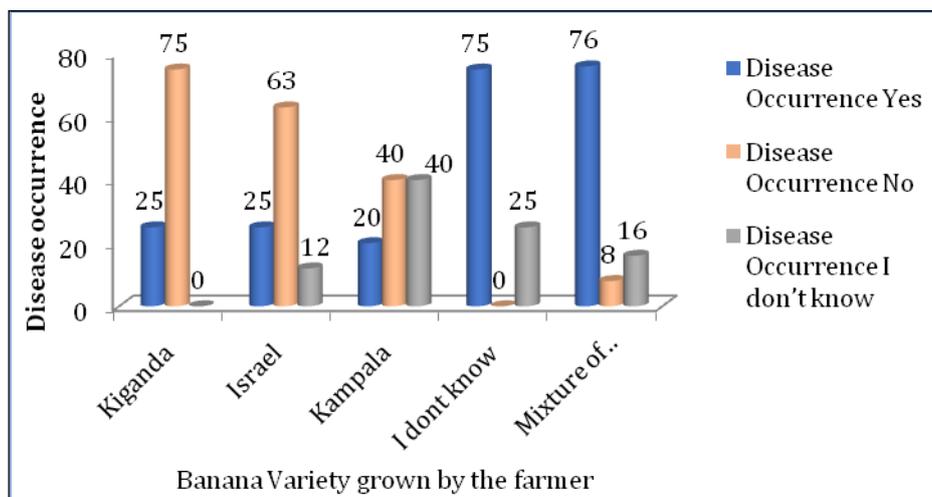


Figure 2. Relationship between banana variety grow and occurrence of diseases in the farm

### 3.3 Banana variety grown and susceptibility to diseases in Nithi

There was significant relationship ( $X^2 (8, N= 46) = 31.165, p = 0.0053$ ) between banana variety grown and susceptibility to diseases. A hundred percent (100%) of farmers who grow purely Kiganda, eighty eight percent (88%) of Israel growing respondents, eighty percent (80%) of farmers who purely grow Kampala, seventy five percent of respondents who lacks knowledge on variety that they grow and sixteen percent (16%) of farmers who grow mixed varieties reported that they did not know variety susceptible to banana diseases (Figure 3)

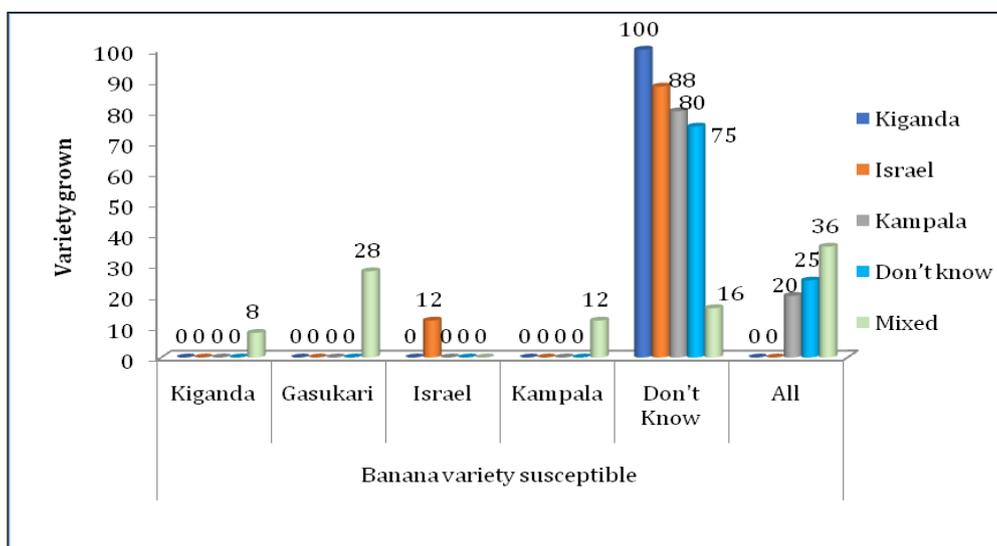


Figure 3: Graph of banana variety grown by farmers and susceptibility

### 3.4 Prevalence of banana diseases based on years of growing banana in the same farm

The relationship between years of growing banana in the same farm and occurrence of banana diseases in Nithi was significant ( $X^2 (6, N= 46) = 8.761, p = <0.0001$ ). Thirty three percent (33%) of farmers growing banana for 1-3 years reported occurrence of disease. Farmers that have grown banana for between 4-7 years, fifty percent (50%) reported occurrence of banana diseases in their farm. On the other hand, twenty three percent (23%) of farmers that have grown bananas for over ten years did not report occurrence of banana diseases in their farms while eight percent (8%) of

farmers who have grown bananas for over ten years do not know whether banana diseases occurred in their farm (Figure 4).

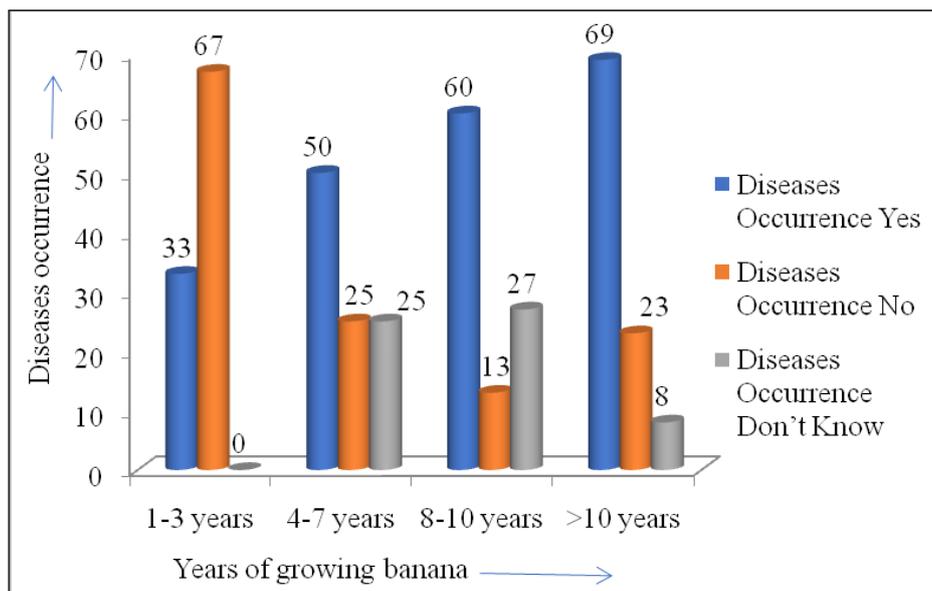


Figure 4: Association between years of growing bananas in the same farm and disease

### 3.5 Disease occurrence across different seasons of the year in Nithi

The relationship between occurrence of banana diseases and season of the year was significant ( $\chi^2(8, N= 46) = 32.459, p= <0.0001$ ). Sixty five (65%) of farmers who reported occurrence of banana diseases in their farms noted that diseases were most common during the dry season. Sixty three (63%) of farmers reported no knowledge of diseases occurrence and season that diseases are common (Figure 5).

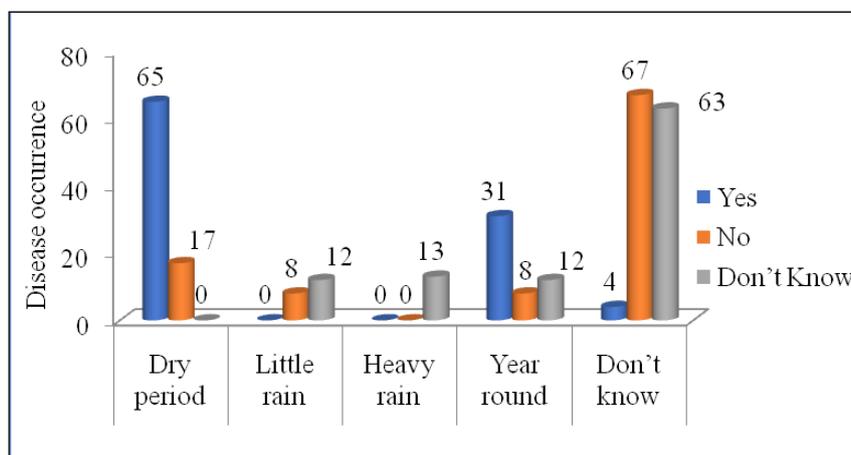


Figure 5: Association between season of the year and occurrence banana diseases

### 3.6 Disease management methods applied for different banana diseases

The relationship between occurrence of banana diseases and management option in Nithi was significant ( $\chi^2(4, N= 46) = 6.9758, p= 0.0025$ ). Out of the total number of farmers who reported disease occurrence in their farms, nineteen percent (19%) uproots diseased tuber to control the diseases, fifteen percent (15%) apply chemicals to control the diseases while sixty six (66%) do not do anything to control diseases (Figure 6).

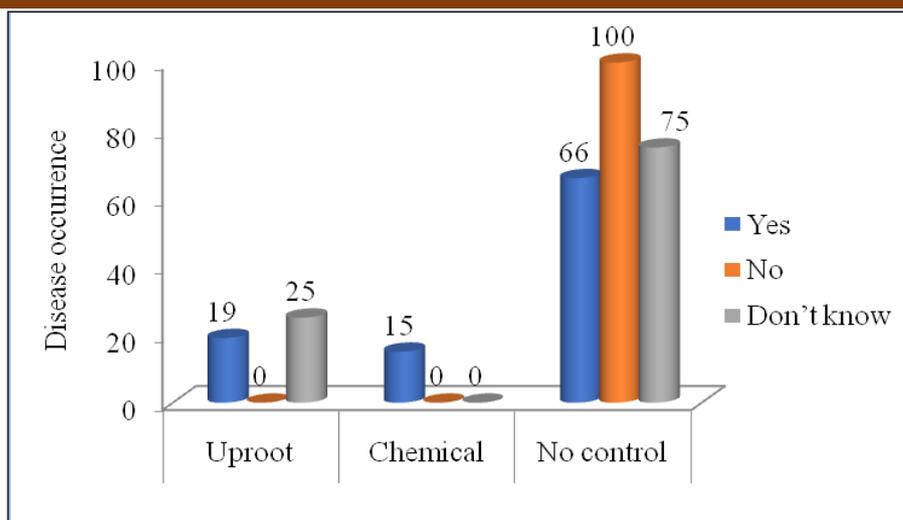


Figure 6. Disease management methods applied for different banana diseases in Nithi

### 3.7 Farmers knowledge of banana *Xanthomonas* wilt in Nithi, Tharaka Nithi County

The results indicated that relationship between occurrence of banana diseases and knowledge of *Xanthomonas* wilt of banana was significant ( $\chi^2 (2, N= 46) = 6.212, p= 0.0448$ ). Out of the total number of farmers who reported occurrence of diseases in their farms, ninety two percent (92%) lack knowledge of *Xanthomonas* wilt of banana while eight percent (8%) knowledge of *Xanthomonas* wilt of banana. Hundred percent (100%) of farmers who did not know whether diseases occur in their farm also reported no knowledge of *Xanthomonas* wilt of banana (Figure 7).

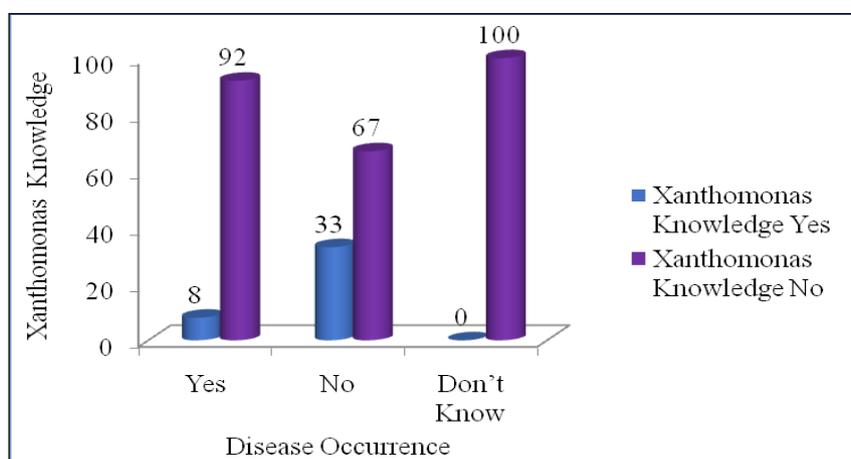


Figure 7. Knowledge of banana *Xanthomonas* wilt and disease occurrence in banana farms in Nithi, Tharaka Nithi County.

### 5.0 Conclusion

Prevalence of banana *Xanthomonas* wilt differed from one village to the next and was slightly higher in Giampampo was 21.14% though the differences were not statistically significant ( $p > 0.05$ ). The variety of banana according to the farmer influences the occurrence of diseases in banana farms. Majority of farmers (66%) in the study area do not do anything to control banana diseases in their farms. Majority of farmers are not aware of existence of *Xanthomonas* wilt of banana. Based on these observations, there is need to educate farmers on best banana farming practices, disease identification and management.

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## Sustainable Animal Feeding Production System: A Case Study for a Stand-Alone Animal Feed-Mixer for Rural Subsistence Pastoral Farmers during Covid-19 Pandemic

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### Abstract:

Animal compound and supplement feed play a significant part in rural subsistence pastoral farming. During these challenging times presented by the advent of covid-19 pandemic, small farmers were left with no choice but to practice small-scale and / or makeshift feedlot systems in their backyards. Due to the pandemic no-movement policy was enforced by the Botswana government which lead to zero grazing and causing detrimental effects to subsistence farmers. In realising these problems, the government offered subsidises to rural farmers so that they can afford different animal compound and supplement feeds for their stock. However, the main challenge comes with achieving homogenous animal compound and supplement feeds mixtures due to lack of manpower caused by restricted movements and curfews. Hence there is a profound need to aid subsistence farmers with a comprehensive process and / or system of achieving this homogenous animal compound and supplement mixture. Traditional animal feeds are general characterised as dispersible multi-ingredient-mixtures in which particles differ in size, density and shape and tend to segregate. The segregation of animal feeds is frequently a reason for customer and official complaints. To avoid segregation, usually small volumes of liquids – e.g., molasses or vegetable oils – are added in the main mixer of a feed production line to cause fine particles. The presence of small volumes of liquids will affect the distribution behaviour of particles during mixing and it may also influence the material and technological properties. However, the mixing homogeneity of typical compound feeds that can be achieved when small volumes of liquids are present is not adequately characterised at the moment. There is insufficient knowledge of the design process and specifically the time of the mixing application will take.

This study strived to investigate the process of mixing amounts of traditional animal feed compounds and supplement to achieve a homogenous mixture. The major material properties, such as flow ability and dusting potential, were determined to evaluate both the results and the product quality. An intensive efficient mixer equipped was used as test facility. The results show that, under certain conditions an intensive mixer may have a positive effect on the achievable mixing homogeneity of mineral feeding stuffs.

**Keywords:** *Less-intensive mixer, Animal supplement feed, Mixture homogeneity, efficient-effective mixing, sustainable design*

### 1. Introduction:

Animal feeds provide the basic nutrients required for animal production, including energy, proteins and amino acids, and minerals, vitamins and other micro-nutrients. Feeds may be broadly classified as concentrates and roughages, depending on their composition. Concentrates are feeds that

contain a high density of nutrients, usually low in crude fibre content (less than 18% of dry matter and high

in total digestible nutrients. Roughages are feeds with a low density of nutrients, with crude fibre content over 18% of DM, including most fresh and dried forages and fodders (McDonald et al. 2003). The use of hand in mixing animal feeds by subsistence farmers was very inefficient. This method was subsequently developed by the use of manually operated machine after the advent of industrial revolution. There is urgent need and demand for an effective and efficient mixer due to its use in subsistence animal farming as machinery for feed production. Small-scale farmers in Botswana are in dire need of a highly nutritious animal feed to increase production output.

## 2. Materials and methods:

### 2.1 Design Analysis

The industrial animal feed mixer is made up of the following major parts; electric Motor, mixing Bucket, Shaft Pulley, Motor Pulley, set of blades mounted on the shaft, ribbon blades, Bearings, Shaft, Supporting Structures, V-Belt. The animal feed mixer has to achieve the desired poultry feed mixing based on the following design specification of the various components of the machine.

### 2.2 Design Schematics and Flow of material

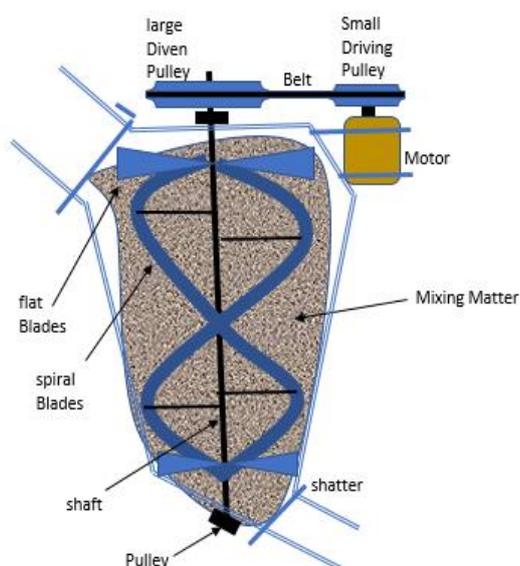


Figure 8 Mixing Parts

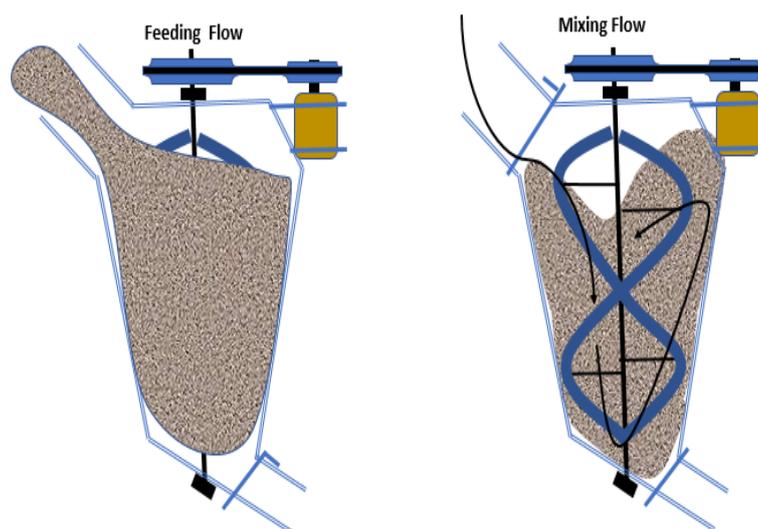


Figure 9 Feeding and Mixing Direction

### 2.3 Determining the Torsion on the shaft and selection of pulleys

The torsion on the shaft [Ts] is from the specified Power [P] of 15 hp on the motor and the maximum revolutions or speed of the motor [ N] of 5000 rpm, the Torsion of the shaft [Ts] is as below;

$$T_s = \frac{P * 60}{2\pi N} \quad (1)$$

### 2.4 Determining the Design Power

The design power [Pd] is to take assure that there is maximum allowable power on the mixer. The design power is governed by the correction factor [ Fa] which depends upon the type of driving unit, the type of driven machine and the operational hours per day.

$$P_d = F_a * P \quad (2)$$

Where P is the power rating of the motor.

### 2.5 Determining the Driver [V1] and the Driven Pulley Linear Speeds[V2]

The speed of the driven pulley has to be converted to the useable speeds of meters per second. The diameter of the Driven pulley [D1] and the Speed of the Driver Pulley [ N1] which in this case is equal to the speed of the Motor [ N] thus the linear Speeds of the Driver Pulley V1 is;

$$V1 = \frac{\pi D1*N1}{60000} \quad (3)$$

The diameter of the Driven pulley [D2] and the Speed of the Driven Pulley [ N2] thus the linear Speeds of the Driven Pulley V2 is;

$$V2 = \frac{\pi D2*N2}{60000} \quad (4)$$

**NOTE;** The circumferential speeds of the driving and the driven pulleys and the linear speed of the belt are equal.

### 2.6 Determining the Tangential Force [F], shaft Diameter [Dshaft] and the Torque [Tr] at the on the shaft

$$F = ma \text{ (Force = mass * tangential Acceleration)} \quad (5)$$

$$D_{shaft} = \sqrt{\frac{1.33 * 10^6 * P}{N}} \text{ [diameter of the shaft]} \quad (6)$$

$$A = \pi D_{shaft}^2 / 4 \text{ (CSA of the body) [Area of Shaft C/s with Diameter of shaft]} \quad (7)$$

$$S_s = F / A \text{ (Maximum shear stress of Force [F] per Area [A]} \quad (8)$$

$$Tr = \frac{S_s * \pi * D_s^2}{16} \text{ (Torque required on SHAFT)} \quad (9)$$

### 2.7 Determining the Belt length [ L] and the Centre Distance [C]

From the Governing principle of the belts, the mean of the centre distance C<sub>mean</sub> is expressed as follows;

$$C_{mean} \leq \left( \frac{D_1 + D_2}{2} + 50m \right) \quad (10)$$

The Belt length is calculated as follows, use the mean of the centre distance as C;

$$L = 2C + \pi \frac{(D_2 + D_1)}{2} + \frac{(D_2 - D_1)^2}{4C} \quad (11)$$

### 2.8 Determining the Number of Belts

The number of belts are calculated as follows;

$$\text{Number of belts} = \frac{P * f_a}{P_r * f_d * f_c} \quad (12)$$

Where; Where P is the power rating of the motor and Pr is the belt power rating, fa, fd,fc are the correction factors from the belt dimension standard IS:2494-1974.

### 3. Results and Discussions

The design parameters needed for the fabrication of the animal feed ribbon mixer was computed using MS Excel. The results are shown in Table 1. The prototype of the design to produce 100kg of poultry feed was to being fabricated to be used in experimental mixing tests.

Table 1: design parameters needed

Parameter	Symbol	Value	Unit
Torque on the motor	Tm	0.028662	Nm
Linear Velocity of the pulley 1	V1	19.625	m/s
Linear Velocity of the pulley 2	V2	19.62498	m/s
Torque of the shaft	Tr	12440.17	Nm
Shear stress on shaft	Ss	3128.841	N/m
Diameter of the shaft	Ds	63.16645	mm
Distributed Force on the shaft	F	9800	KN
Diameter of the Driven Pulley	D1	750	mm
Diameter of the Driven Pulley	D2	6756.757	mm
Mean Centre Distance	C mean	14310.37	mm
Length of Belt	L	21215.71	mm
Centre distance	C	890.0472	mm
Belt power rating	Pr	16.57517	Hp

### 4. Conclusions:

The computation design of the animal feed mixer was completed. The prototype of the design to produce 100kg of poultry feed was to being fabricated to be used in experimental mixing tests. The machine is to be made safe to use. More test is to be made and mixing performance has to be rated for homogeneous feed mixing.

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## Smallholders' choice of avocado marketing channels in Murang'a County, Kenya

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### Abstract

Avocado fruit continues to experience increased demand at both the local and export markets. However, smallholder avocado farmers have not benefited from this expansion in demand. This is attributed to use of non-performing marketing channels that does not link them to the high value markets. The purpose of this paper is to investigate the determinants of choice of avocado marketing channels in Murang'a County. Stratified sampling procedure was used to obtain a sample of 384 smallholder avocado farmers from the seven key producing areas of the County. Descriptive statistics and multinomial logit regression model were used for analysis, with marketing through farmer organizations being the reference marketing channel. Results of Multinomial regression analysis showed that the probability of choosing brokers was significantly affected by farm size, household head's gender, education level of HHH, time taken to collect avocado, access to extension, farm income and intercropping avocado with coffee. Likewise, probability of farmers' decision on direct sales to market was influenced by off farm income, dairy cattle kept by the farmer, intercropping avocado with coffee, growing organic avocado, travelling costs to buyer locations, farmer organization membership fees and subscriptions. Trainings on avocado farming methods, time taken to collect avocados, delayed buying of avocados and off-farm income were among the factors that significantly affected the probability of choosing to market through local traders. Farm gate price reduced the likelihood of choosing brokers and direct sales. Enhancing adoption of organic avocado production technology would increase the likelihood of smallholders' choice of export markets.

**Keywords;** *smallholders, marketing channels, multinomial logit model*

### 1. Introduction

Avocado (*Persia americana*) is experiencing a rapidly increasing global demand. It is the most traded fruit after pineapple and mango that contributes more than 25% of tropical fruits export annually in the global market (FAO, 2019). Avocado contains fat-soluble vitamins, protein, potassium and unsaturated fatty acids that are less common in other fruits (Duarte et al., 2017). The fruit pulp has about 30% oil content similar to olive oil [10]. It is used in the pharmaceutical and cosmetic industries as a raw material (Duarte et al., 2017).

Africa has shown a burgeoning trend in uptake and production of avocados that currently stand at 751,881 metric tonnes (FAO, 2019). South Africa, Ethiopia, Cameroon, Rwanda and Kenya are the top five exporters of avocados in the region. Despite the immense growth in production of avocados, small-scale avocados farmers in the rural set-up of Africa face many constraints when choosing the marketing channels for their produce. Such constraints may include lack of assured markets and low farm gate prices (Yankson et al., 2016).

In Kenya, horticultural industry is the fastest growing agricultural subsector and is ranked third in terms of value after dairy and tea (USAID, 2017). Banana, pineapples, mangoes and avocados are the

major fruits grown in Kenya. The annual value of fruits in Kenya stands at 53.24 billion. Avocado alone accounts for more than 17 percent of this value and is projected to increase due to the access of a new market in China (Yankson et al., 2016). The area under the production of avocado has also been on the increase and is currently estimated to be 7500 Ha and yielding 115,000 MT annually (Wasilwa et al., 2017). However, in the face of this growth, majority of farmers hardly report substantial benefits.

Choice of marketing channel is one of the most important farm level decisions that have a great impact on household's income (Shewaye, 2016). The marketing outlet choices are mostly household head's specific and this might require consideration of multiple factors like socio-economic, market related factors and transaction costs variables (Berhanu et al., 2013; Shewaye, 2016; Pokhrel., et al. 2020). These factors thus, can either attract farmers to a particular channel or discourage them from using other channels (Sigei et al., 2014; Kihoro et al., 2016; Shewaye, 2016; Mango et al., 2018).

As pointed out, there exist various avocado marketing channels in Murang'a County, but little is known on what informs their choices among. Several studies carried out in Murang'a County have focused on determinants of avocado farmers' participation in export market (Mwambi et al., 2016; Oduol et al., 2017), and also impact of export market participation on avocado farmer's income (Amare et al., 2019), but to the best of our knowledge none has addressed the choice of avocado marketing channels. This paper therefore, contributes to narrowing this knowledge gap in this developing literature on avocado.

## **2. Theoretical framework**

This study appeals to the Random Utility theory (McFadden, 1986). The main assumption of this theory is that individuals are rational decision makers with well-defined preferences, and will make decisions based on the utility derived (Thaler and Eric, 1990). In regard to the theory, a farmer is expected to make decisions considering exclusive alternatives that constitute a set of avocado marketing channels that maximizes the returns (Sigei et al., 2014). An avocado farmer assigns a set of perceived utility to the alternative marketing channels and selects the marketing channel that maximizes his/her utility. The utility assigned to each alternative depends on a number of measurable attributes of the alternative choice and those of the avocado farmer who is the decision maker.

Random utility theory is widely used with the multinomial logit model to explain farmers' behaviour with regard to the choice of marketing channels (Maina et al., 2015; Sigei et al., 2014; Muthini et al., 2017; Kihoro et al., 2016). This is because the model allows measurement of dependent variable with multiple choices (Wasilwa et al., 2017). In this case avocado farmers were expected to make a decision on four major marketing channels considered in the study. Henceforth, the Random Utility theory was used to develop a framework that explains the determinants of choice of avocado marketing channels among smallholders in Murang'a County.

## **3. Methodology**

This research was conducted in Murang'a County which is located in the Central Highlands of Kenya, that lies between latitudes 0° 34' and 107' South and longitudes 36° and 37° 27'. The County occupies an area of 2558.8 square kilometres (GOK, 2018). The main agro-ecological zones occupied are upper midland (UM) agro-ecological zone with some traces of lower midland (LM) zone. Murang'a County was selected for the study since it is the leading producer of avocados in Kenya with production level of up to 120,645 tons annually and area under avocado estimated at 4,319 hectares (USAID, 2017). Seven key avocado producing locations were selected for the study namely; Kigumo, Kagunduini, Ruchu, Gaichanjiru, Ithiru, Muruka and Ng'araria.

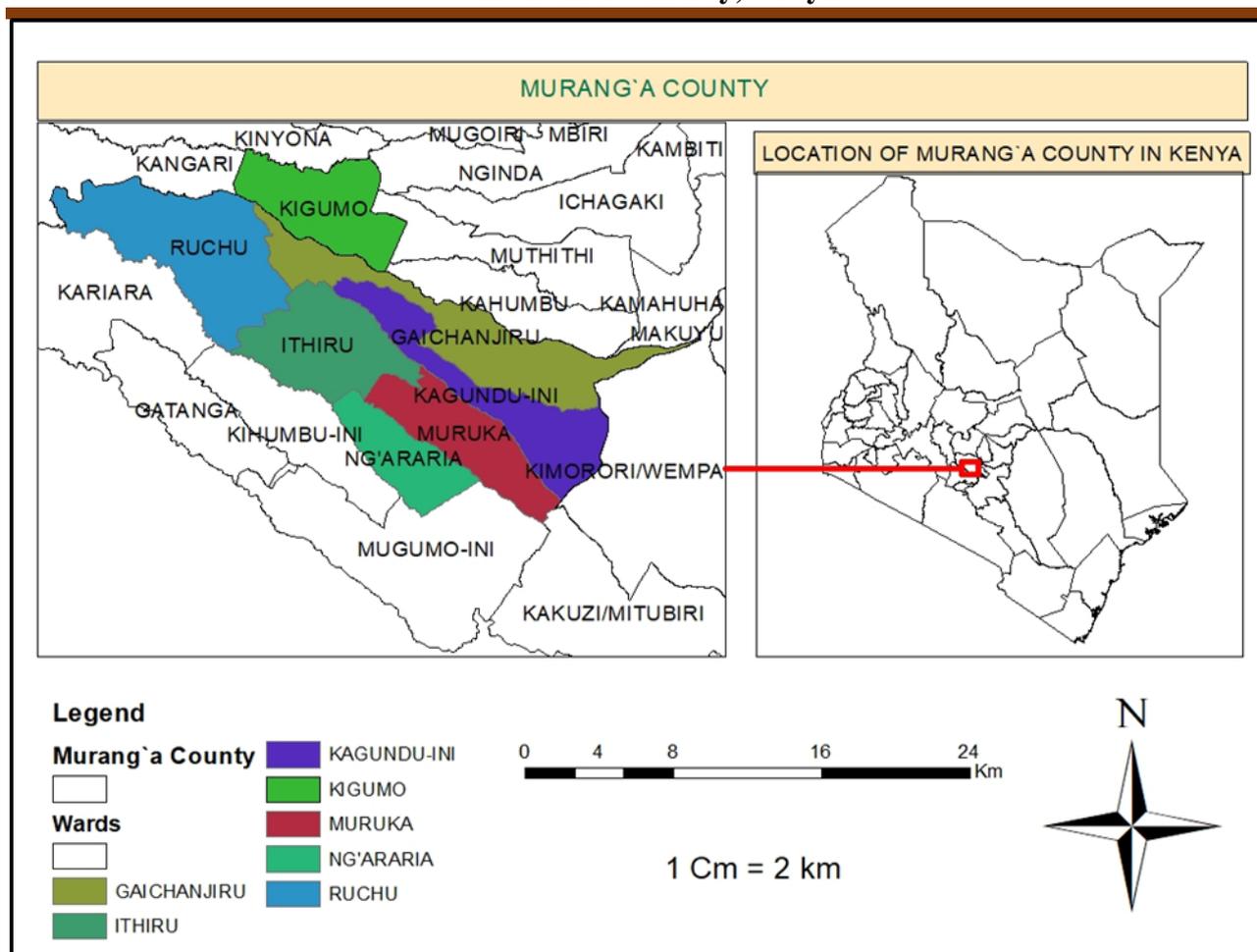


Figure 1: Map of the study area

### 3.1. Sampling procedure

The study applied the stratified sampling technique to randomly select a sample comprising 384 smallholder avocado farmers (Kumar, 2018). Firstly, the seven avocado producing locations in Murang'a County were identified. Secondly, seven sub-locations were randomly selected from the identified locations. Proportionate to size formula was applied to determine the total number of farmers to be interviewed in each village. The total population of farmers in each village was divided by the total number of farmers in the selected villages and then multiplied by the expected sample size (384 smallholder avocado farmers). Finally, the interval between the farmers to be interviewed was estimated by dividing the total number of farmers in the village by the required number of farmers.

### 3.2. Empirical model

Multinomial logit model (MNL) was used to analyse the factors affecting choice of avocado marketing channels. The model was preferred since it allows for analysis of decisions on multiple dependent variables (Maina et al., 2015). Choice of avocado marketing channels had four possible outcomes (brokers, farmer marketing organizations, local traders and direct sales to market). Thus, the multinomial model was suitable for this analysis. The model was specified according to Muthini et al. (2017);

$$\text{Prob}(Y_j = i) = \frac{\exp(X'_j \beta_i)}{\sum_{k=1}^m \exp(X'_j \beta_k)} \quad (1)$$

$Y_j$  is the probability of farmer  $j$  choosing avocado marketing channels  $i$  (brokers, farmer marketing organizations, local traders and direct to market sales).  $X$  is vector of households socioeconomic,

market and transaction costs variables.  $\beta$  is the vector of coefficients associated with the market choice. Maximum likelihood estimator was used to determine the parameters in the model (Greene, 2000).

The model was summarized as follows;

$$\text{prob}(Y_j = i) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \dots \dots + \beta_n x_n \quad (2)$$

Where  $\text{prob}(Y_j = i)$  is the probability choosing avocado marketing channels.  $\beta_0, \beta_1$  to  $\beta_n$  are parameters to be estimated by the model.  $X_1$  to  $X_n$  are the factors.

#### **4. Results and discussions**

##### **4.1 Preliminary tests**

The Hausman test was carried out to check for Independence of Irrelevant Alternative assumption (IIA). The IIA Property requires that the relative probabilities of two options being selected are unaffected by the introduction or removal of other alternative. The first two set of choices involves brokers and direct to market while the second set is brokers and local traders. The results of Hausman test were positive and insignificant indicating that the IIA assumption was not violated Hausman and Mc-Fadden, 1984). The results are given in Appendix 1.

Additionally, the multicollinearity test was also done to check for correlation within the explanatory variables. The rule of thumb is that if the pairwise correlation between the variables is greater than 0.5, multicollinearity problem exist (Gujarati and Sangeetha, 2007). The results showed no multicollinearity problem that existed between explanatory variables.

##### **4.2 Description of main marketing channels in the study area**

The main marketing channels used by smallholder avocado growers in the study area were identified in terms of the flow of avocado products and participants in each channel (Figure 2). Marketing channel 1 entailed the flow of avocado from the smallholder avocado farmers to brokers, then to oil manufacturing companies as well as to domestic markets in the nearby towns like Thika, Ruiru and Nairobi, and finally to the domestic consumers. Marketing channel 2 involved flow of avocado from the smallholder farmers to the farmer marketing organizations sub-contracted by the exporting companies in the study area. The marketing organizations ensure that farmers are trained on desired quality standards. Ultimately, the avocado ends in export markets. In marketing channel 3 avocado moves from smallholder avocado farmers to the local traders. These local traders collect avocados from farmers in small quantities and then sell them to nearby local retail markets such as Kandara, Kagunduni, Kigumo, Muruka and Murang'a. In marketing channel 4 the movement of avocado is direct to the nearby markets and finally to the domestic consumers. In most cases avocado in this chain are sold to nearby shopping centres that are accessible to the farmers.

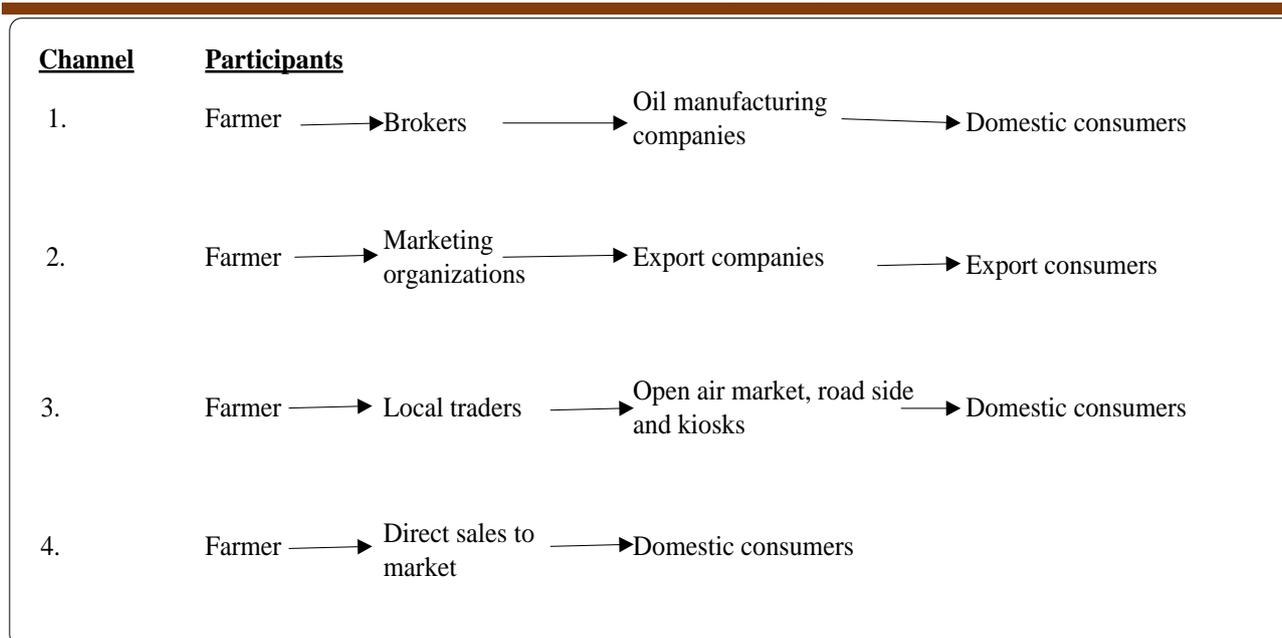


Figure 10 Description of main marketing channels

#### 4.3 Descriptive statistics on socioeconomic factors across the main marketing channels

The study analysed the variations of farmers’ socioeconomic characteristics across the four avocado marketing channels used in the study area. The significance of variations of continuous variables was tested using Analysis of Variance (ANOVA), while Chi-square ( $\chi^2$ ) was used to test the significance of variations of discrete variables. The results are given in Table 1.

The variations in farmer’s age and marketing experience were significant at 1% level, while farmer’s household size was significant at 10% level. The mean age of the farmers selling through marketing channel 2 (farmer marketing organizations) was found to be higher (64.38 years), while that of farmers marketing through channel 4 (direct sales to market) was the lowest (45.59 years). This implies that the elderly farmers prefer to sell through the marketing organizations, while relatively younger farmers prefer making direct sales to the market. The older farmers are more risk averse compared to younger farmers, and therefore would sell through the marketing organisations that are less risky (Barrett, 2008).

The mean experience in avocado marketing was highest in marketing channel 2 (17.25 years), while the lowest experience was among farmers who make direct sales to the market (10.59 years). It appears that farmers with more experience in avocado marketing understands the avocado market dynamics thus are likely to sell through marketing organization as compared to less experienced farmers. The findings also showed that farmers selling through channel 1 (sales through brokers) had the highest family size (5 persons per household), while those with lowest household size sell through channel 3 (sales through local traders). This implies that farmers with large household sizes were likely to prefer quick cash sales with brokers for immediate payment.

The variations in farm incomes, farm size, land area under avocado, number of trees in production, quantity of fruits harvested and farm gate prices were significant at 1% level (Table 1). Farmers who sell through marketing organizations (channel 2) received the highest average farm income (KES 190,300.50) while those selling through brokers and direct sales to market (channels 1 and 4) earn the lowest level of farm income. Analysis also showed that the mean farm size in hectares was largest for farmers selling through channel 2 (0.34 Ha) while it was lowest for farmers making direct sales to market. Farmers who sold their produce through market organizations (channel 2) had the largest average land-size under avocado trees (0.34 ha) and the average number of avocado trees at production stage (22.49 trees). These results imply that the relatively large-scale avocado producers prefer to sell through marketing organizations. On the other hand, the findings revealed that farmers making direct sales to market (channel 4) had the lowest average acreage under

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avocado and number of trees in production. In terms of avocado output, farmers who sell through local traders (channel 3) had the highest average quantity of avocado harvested (3440 kg), while the ones making direct sales to the market (channel 4) had the lowest average quantity of avocado harvested (1239 kg).

Table 2: Variations in Farm socioeconomic factors across the marketing channels

	Marketing Channels				F/ $\chi^2$ -value
	1 (brokers) N=320 83.33%	2 (marketing organization) N=106 27.60%	3 (local traders) N=20 5.21%	4 (direct sales to market) N=27 7.03%	
<b>Continuous variables</b>					
Age (years)	59.72	64.38	59.20	45.59	2.03(0.00)***
Marketing experience (years)	13.93	17.25	16.35	10.59	2.11(0.00)***
Family size	5.15	4.76	4.35	4.63	1.64(0.09)*
Education level (years)	7.11	7.40	7.80	7.78	0.85(0.62)
Farm income(KES)	97911.40	190301.00	106590.00	85203.70	3.58(0.00)***
Farm size (Ha)	0.66	0.96	0.69	0.35	1.46(0.06)*
Farm area under avocado trees(Ha)	0.21	0.34	0.26	0.13	1.19(0.01)***
Number of avocado trees in production	16.59	22.49	17.75	14.63	3.21(0.00)***
off-farm income per year(KES)	105,382	99,105.3	56,250	113,429	1.19(0.23)
Dairy cows kept	1.25	2.01	2.12	1.32	1.26 (0.74)
Quantity harvested (Kg)	1815.41	2722.26	3440.60	1239.56	3.27(0.00)***
Farm gate price per Kg (KES)	23.95	64.53	14.00	48.15	12.41(0.00)***
<b>Categorical variables</b>					
Gender:					
Male (%)	77.81	83.02	90	59.26	2.52 (0.47)
Female (%)	22.19	16.98	10	40.74	
Intercropping avocado with macadamia					
Yes (%)	34.53	36.67	11.11	28.57	10.33 (0.02)**
No (%)	65.47	63.33	88.89	71.43	
Intercropping avocado with coffee					
Yes (%)	23.74	22.22	33.33	14.29	0.34 (0.95)
No (%)	76.26	77.78	66.67	85.71	
Growing organic avocado					
Yes (%)	23.33	28.78	22.22	0.00	181.92 (0.00)***
No (%)	76.67	71.22	77.78	100	
Access to information					
Yes (%)	97.81	98.11	95.00	100.00	0.31 (0.96)
No (%)	2.91	1.89	5.00	0.00	
Access to extension					
Yes (%)	33.13	97.13	80.00	29.63	81.22 (0.00)***
No (%)	66.18	2.83	20.00	70.37	
Access to credit					
Yes (%)	1.88	3.77	10.00	0.00	3.55 (0.31)
No (%)	98.13	96.23	90.00	100.00	

**Notes:** 1 USD=101.29 KES, Asterisks\*\*\*, \*\* and \* indicate significance at 1%, 5%, 10% level,  $\chi^2$  indicate chi-square.

The mean farm gate price was highest for farmers selling through market organizations (KES 64.53 per Kg) but lowest for those selling through local traders (KES 14.00 per Kg). These results show that marketing organizations are the most profitable channel compared to other marketing channels in the study area

Sales through farmer marketing organizations (channel 2) had the highest number of farmers intercropping avocado with macadamia (36.67%), but lowest for ones selling through local traders (11.11%). This implies that growing both avocado and macadamia could attract farmers to sell through farmer marketing organizations. Approximately, the number of farmers growing organic avocado was highest in channel 2 (sales through marketing organization) (28.78%), indicating that farmers trading through marketing organizations are likely to adopt organic avocado. This is because export markets buys avocado that has minimum chemical residues thus organic avocado is mostly preferred.

The findings further revealed that the variations in proportions of farmers who intercropped avocado with macadamia or coffee, those producing organic avocado and those accessing extension services were significant at 1% level (Table 1). The marketing channel 2 (selling through marketing organization) had the highest proportion of farmers accessing extension services (97.13%) followed by marketing channel 3 (local traders) which had 80.00%. The marketing channel 4 (direct sales to market) had the lowest proportion of farmers accessing extension (29.6%). These results indicate that farmers selling through the marketing organization have higher access to extension services as compared to the other three channels.

Access to extension service is important in empowering avocado farmers with skills and knowledge on better methods of production and market information. These findings agree with those of Jagwe and Machethe, (2011); Noe (2020), that showed that farmers in marketing groups have better access to extension services than the non-members.

#### **4.4 Descriptive statistics on market factors**

Results in Table 2 indicates that the average waiting time for avocado collection was higher for farmers selling through channel 2 (2.55 days) and was found to be lowest for ones selling through channel 3, indicating that increase in waiting time for avocado exchange reduce the likelihood of selling through farmer marketing organizations. Farmers selling through channel 2 had the highest mean time taken to receive payment (3.49 days) but was lowest for farmers selling through channel 4 (direct sales to market), implying that farmers who sold through export market had to wait between 2 to 4 days to receive their payment while those selling in local markets were paid more promptly.

With regard to farm gate price in Kenyan shilling, farmers selling through marketing channel 2 (sales through farmer organizations) received highest farm gate price per kilogram followed by marketing channel 4 (direct sales to market) while sales through channel 3 (sales through local traders) had the lowest farm gate price per kilogram. This imply that selling through farmer organization were likely to earn more profit than sales through other channels.

Comparatively, farmers in Marketing channel 4 (direct sales to market) reported that they often experience buying delays from their preferred buyer (71.43%), followed by sales through channel 2 (sales through farmer marketing organization) (60%). The preferred buyer in the study area was export buyers since they paid competitive prices, and delays in buying of avocado thus made most of farmers to sell through local channels like brokers so as to mitigate the risk of produce spoilage and loss due to perishability. With respect to quality checks by the buyers, findings revealed that sales through channel 2 (farmer marketing organization) had high levels of quality checks (89.93%) while channel 4 (direct sales to market) reported lowest quality checks (85.79). Quality checks are vital because top quality avocados are sold through export markets while the lesser quality are sold to the domestic markets.

**Table 3: Variations in market factors across the marketing channels**

	Marketing Channels				F/ $\chi^2$ -value
	1	2	3	4	
Distance to market (Km)	2.83	6.21	4.77	2.10	1.09 (0.35)

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Waiting time for avocado collection (days)	1.23	2.55	1.37	1.10	3.24 (0.00)***
Time taken to receive payment (days)	1.01	3.49	1.19	1.00	3.24 (0.00)***
Farm gate price per Kg (KES)	23.94	65.18	14.00	48.24	9.74 (0.00)***
Preferred buyer delays to buy avocado					
Yes (%)	60.00	56.83	55.56	71.43	65.12 (0.00)***
No (%)	40.00	43.17	44.44	28.57	
<b>Attributes that buyer looks at;</b>					
Quality checks					
Yes (%)	87.78	89.93	88.89	85.71	9.34 (0.03)**
No (%)	12.22	10.07	11.11	14.29	
Variety checks					
Yes (%)	85.61	88.89	83.45	71.43	2.59 (0.46)
No (%)	14.39	11.11	16.55	28.57	
Checks at size of avocado					
Yes (%)	97.19	99.06	95.00	92.59	3.52 (0.32)
No (%)	2.81	0.94	5.00	7.41	

**Notes:** 1 USD=101.29 KES, Asterisks\*\*\*, \*\* and \* indicate significance at 1%, 5%, 10% level,  $\chi^2$  indicate chi-square.

#### 4.5 Descriptive statistics on transactional costs

Transaction costs incurred under various marketing channels were estimated (Table 3). The result indicate that farmers selling through channel 2 (sales through marketing organizations) incurred highest cost of travelling to the buyers' location (KES 201.55), but was lowest in channel 3 (sales through local traders) (KES 78.57). This cost was captured as fares paid by farmers when they made trips to the buyers' location. Thus, these findings showed that selling through marketing organization attracts more extra cost in form of information search on price and demand conditions. Further, the analysis revealed that farmers selling through channel 2 (marketing organization) incur a cost of joining the marketing organizations and also the organization subscription fee of KES 100 each. These payments were not applicable in other channels.

**Table 4 Transactional costs**

Transaction costs	Marketing channels				F value
	1	2	3	4	
Travelling cost to buyer location (KES)	169.44	201.55	78.57	177.77	3.63 (0.00)***
Marketing Organization joining fee (KES)	0.00	100	0.00	0.00	13.88(0.00)***
Marketing organization subscriptions per season (KES)	0.00	100	0.00	0.00	12.53(0.01)***

**Notes:** \*\*\* indicate significance at 1%

#### 4.6 Determinants of choice of avocado marketing channels

Multinomial model was used to assess the factors affecting choice of avocado marketing channels. Marketing through farmer marketing organization fetched the highest average farm gate price, and was therefore used as a reference category. The results of multinomial regression analysis are given in Table 4. The likelihood ratio ( $\chi^2$ ) value was 441.74 and significant at 1% level. The likelihood ratio test confirms that all the variable coefficients are significantly different from zero (Ojo et al., 2013). The pseudo R<sup>2</sup> was 0.5242 indicating that the selected factors collectively and significantly explain 52.42% of the observed variations in the choice of avocado marketing channels. The marginal effect from the multinomial regression analysis measures the expected change in the probability of a particular choice being made with respect to a unit change in an

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independent variable Gujarati and Sangeetha (2007), and therefore was used in the interpretation of the results.

Table 5: The results of Multinomial regression analysis

Variables	Broker		Direct sales to market		Local Trader	
	Marginal effects	Std. Err.	Marginal effects	Std. Err.	Marginal effects	Std. Err.
<b>Socioeconomic factors;</b>						
Farm size (Ha)	0.1398 (0.0480)**	0.0708	-0.0365 (0.4420)	0.0475	-0.0061 (0.9020)	0.0496
Farm area under avocado	-0.0635 (0.7060)	0.1682	0.0035 (0.9870)	0.1253	-0.1480 (0.2450)	0.1272
Gender (Male, Female)	-0.1247 (0.0250)**	0.0555	-0.0670 (0.1170)	0.0427	0.0291 (0.4900)	0.0421
Family size	0.0011 (0.9230)	0.0116	-0.0120 (0.1900)	0.0092	0.0077 (0.2800)	0.0072
Age (years)	0.0002 (0.9060)	0.0020	-0.0016 (0.2870)	0.0015	0.0001 (0.9520)	0.0013
Education level (years)	0.0176 (0.1250)*	0.0115	0.0038 (0.6470)	0.0082	-0.0011 (0.8930)	0.0082
Experience in avocado marketing (years)	-0.0030 (0.3980)	0.0035	0.0015 (0.5760)	0.0027	-0.0017 (0.5250)	0.0027
Farm income (KES)	-0.0836e <sup>-5</sup> (0.0520)**	0.0431e <sup>-5</sup>	0.0148e <sup>-5</sup> (0.5920)	0.0277e <sup>-5</sup>	0.0310e <sup>-6</sup> (0.9160)	0.0294e <sup>-5</sup>
Intercropping with macadamia	-1.2700 (0.9780)	45.5253	1.5758 (0.9800)	62.6760	-0.1810 (0.9850)	9.8663
Access to extension services	-0.2703 (0.0350)**	0.1279	0.1166 (0.2080)	0.0926	0.0727 (0.4790)	0.1027
Access to market information	0.2352 (0.3520)	0.1439	-0.0690 (0.4960)	0.1013	-0.0268 (0.7750)	0.0936
Access to credit on avocado farming	1.0496 (0.9980)	525.069 5	0.3563 (0.9970)	98.8094	-1.1905 (0.9990)	655.965 5
Training on avocado farming	-0.0309 (0.6940)	0.0786	-0.0214 (0.6950)	0.0546	-0.1180 (0.0390)**	0.0571
Dairy cow kept by farmer	-0.0531 (0.5940)	0.0994	0.2149 (0.0080)***	0.0814	0.0206 (0.7430)	0.0630
Intercropping avocado with coffee	-0.1505 (0.0020)***	0.0477	-0.0648 (0.0630)*	0.0348	-0.1277 (0.0000)***	0.0354
Number of avocado trees in production stage	0.0029 (0.3170)	0.0029	-0.0008 (0.7180)	0.0022	-0.0011 (0.6290)	0.0022
Quantity of avocado harvested	-0.0270e <sup>-4</sup> (0.3470)	0.0287e <sup>-4</sup> 4	-0.0723e <sup>-5</sup> (0.7380)	0.0216e <sup>-4</sup> 4	0.0212e <sup>-4</sup> (0.3110)	0.0020
Growing organic avocado	0.4249 (0.2320)	0.3553	-0.4314 (0.0580)**	0.2279	-0.2854 (0.3110)	0.2819
<b>Market factors;</b>						
Time taken to sell avocado	0.0923 (0.0610)*	0.0493	0.0071 (0.6540)	0.0158	-0.1132 (0.0530)**	0.0585
Time taken to receive payment	0.0484 (0.6030)	0.0932	-0.0063 (0.9160)	0.0603	0.0529 (0.4810)	0.0750
Delayed collection of fruits	0.0299 (0.6970)	0.0768	-0.0019 (0.0.9670)	0.0463	0.1584 (0.0090)***	0.0607
Quality checks by the buyer	-0.1219 (0.2340)	0.1025	0.0735 (0.2760)	0.0674	0.0833 (0.3070)	0.0815
Farm gate price	-0.0049 (0.0020)***	0.0034	-0.0014 (0.0010)***	0.0021	0.0026 (0.3780)	0.0030

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Variety checks	-0.1607 (0.3370)	0.1672	-0.0858 (0.3540)	0.0925	0.0214 (0.7330)	0.0626
Buyer not reliable	0.0422 (0.7520)	0.1337	-0.0321 (0.7010)	0.0835	-0.0441 (0.7270)	0.1261
Distance to market	-0.0090 (0.1080)	0.0056	0.0044 (0.2860)	0.0041	0.0066 (0.1100)*	0.0041
Type of road	0.0159 (0.6550)	0.0355	-0.0126 (0.6270)	0.0258	-0.0302 (0.2890)	0.0285
<b>Transactional costs;</b>						
Farmer organization registration fee	0.0017 (-0.1190)	0.0011	0.0015 (0.0380)**	0.0007	-0.0006 (0.3770)	0.0007
Farmer organization subscriptions	-0.0012 (-0.2560)	0.0010	0.0013 (0.0430)**	0.0007	0.0005 (0.4750)	0.0007
Travelling to buyer location cost	0.0001 (0.7000)	0.0002	0.0003 (0.0030)***	0.0001	-0.0003 (0.2370)	0.0003

Reference category =farmer marketing organization, Asterisks \*\*\*, \*\* and \* indicate significance at 1%,5%, 10% level. LR chi2 = 441.74, Prob > chi2 = 0.0000, Pseudo R2 = 0.5242, Log-likelihood = - 200.48. Figures in brackets are P-values

The findings revealed that farm size positively affects the choice of brokers at 5% level of significance. Increase in farm size increases the probability of choosing brokers by 13.98% against that of choosing farmer marketing organizations. This is because a large farm size leads to increased avocado output and thus farmers may choose to sell to brokers as a way of reducing marketing costs incurred if selling through farmer organizations. The large producers may also not need the benefits that accrue from farmer organizations since they operate independently. Similar results were reported by Dessie et al. (2018); Kumar (2018) that farm size positively influenced choice of informal traders such as assemblers and retailers.

Results further showed that gender of the household head had a negative effect on the choice of marketing through brokers at 5% level of significance. This indicates that male-headed households decrease the likelihood of choosing brokers by 12.47% in favour of sale through marketing organization. Male headed households possess marketing networks unlike women who are in most cases restricted to household tasks (Maina et al., 2015). These findings are consistence with those of (Muthini et al., 2017; Kihoro et al., 2016), that found gender had negative effect with regard to decision to marketing through brokers.

The household's level of education had a positive coefficient and significantly affected the decision to choose brokers at 10% level of significance. This indicates that an increase in number of years spent in education increases the probability of farmers' decision to choose brokers by 1.76% against that of choosing farmer marketing organization. The possible explanation for this observation is

because highly educated household may have more preference to off- farm jobs thereby reducing their investment on avocado farming which consecutively leads to choice of local channels. These results corroborate the findings of (Mango et al., 2018).

We further establish that farm income negatively affects the probability of choosing brokers by 0.0008% in favour of farmer marketing organization. This is because the endowed farmers are more likely to procure farm inputs which would in turn enable them to obtain the high-grade quality of avocados that satisfy requirements of the export market. Muthini et al. (2017) showed that household head's income negatively affected choice of brokers in favour of export market. The household heads' off-farm income positively affected choice of local traders and direct sales to market at 5%. This analysis implies that increased household's head level of off-farm income increases the likelihood of making direct sales and choice of local traders by 2.89% and 2.31% respectively against that of farmer marketing organization. This means that most farmers with off-farm income are occupied by off-farm jobs thus decreased effort in avocado farming, consequently leading to low avocado production that is sold through local markets. Similar findings by Dessie et

al. (2018) showed that availability of off-farm income increases the probability of choosing local traders and direct to consumer channel than other channels.

Access to extension services negatively affects choice of marketing through brokers at 5% level of significance and decreases the probability of choosing brokers by 27.03% in favour of farmer marketing organization. Extension visits also decreases the probability of choosing brokers by 8.69% in favour of farmer marketing organization. This might have been as a result of information obtained by the farmer on avocado farming that improves the avocado productivity and quality, thus favouring choice of farmer marketing organizations. These results agree with Melese et al. (2018); Tarekegn et al. (2017) that access to extension services negatively affects choice of informal traders such as brokers.

Exposure to trainings on avocado farming methods negatively affected the choice of marketing through local traders at 5% level of significance. Increased trainings on avocado farming methods reduce probability of choosing local traders by 11.80% in favour of farmer marketing organization. Avocado farming methods increases skills and knowledge that improves the quality of avocado that is marketed in export market. Tarekegn et al. (2017) reported that trainings on farming methods negatively affects choice of local assemblers.

The practice of dairy enterprise in the farm positively affected the farmer's decision on direct sales to market at 5% level of significance. Existence of dairy enterprise increased the likelihood of making direct sales by a 21.49% against that of choosing farmer marketing organizations. This is because farmers with dairy cows in most cases had direct interactions with consumers while selling milk products that also could have resulted to direct sale of avocados to them. Similar findings were reported by Dessie et al. (2018); Melese et al. (2018), that having cattle unit in the farm affects the likelihood of selling the output direct to market since the cattle produce such as milk requires spot markets.

Intercropping avocado with coffee negatively affects farmer's choice of brokers, local traders and direct sales to market at 1% and 10% level of significance respectively. Intercropping avocado with coffee was found to decreases the probability of choosing brokers, local traders and direct sales to market by 15.05%, 6.48% and 12.77% singularly in favour of farmer selling through marketing organization. Farmers who grow coffee have previous marketing experience through farmer marketing organizations, which leads to formation of avocado marketing groups that facilitate marketing of avocados. Research shows that having a marketed intercrop encourages group formation

and thereby choice of marketing groups, while having no intercrop leads to choice of direct marketing (Adanacioglu, 2017).

Based on the results, production of organic avocado was found to negatively affect choice of brokers and direct sales to market at 5% level of significance. It decreases the probability of direct sales to market by 43.14% in favour of farmer marketing organizations. Organic farming results to no chemical residues in avocados thus making them meet the European global gap standards. This therefore increases the chances of selling to the export market as reported by (Corsi et al., 2018).

Time taken to collect avocado positively and significantly affects the decision to choose brokers at 10 % level of significance. An increase in time taken to collect avocados increases the farmer's chances of choice of marketing through brokers by 9.23%, against the probability of selling through farmer marketing organizations. This implies that increased time taken to transact through farmer marketing organization encourages marketing through brokers in the region. Increased bargaining time encourages farmers to use other channels other than market cooperatives (Maina et al., 2015). Further, the results showed that time taken to collect avocado decreases likelihood of choosing local traders by 11.32% in favour of farmer marketing organizations. This was so because local traders harvest avocado produce but not assemble them the same day, thus increasing the chances of loss due

to perishability. Similarly, the increase in time of transacting affects the likelihood of selling through marketing organizations (Fischer & Wollni, 2018).

Delayed buying of avocado by the targeted buyers positively affects the decision to choose local traders at 1% level of significance. This implies that delayed buying of avocados increases the probability of choosing local traders by 15.84% against that of farmer marketing organizations. These findings imply that farmers may prefer to sell through farmer marketing organizations, however delayed buying of avocados results to choice of other channels such as local traders. According to Fischer & Wollni (2018), delayed buying of the produce negatively affects the likelihood of selling through marketing organizations

Farm gate prices negatively affected farmer's decision on choice of brokers and direct sales to market at 1%. Increase in farm gate price offered reduces the farmer's likelihood of choosing brokers and direct sales to market by 0.49% and 0.14% respectively in favour of farmer marketing organizations. Price is an important aspect when choosing marketing outlets among farmers in rural areas. Farmer marketing organizations offered the highest farm gate price among the channels, therefore attracting farmers to use the channel. Results by Zhang et al. (2017); Kihoro et al. (2016) revealed that price satisfaction had an impact on farmer marketing decision.

With regard to transaction costs hypothesised, farmer marketing organization membership and farmer marketing organization subscription fees increases the probability of making decision in inclined to direct sales to market by 0.15% and 0.13% respectively against that of marketing through farmer marketing organizations. These costs were collected in terms of the amount of money smallholder spent while registering and maintaining the contract with farmer marketing organization. These findings imply that the transaction costs reduce avocado farmers' potential of selling through farmer marketing organizations as also observed by (Maina et al. 2015).

Travelling costs to buyer locations positively affects the decision on marketing through direct sales to market at 1%. This indicates that increased travelling cost to buyer location increases the likelihood of making direct sales to market by 0.03% against that of farmer marketing organization. Findings also revealed that the distance to market increases the likelihood of choosing local traders by 0.66%

against farmer marketing organization. This implies that long distance to markets increases the cost of marketing, and thus farmers may choose to sell to nearby markets or sell to traders who buy the produce at the farm gates. This is in line with (Honja et al. (2017); Temesgen et al. (2017), that cost of transport cost affected the likelihood of making direct sales to market among smallholders.

## **5. Conclusions and recommendations**

This study assessed the factors affecting choice of avocado marketing channels among smallholders in Murang'a County, Kenya. Avocado in this region is mainly produced for sale, thus farmers can select one or more marketing channels based on the comparative advantage of the channels in maximizing their return.

In reference to this, the multinomial logit model results showed that the probability of choosing brokers was significantly affected by farm size household head's gender, education level in years, time taken to collect avocado, access to extension, farm income and intercropping avocado with coffee. Likewise, the probability of farmers making direct sales to the market was influenced by off farm income, dairy cattle kept by the farmer, intercropping avocado with coffee, growing organic avocado, travelling costs to buyer locations, farmer organization membership fees and subscriptions. Trainings on avocado farming methods, Time taken to collect avocados, delayed buying of avocados and off farm income were among the factors that significantly affected the probability of choosing local traders. It was noted that farm gate price reduced the likelihood of selecting brokers and direct sales to market in favour of farmer marketing organization.

Based on the results, the study recommends that increased trainings on avocado marketing will enhance farmers' skills on avocado marketing. This will also promote farmers' knowledge on the various worthwhile marketing channels that ultimately contribute to reducing poverty levels among smallholders in rural areas. Also male-headed households dominated in marketing through farmer marketing organizations, thus developing policy interventions that support more female-headed households' participation in avocado marketing will be appropriate in enhancing gender parity.

The findings showed that intercropping of avocado with coffee was found to be a good blend for farmer involvement in export marketing. Therefore, interventions that promote production of avocados alongside coffee or with other cash crops may require further investigation. Production of organic avocado was also an important variable with regard to choice of marketing channels. Thus, enhancing adoption of organic avocado production technologies among farmers' may increase access to the export markets.

Time taken to collect avocados and delayed buying of avocados led to sales of avocado in local channels. Hence, there is need to provide information on fruits collection calendar to smallholder farmers that shows the expected picking dates. This may reduce the risk of loss due to fruit perishability. Farm gate price was an important variable with regard to choice of marketing channels. Therefore, there is a need to protect farmers from low prices offered by the avocado traders in the region through government agencies such as Agriculture fisheries and Food Authority (AFFA). Farm gate price was found to be an important variable with regard to choice of marketing channels. Thus, interventions by the Ministry of Agriculture through Agriculture, Food and Fisheries (AFFA) should formulate policies that protect farmers from exploitation by the avocado traders in the region.

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**Appendix 1. Hausman Test**

Choice	$\chi^2$ value	P>z
Broker and direct sale to market	3.30	0.65
Broker and local traders	5.44	0.99
Local traders and direct sales to market	0.62	0.98

**SUB~THEME 2: ECONOMIC SURVIVAL THROUGH  
RESPONSIVE ENTREPRENEURSHIP IN THE ERA OF  
GLOBAL DISRUPTION**



## Influence of Performance Contracting Strategies on Examination Performance in Technical Training Institutes in Eastern Region, Kenya.

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### Abstract

This study was carried out on the influence of Performance contracting strategies on examination performance in Technical Training Institutes in Eastern region, Kenya. The purpose of this study was to establish how the introduction of Performance Contracting in Technical Institutions has impacted on external examinations performance. A descriptive survey design was used. A sample of three institutions was selected using simple random sampling method, out of which a sample of two hundred and two respondents was selected using a combination of simple, systematic and stratified random sampling method. The data was analyzed using SPSS (Statistical Package for Social Sciences). The study found out that Performance Contracting was effectively implemented in these TTIs. The study established that the PC curriculum implementation strategies implemented by these Institutions had a significant influence on examination performance. It was however established that Compliance with statutory obligations, timely completion of long-term projects and the staff work environment, as PC strategies had no significant influence on examination performance. The study recommended that the Institutions should not spend a lot of efforts and resources on these strategies, but instead strengthen and continuously improve on curriculum implementation strategies so as to improve on academic productivity.

## 1. INTRODUCTION

### 1.1 Background Information

The concept of performance contracting is a branch of management science referred to as Management control systems (Marangwa, 2007). Different definitions exist to describe a Performance Contract. It has been described as “a Memorandum of Understanding (MOU), rooted in an evaluation system, which does not only look at performance comprehensively but also forces improvements of performance management and industries by making the autonomy and accountability aspect clearer and more transparent,” (Suresh Kumar, 1994). It is “a range of management instruments used to define responsibility and expectations between parties to achieve mutually agreed results” (OECD, 1999). Another more focused on public affairs one describes it as “a management tool to help public sector executives and policy makers define responsibilities and expectations between the contracting parties to achieve common, mutually agreed goals” (Smith, 1999).

First introduced in France after the publication of the famous Nora Report on the reform of state-owned enterprises in France, today almost all OECD countries use some variant of performance contracts in managing their public sector. Adoption of Performance Contracts received a massive fillip after they were introduced in

In Africa, PC has been used in selected enterprises in Benin, Burundi, Cameroon, Cape Verde, Congo, Cote d'Ivoire, Gabon, the Gambia, Ghana, Guinea, Madagascar, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia. In Nigeria prior to the introduction of the Performance Contract in Nigeria for Ministries, Department and Agencies (MDAs), there was no clear objective and defined measurement and evaluation system of Ministerial performance

exist. This may not be unconnected with the fact that, before the conception of Nigeria Vision 20:2020 Economic Transformation Blueprint in the year 2010 and the development of the 1st National Implementation Plan (2010-2013), the country is approaching development intervention with no clearly defined and articulated national development plan.

Performance contracting was introduced in Kenya by the Kenyan Government in 2004, as part of the civil service reforms under the Economic Recovery Strategy for Wealth and Employment creation. The *Kenya sensitization training manual*, (2004) define a performance contract as a freely negotiated agreement between the government, institution and individuals on one hand, and the agency itself. Its primary goal was to increase productivity and improve service delivery in the public sector. It outlined those actions that were necessary to enhance long-lasting and sustainable change in the way public services are offered in Kenya. This strategy was anchored in the Results Oriented Management of operations to respond to pre-determined objectives,

outputs and results. Yet, no other country in the world has implemented a more theoretically sound and useful version of performance contracting than the version implemented by Kenya. It is in this sense that the Kenyan version of Performance Contracts represents a simultaneous giant leap for Kenya and the world.

## **1.2 Statement of the Problem**

The process of performance contracting is quite costly in terms of time and money. It involves the mobilization of institutional human and financial resources, which are necessary to facilitate the process. The Institution must formulate strategic objectives, in terms of what it aspires to accomplish within a stated period of time. These strategic objectives/plans must be guided by the institutions corporate vision and missions which must also be developed. The strategic plan sets targets which the institution is set to achieve within a specified period of time. To achieve this, a lot of resources are utilized to ensure that the whole process of performance is completed. The main objective behind PC is to increase productivity and service delivery in Public Institutions. In learning Institutions, productivity is determined by the amount of learning taking place, which can only be measured in terms of examination performance.

Since the introduction of Performance Contracting in Kenya, there has been no comprehensive study undertaken to measure the relevance and success of PC in educational Institutions.

The main problem identified was how the implementation of performance contracting has influenced examination performance in Technical Training Institutes in Kenya. This is with reference to both the internal and external examinations. The main stakeholders include parents, students staff, examination bodies, suppliers, bankers, insurers, government agencies and others.

This study therefore was intended to carry out an information analysis, by comparing examination performance data for that period before performance contracting was introduced and data for the period after performance contracting was introduced to establish whether PC has influenced the performance in these Institutions.

## **1.4 Objectives of the Study**

### **1.4.1 Main Objective**

The core objective of this study was to establish how implementation of performance contracting strategies in Technical Training Institutes in Kenya has influenced examination performance in these Institutions.

### **1.4.2 Specific objectives**

This study sought to:

- i. Establish the effect of Curriculum implementation strategies on examination performance in TTIs in Kenya
- ii. Determine mitigation measures taken by TTIs to enhance examination performance

## **1.5 Research hypothesis**

H<sub>1</sub>: Curriculum implementation strategies have influence on students' examination performance in TTIs in Kenya?

## **1.6 Significance of the Study**

This study was quite important as it attempted to establish the degree to which the government of Kenya is achieving its objective of increasing productivity and improving service delivery to its citizens through performance contracting. It attempted to establish how the PC strategies that have been adopted in Technical Training Institutes are relevant and productive in terms of improving productivity. The study sought to evaluate the viability of performance contracting in with regard to the extent if any to which it has influenced productivity in TTIs. This being the only study undertaken on evaluation of PC in TTIs, the findings were of great importance to both PC implementers and monitors. The study helped identify the successes and failures of PC in TTIs. The implementation of the findings of the study shall enable TTIs to improve on examination performance. The findings will also help the policy makers in the education sector to modify the PC process where necessary in order to make it more effective, relevant and productive in learning institutions.

## **1.7 Assumptions of the Study**

In the conduct of this study, it was assumed that:

- 1) The selected sample represented the population;
- 2) The respondents would answer questions correctly;

- 3) The data collection instrument had validity and measured the desired constructs;
- 4) Examination results were the best measure of academic productivity; and
- 5) The quality of work remained constant as time taken to complete a given project varied.

## **2.0 Literature Review**

### **2.1 Introduction**

This chapter presents a review of the related literature on the subject under study. Materials will be drawn from several sources which are closely related to the objectives of the study. Studies by various past writers, authors and researchers will be reviewed to assist the researcher meet the objectives of the study. This is in line with giving the study problem in question a theoretical perspective and conceptualization that would aid in carrying out the study. In addition, theoretical literature will be reviewed.

### **2.2 Background Information**

The concept of performance contracting is a branch of management science referred to as Management control systems (Marangwa, 2007). Different definitions exist to describe a Performance Contract. It has been described as “a Memorandum of Understanding (MOU), rooted in an evaluation system, which does not only look at performance comprehensively but also forces improvements of performance management and industries by making the autonomy

and accountability aspect clearer and more transparent,” (Suresh Kumar, 1994). It is “a range of management instruments used to define responsibility and expectations between parties to achieve mutually agreed results” (OECD, 1999). Another more focused on public affairs one describes it as “a management tool to help public sector executives and policy makers define responsibilities and expectations between the contracting parties to achieve common mutually agreed goals (Smith, 1999).

First introduced in France in 1960s, after the publication of the famous Nora Report on the reform of state-owned enterprises in France, today almost all OECD countries use some variant of performance contracts in managing their public sector. Adoption of Performance Contracts received a massive fillip after they were introduced in New Zealand as part of that country’s pioneering public sector reforms. They gained further momentum and legitimacy when they were introduced in the US government as part of the Government Performance and Results Act (GPRA) of 1993.

In Africa, PC has been used in selected enterprises in Nigeria, Benin, Burundi, Cameroon, Cape Verde, Congo, Cote d’Ivoire, Gabon, the Gambia, Ghana, Guinea, Madagascar, Mali, Mauritania, Morocco, Niger, Senegal, Togo, Tunisia and Zaire. In Nigeria, prior to the introduction of the Performance Contract in Nigeria for Ministries, Department and Agencies (MDAs), there was no clear objective and defined measurement and evaluation system of Ministerial performance exist. This may not be unconnected with the fact that, before the conception of Nigeria Vision 20:2020 Economic Transformation Blueprint in the year 2010 and the development of the 1st National Implementation Plan (2010-2013), the country is approaching development intervention with no clearly defined and articulated national development plan

Public sector reforms meant to address these challenges have achieved minimal results. The Civil Service in Kenya inherited at independence had not been designed to grapple with development needs of post-independence Kenya. This led to the launching of the on-going reform efforts necessitated by need to address the declining performance of the Public Service in spite of the many reforms which had been carried out. Enhanced Public Service efficiency and productivity facilitated equitable wealth distribution necessary for poverty alleviation and creation of an enabling environment for investment and enhanced private sector growth. Introduction of Results-Based Management (RBM) is guided by the Economic Recovery Strategy (ERS) for Wealth and Employment Creation (2003-2007). Economic Recovery Strategy (ERS)-2003-2007 was aimed at Economic recovery and improving the performance of public service. Specifically, it enhanced efficiency and effectiveness, macro-economic stability, economic growth, strengthening the institutions of governance, rehabilitation of physical infrastructure and investment in human capital.

Performance Contracting was introduced in Kenya on October 1, 2004, in sixteen commercial State corporations, as part of the *‘Economic Recovery Strategy for Wealth and Employment*

*Creation 2003-2007*. The performance of these corporations was evaluated in September 2005, where the Ministry of Agriculture led with a 1.9653 score.

Since then, only one published study has been undertaken to evaluate the success of PC implementation. The study *Performance Contracts in Kenya: Instruments for operationalising good governance (Prajapati Trivedi, 2006)*, sought to examine the experience of implementing PC in Kenya and also compared this to such attempts in Developed and Developing countries.

This study found out that after PC was introduced in State corporations, in the financial year 2005/06, the dividends received by Treasury from State corporations increased by approximately 200%, from 849 million to 2.14 billion, which was attributed to the introduction of PC.

### **2.3 Research Gap**

It is however very notable that none of the above researches studies covered any educational institutions. These Institutions have unique features and characteristics in that their core business is the creation and the dissemination of knowledge through learning. The amount of learning can only be measured in terms of performance in examinations. Technical Training Institutes, offer middle-level education and training to secondary school leavers in the country. It therefore remains an issue of great interest to carry out research work aimed at evaluating the influence that PC on examination performance in TTIs Institutions.

The implementation of the Service delivery charter by these Institutions is accomplished through maximizing the learning process by improving on external examination performance through curriculum implementation strategies, timely completion of projects, improving working conditions and ensuring full compliance with all statutory requirements. It is therefore quite important for research to be carried out to establish the degree to which the introduction of PC has influenced academic performance in Technical training Institutes in Kenya.

### **2.4. Theoretical Framework**

This study was supported by the following strategic management theory:

#### *The Contingency Theory*

The contingency theory states that there is no single best way to manage organizations but each particular situation requires a fit for that purpose approach solution. Performance Contracting allows mutual negotiation between the curriculum implementers and managers of TTIs on the best strategies of curriculum implementation which will help achieve the best performance in examination in TTIs in Kenya. Performance contracting is a broad concept whose overall objective is to increase productivity and improve service delivery in an organisation. In a learning institution one of the major activities is the creation, dissemination and transfer of knowledge through learning. It can be urged that the only valid indicator of learning is examination performance. Thus when students pass the examinations, this may be used as an indicator that learning has taken place effectively. On the inverse, when students fail in examinations the only reasonable explanation to this may only be the learning did not take place effectively.

### **2.5 Conceptual Framework**

The conceptual framework used in this study is shown in Figure 2.1.

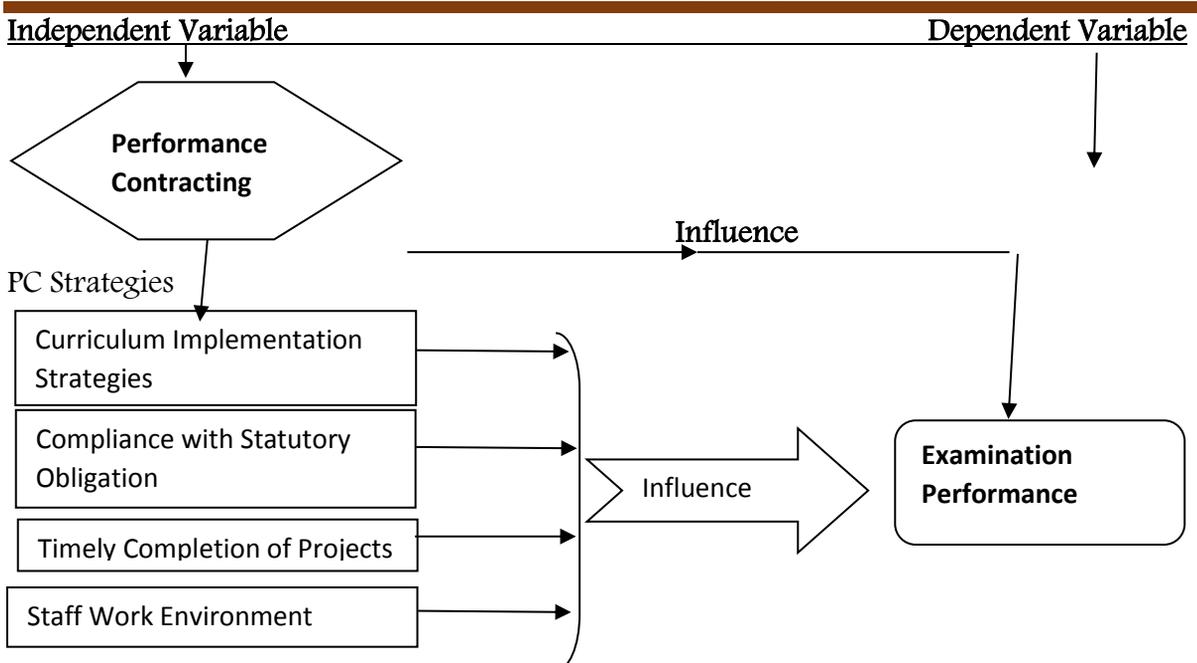


Figure 2.1: Conceptual Framework

### 3 Research Methodology and Design

#### 3.1 Introduction

This chapter describes the procedures and strategies that will be adopted by the researcher in order to reach the sampled population, collect and analyze data so as to answer the research questions. It consists of the research design, target population, sample and sampling procedures, data collection instrument and analysis procedures.

#### 3.2 Research Design

Anene (1998) defines research design as a method the researcher wants to use in executing his or her research. That is, the road map of research investigation, procedure the investigator wants to use to solve the identified problem. The research design which was used is descriptive survey. In this study the target population consisted of management staff, lecturers, support staff and students, from the sampled Institutions.

#### 3.3 Data Collection

This study maximized the use of primary and secondary sources to achieve the set objectives since the study intended to establish the influence of performance contracting on service delivery in TTIs in Kenya.

#### 3.4 Validity and Reliability of the Instruments

##### 3.4.1 Validity

Validity is the extent to which inferences made on the basis of numerical scores are appropriate, meaningful and useful. Validity of the study is assessed depending on the purpose, population and environmental characteristic in which measurement takes place (Macmillan and Schumacher 2001).

To test the validity of the research instrument, a pilot study was carried out to test if research instruments were ambiguous. This involved distributing a few samples of the research instruments to the respondents, hence the response and understanding of the questions analyzed. In case of any ambiguity and irrelevant information responded the questionnaire was modified for validity purpose. The respondents were also requested to respond on the clarity of the questions presented to them.

##### 3.4.2 Reliability of Research instruments

As defined by Ogula (1998), reliability is the extent to which a research instrument yields measures that are consistent each time it is administered to the same individuals or yields consistent results after repeated trials.

To determine reliability of the instruments in this study, the researcher used the split half technique which requires only one testing session (Nachmias and Nachmias, 1996). This involved splitting the items into two halves (odd and even). The odd and even items were administered separately at different times and scored accordingly. The scores of the two tests

were then computed by Pearson's Product moment correlation coefficient to determine an estimate of reliability coefficient of the whole inventory.

### **3.5 Data Collection Procedures**

Permission to carry out the research and authorization letter was received from the University. These explained to the respondent the reason for the research and enhance the confidentiality of the data collected from them. Thereafter, the questionnaires were self administered by a drop and pick method. This was carried out during tea and lunch breaks, to avoid interfering with the Institutional schedules. During this process, the researcher went to the sampled groups, introduced himself and met the workers and students, giving them brief information in regard to the research. Then the questionnaires were distributed to the sampled group using systematic random sampling method.

### **3.6 Research Ethics**

Permission to carry collect data from the respondents was sought from the MOE. Letters requesting respondents to participate in the research were given to the respondents early enough. The respondents were requested to pick the questionnaires, duly fill them and return to designated persons or places. The letter assured the respondents that the information they gave would be treated with strict confidentiality and that the information was solely for academic purposes.

## **4. Findings and Discussions**

### **4.1 Introduction**

The purpose of this chapter was to broadly discuss and present the analysis of data collected using the various data collection modes. Analysis therefore was to make it easy for the readers to comprehend each study variable and consequently draw any relationship between them. The questionnaires were administered to all sampled population and they were given ample time to respond to the questionnaires independently.

The study was done with the view of investigate the influence of how implementation of performance contracting strategies in Technical Training Institutes in Kenya has influenced

service delivery in these Institutions. The responses contained in the questionnaires were interpreted for analysis based on the fundamental assumptions underlined in each question. The returned questionnaires formed the basis for the analysis which forms this study. The questionnaires were then verified coded and tallied according to the themes thereafter were quantitatively and qualitatively analyzed by use of SPSS (Scientific Package for Social Sciences) through the use of tables and charts. Qualitative data refers to the information gathered in a narrative form through interviews, focus discussion groups and observations. The responses from the people who verbalized their reactions in different ways were organized to answer the research questions of the study. The researcher gave much attention to the recurring responses that formed the themes of the study. This study was undertaken to analyze and discuss data collected from respondents in relation to research objectives and questions. The responses from the people who verbalized their reactions in open-ended questions in the questionnaires, Focused Discussion Groups, interview schedules and observations were organized to form the qualitative analysis and answer the research questions of the study. The researcher gave much attention to the recurring responses that formed the themes of the study. The reactions were organized into various thematic aspects as outlined in the research objectives and questions.

### **4.2 Classroom Instruction**

This part sought to establish the respondents' views whether the tutors implement the curriculum. The results were presented in figure 4.2.

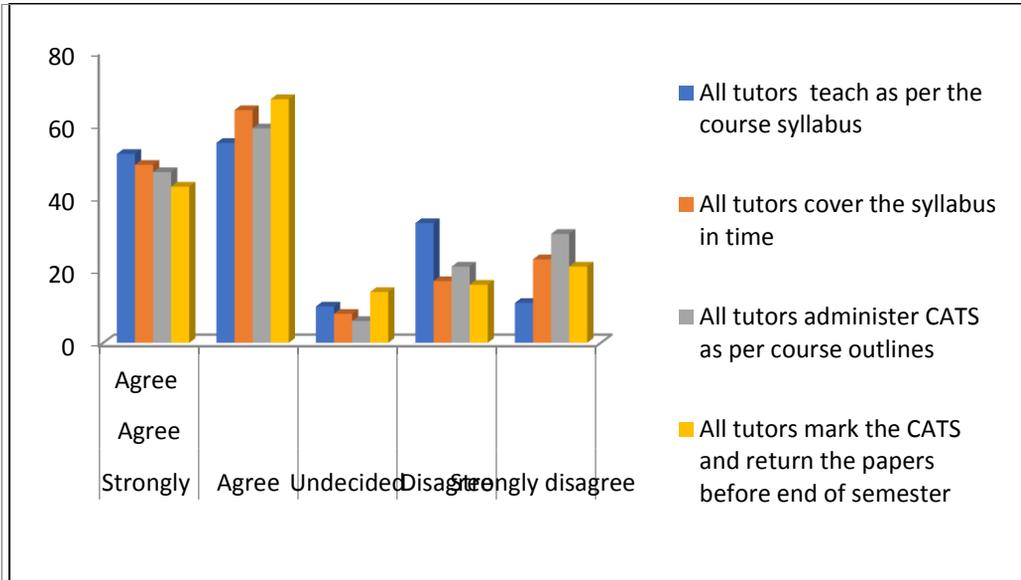


Figure 4.2 Class room Instruction

**4.3 Instructional materials**

This part sought to establish whether the instructional materials are available, adequate, and relevant for the courses offered and they are provided in time by the institutions management. The respondents were asked to indicate their views. The results were presented in table 4.3 and figure 4.3.

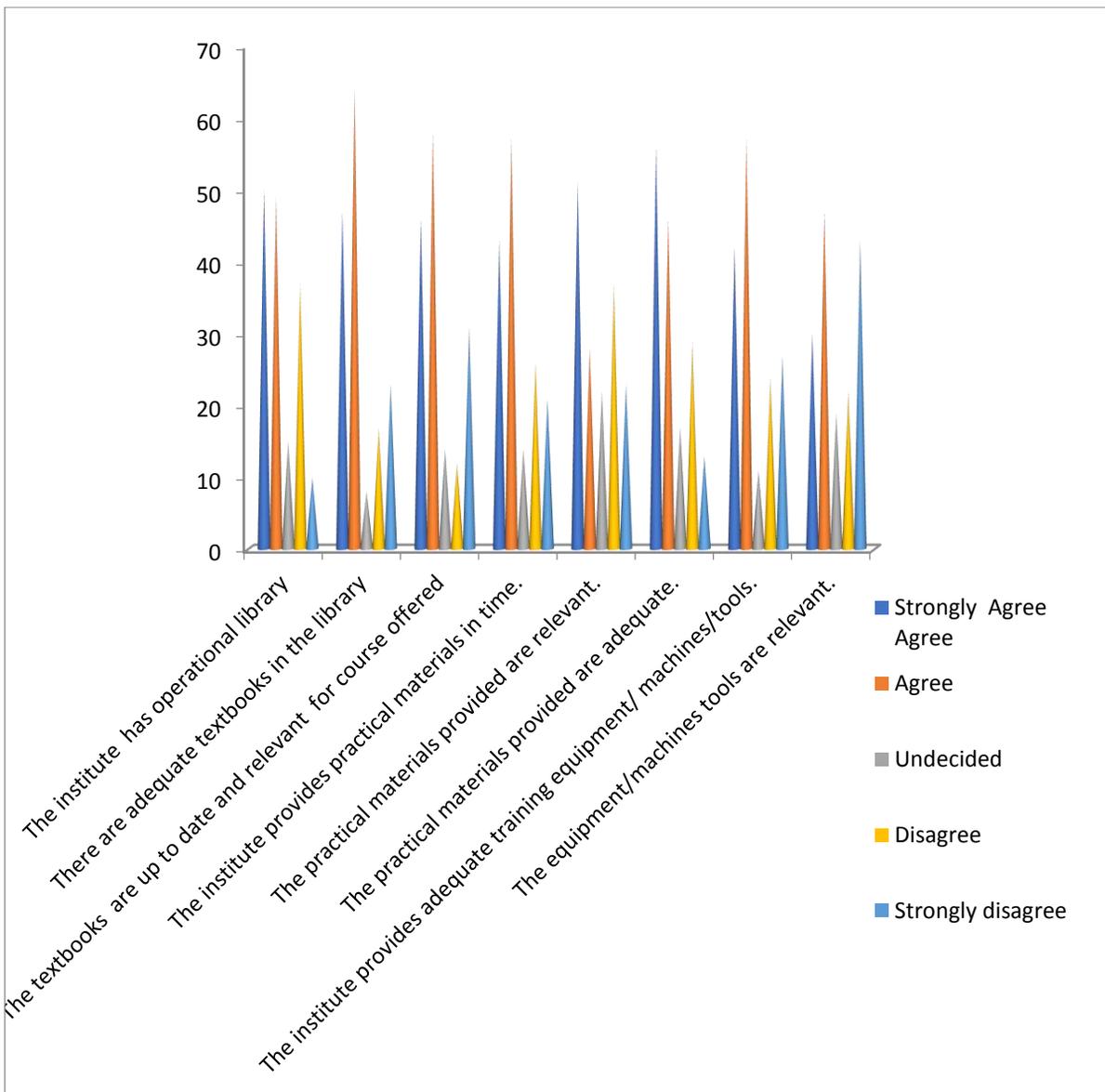


Figure 4.3: Respondent Views

Table 4.3: Examination pass rate data

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
% Pass Rate	51.1	46.9	49.1	55.0	52.0	51.2	55.9	59.1	67.0	68.8	70.1

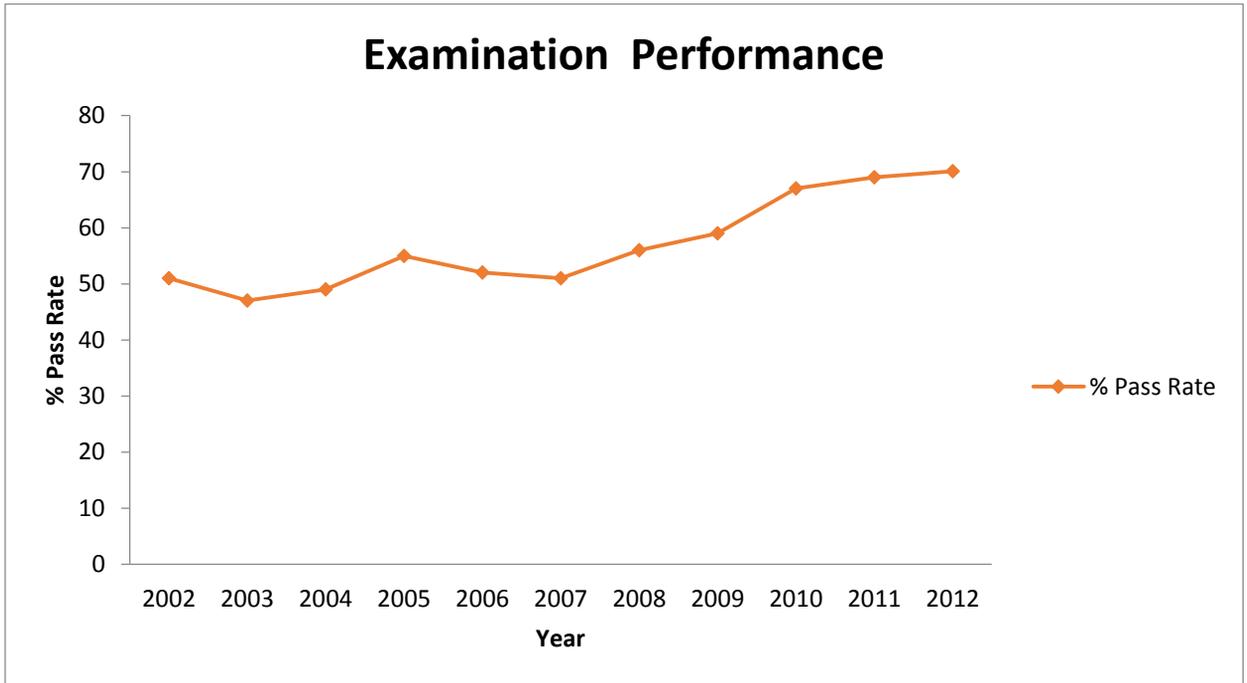


Figure 4.4: Examination Performance

#### 4.4 Summary Statistical analysis

The historical data was analysed on the five variables under study, where one is the dependent variable and the other four are the independent variables. The objective of this analysis was:

- To establish any correlation between all the variables under study,
- To determine whether the correlation, if any, is significant, and
- Whether and to what extent the independent variables have influence on the dependent variable.

Table 4.18: Regression Statistics

Regression Statistics	
Multiple R	0.994131813
R Square	0.988298063
Adjusted R Square	0.980496771
Standard Error	1.150160235
Observations	11

Table 4.19: ANOVA

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	670.3446068	167.5861517	126.683902	6.35338E-06
Residual	6	7.937211394	1.322868566		
Total	10	678.2818182			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	18.87679889	4.999985977	3.775370367	0.009230352	31.11132381	6.64227397
Compliance	0.517097893	0.27321623	1.892632415	0.107259919	1.185633923	0.15143813
ProjCompl	0.067259816	0.128762523	0.522355527	0.620139671	0.382330358	0.24781072
WorkEnv	0.094509237	0.057285683	1.649788078	0.150079572	0.234682253	0.04566377
Curr Impl	1.644304922	0.24129097	6.814614403	0.000489687	1.053887188	2.23472265

Table 4.20: Variance-Covariance Matrix

	<i>ExamPerf</i>	<i>Compliance</i>	<i>ProjCompl</i>	<i>WorkEnv</i>	<i>Curr Impl</i>
ExamPerf	61.6619834				
Compliance	7	61.1074380			
ProjCompl	57.7107438	2	55.7851239		
WorkEnv	49.4504132	8	7	52.6115702	
Curr Impl	10.8421487	6.96694215	10.5371900	5	55.8347107
	57.8561983	56.9256198	49.9586776	12.2396694	4
	5	3	9	2	

Table 4.21: Correlation Matrix

	<i>ExamPerf</i>	<i>Compliance</i>	<i>ProjCompl</i>	<i>WorkEnv</i>	<i>Curr Impl</i>
ExamPerf	1.00000000				
Compliance	0	1.00000000			
ProjCompl	0.94015809	0	1.00000000		
WorkEnv	0.84314443	0.92573383	0	1.00000000	
Curr Impl	0.19035574	0.12287245	0.19450240	0	1.00000000
	0.98602746	0.97456002	0.89515779	0.22582754	0
	7	9	6	9	

### Regression Equation

$y = -18.87x_0 + 1.644x_1 - 0.094x_2 - 0.067x_3 - 0.517x_4$ , where:

- y-Examination performance,
- x<sub>0</sub>-Intercepting variable,
- x<sub>1</sub>-Curriculum implementation strategies,
- x<sub>2</sub>-staff working environment,
- x<sub>3</sub>-timely completion of projects, and
- x<sub>4</sub>-Compliance with statutory obligations.

## 5 Summary of Findings, Conclusions and Recommendations

### 5.1 Introduction

This chapter provides details information obtained from the data analysis during the study. The conclusions and recommendations are also provided in relation to the aim of the study that

sought to establish how implementation of performance contracting strategies in Technical Training Institutes in Kenya has influenced service delivery in these Institutions.

## 5.2 Summary of Findings

The findings of the study were as follows:

### 5.2.1 Influence of Curriculum implementation strategies on examination Performance.

It was established that most of the tutors do not miss lessons, come to class in time, do not waste time on out of topics issues and above all, they do not leave class before the end of the lesson. This greatly impacts on the performance of the institutes positively in various ways. It was also established that most students do not miss lessons; the students further submit their assignments in time whereas most teachers do not miss lessons and hence cover the syllabus in time. This was articulated to the fact that the institutions' Teachers and Students tend to serve institution's interests that are in tandem with the values of the institution.

Due to due performance contracting in the institution, it was also found that most tutors teach as per the course syllabus, the syllabus is covered in time and that the tutors administer CATS as per course outlines and also the institution have a well-defined system to provide the relevant instructions materials and equipment in time. This was articulated to be as a result of appropriate and relevant performance contracting strategies on curriculum implementation in Technical Training Institutes. A regression analysis showed a positive influence of these strategies on examination performance.

## 5.3 Recommendations.

The key to performance contracting strategies is the ability to take control of its professionalism in dealing with clients. One has not to take for granted anything hence one needs to develop a very inquisitive mind so as to be able to manage the affairs well. Good performance contracting strategies is the key to the institutions survival because without it there will be poor performance. The study concluded that the institutions have few weak internal control systems. In a nut shell, the conclusions evolved the following recommendations;

- 1) The Heads of departments should summon those tutors who miss lessons and explain to them the importance and impact attending all the lessons and avoid missing all of the lessons in time in order to attain the institutions set goals.
- 2) The heads of departments should put in place effective measures to ensure all students attend classes in time, and also submit their assignments in time.

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Machakos University, Kenya**

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## Influence of Human Resources on the Strategic Plan Development Among SMEs in Machakos Town

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### Abstract

The purpose of this study was to establish the influence of human resource development on the strategic plan development among SMEs in Machakos Town in Kenya. Statement problem of this study evolved on the fact that SMEs have suffered in one way or the other from lack of or poorly developed strategic plans and are well aware of the negative impact. Past and previous studies were reviewed with the aim of identifying research gap and endeavored to fill the knowledge through this current study. This study was achieved by employing descriptive survey design on a sample of SMEs in Machakos for representativeness. Using questionnaire, document analysis and interview guide on selected participants from a population of the SMEs, research data was collected using questionnaires and interviews guides. Automatic inclusion and purposive sampling were employed sampling all respondents at the selected SME firms in Machakos Town. The data was analyzed descriptively with the use of analyzing techniques like inferential statistics among others of the SPSS and findings presented through tables and percentages. The conclusions evolved recommendations which included: training employees on strategic plan development and initiating motivation schemes to encourage employees to participate in strategic plan development.

**Keywords:** *Human Resources Development, Strategic Plan Development, SMEs & Machakos Town.*

### 1. Introduction

#### 1.1 Background of the Study

In Kenya, SMEs are vital. According to Gakure and Amurle (2013), the SMEs sector employs 74% of the labor force and contributes over 18% of the country's Gross Domestic Product (GDP). Despite its great contribution to Kenyan society, and the numerous policy prescriptions, SMEs sector encounter series of challenges and constraints that inhibit its growth. The effect is less growth, low competitiveness, high failure rate, and an average lifespan of five years. On the other hand, for a long-time strategic planning is known to be an essential activity that generates positive outcomes for firms of all sizes. However, little is known of the strategic planning practices among SMEs in Africa and in particular Kenya (Gakure & Amurle, 2013).

Kenyan SMEs' strategic planning is guided by the organization's value system, or culture, which is manifested not only in the organization's mission statement, policies, and strategic goals, but also in the behavior of top management and other key managers in the organization. For instance, if an SME wishes to address issues of service delivery and performance management based on strategy focus, then service delivery must become one of the values of that an SME and the managers and employees must be seen to live that value in their everyday lives and for this to happen, there needs to be a well thought strategic management system working throughout the institution (Neale, 2004). Strategy researchers, writers and practitioners largely agree that every strategy context is unique. Moreover, they are almost unanimous that it is usually wise for strategists to adopt the strategy process and strategy content to the specific circumstances prevalent in the strategy context (Wit & Meyer, 2001).

Small and medium-sized enterprises (SMEs) play a key role in around the world. In Europe's economies, for instance, SMEs employ as much as 66% of the total employed personnel in the private sector and account for 55% of total revenues in the EU (Barney, 2001). In Portugal around 98% of the industrial fabric is composed by SMEs. Most of times, firms are seen as a black box on what concerns to development however the measures taken by them, entrepreneurial strategies, and entrepreneurship actions, have influence in the development theatre (Stonehouse & Pemberton, 2002).

In Kenya, the Micro, Small and Medium enterprises are variously referred. They fall under the popular informal sector called Jua Kali as they largely start in the open sun under no roof. The sector employs over 80% and is currently receiving a lot of government attention as its seen as the solution to the crippling unemployment especially for the youth. Over 65% of Kenyan population is youthful and unemployed. In 2008, Kenya experienced the post-election violence

which left over 1,000 people dead and 500,000 displaced. And while this might have been politically instigated, the fuel was the youth unemployment and the grinding poverty. This realization has re-energized the government's resolve to address the unemployment with such initiatives as *Kazi Kwa Vijana*.

The site of the study was the SMEs within Machakos town, Machakos County in the Eastern part of Kenya. The county has been selected as the home to the upcoming Konza Technology City due to its proximity to Machakos Town, good infrastructure and availability of massive chunks of land. Machakos County, Machakos Town's Eastern neighbor, is home to important industrial and residential canters like Athi-River and Mlolongo. Sadly, the developments do not extend to most parts of the huge county, but that is about to change when a planned technology city development is finalized. Administratively, the county is divided into twelve divisions, sixty two locations and two hundred and twenty five sub-locations (Republic of Kenya, 2001).

### **1.2 Statement of the Problem**

There are many factors that hamper strategic plan development in Kenya. Inadequate resources, unfavorable organizational culture among others are some of the organizational factors that this study will seek to investigate. Scholars in Kenya have undertaken studies on strategic plan in organizations. Among the local studies include Kasimbu (2007) who focused on strategic plan development among Non-Governmental Organizations (NGOs) in Nairobi where the study established that community determines the nature of operations and the quality of products and services offered by NGOs and that sponsors influence on the budget allocation while the government plays a supervisory role and creation of conducive environment for the NGOs to work in. Kisinguh (2006) who laid focus on stakeholders' involvement in the strategic plan development in public organizations in Kenya where the study established that most NGOs never put premium on strategic development. Bariti (2009) whose focus was on management perception of strategic plan development Nature Kenya and Gekonde (2011) who assessed the role of stakeholders in determining the content of the strategic plan at Nature Kenya where they established that stakeholders never put emphasis on strategic plan development.

Strategic plan development is by nature complex; thus, it must have clear priorities in order to be manageable. The management of diverse stakeholders' expectations, priorities, interests and powers in this process can make or break an organization. Many organizations have had unending challenges in developing strategic plans. The worst hit are SMEs in Kenya. This is so because of the rate at which they are winding up their business. SMEs in Kenya have not fully embraced the use of strategic plans due to the difficulties involved in development of strategic plans.

While studies have availed evidence of strategic plan development in various organizations, the researcher has not come across a study with a specific focus on human resources influence on strategic plan development among SMEs. Hence this study sought to fill the identified research gap by establish the influence of human resources on the strategic plan development among SMEs in Machakos Town.

### **1.3 Objective of the Study**

To find the influence of human resources development on the strategic plan development among SMEs in Machakos Town.

### **1.4 Research Hypotheses**

**Ho:** There is no significant relationship between human resource development and strategic plan development among SMEs in Machakos Town.

## **2.0 Literature Review**

### **2.1 Theoretical Framework**

#### *2.1.1 Strategy Theory*

The strategy theory has provided a useful framework to understand how firms attempt to embrace strategic planning. Strategy provides a coherent blueprint to bridge the gap between the realities of today and a desired future. It is the disciplined calculation of overarching objectives, concepts, and resources within acceptable bounds of risk to create more favorable future outcomes than might otherwise exist if left to chance or the hands of others. It is the consideration of the relation of how to apply resources to achieve desired results in a specific strategic environment over time. In the context of the state, strategy is the employment of specific instruments of power (political/diplomatic, economic, military, and informational) to achieve the political objectives of the state in cooperation or in competition with other actors pursuing their own possibly conflicting objectives (Stephen, 2001).

The role of strategy is to ensure that the pursuit, protection, or advancement of these interests which are achieved through the application of the instruments of power to specific objectives to create strategic effects in favor of the interest based on policy guidance is accomplished in a coherent and optimal manner. Strategy is fundamentally about choices; it reflects a preference for a future state or condition and determines how best to get there. In doing so, strategy confronts adversaries, allies, and other actors; and it addresses resource and organizational issues; even then some factors simply will remain beyond control or maybe unforeseen (Donald, 2005). Rational choice, chance and probability, irrational actors, allies, and competitors are all part of the strategic paradigm. Strategy is inherently comprehensive; its foremost purpose is to favorably influence the complex and volatile strategic environment by providing direction for the judicious application of power toward achievement of policy-driven objectives.

### *2.1.2 Institutional Theory*

Institutional theory focuses on the deeper and more resilient aspects of social structure. It considers the processes by which structures, including schemes, rules, norms, and routines, become established as authoritative guidelines for social behavior (Scott, 2006). Different components of institutional theory explain how these elements are created, diffused and adapted over space and time; and how they fall into decline and disuse. Institutional theory states that organizations exist in an institutional environment which defines and delimits its social reality (Scott, 2006). In the current study, institutional theory was applicable given that SMEs are organizations. It is the organization within which strategic planning development is taking place. The organization has structures, rules, norms and routines. The institutional theory therefore points out the need to focus on the institutional factors that are likely to influence strategic planning development.

## **2.2 Empirical Review**

### *2.2.1 Strategic Plan Development Process*

Strategic plan development involves acting on what has to be done internally to put the chosen (formulated) strategy into place and achieve the targeted results. Strategies and policies are translated by management into action through the development of programs, budgets, and procedures. Strategic management by itself is a process and it refers to a set of decisions and actions that result in the formulation and development of long term designed plans to achieve organizational objectives (Pearce & Robinson, 1997). According to Niville (2002), strategic management is the process that encompasses strategic planning, development and evaluation. In their view, strategic management process is a way of considering, dealing, and realizing already formulated strategies.

On the other hand, strategic plan development involves allocation and management of sufficient resources, establishing a chain of command or some alternative structure, assigning responsibility of specific tasks or processes to specific individuals or groups. Implementing strategies successfully is vital for any organization public or private. Without development, even the most superior strategy is useless. The notion of strategic plan development might at first seem quite straightforward: the strategy is formulated and then it is implemented. Implementing would thus be perceived as being about allocating resources and changing organizational structure. However, transforming strategies into action is a far more complex and difficult task (Martin, 2012).

### *2.2.2 Strategic Plan Development*

Hrebiniak (2005) recognized the difficulty of strategy execution and the reward from doing that correctly. He discussed various factors that can lead to incorrect development of any strategy similar to those already discussed in the above literature discussion. Additionally, Hrebiniak's research survey of 400 managers contributed to the identification of additional factors that may cause obstacles to successful strategic plan development included: Lack feelings of "ownership" of a strategy or execution plans among key employees; not having guidelines or a model to guide strategy- execution efforts; lack of understanding of the role of organizational structure and design in the execution process; inability to generate "buy-in" or agreement on critical execution steps or actions; lack of incentives or inappropriate incentives to support execution objectives; insufficient financial resources to execute the strategy.

Marius and Rachel (2011) researched 15 development problems and found that six strategic plan development problems were experienced by over 70% of the sample group of firms. Based on case studies, Matthew, (2009) identified additional development problems as a) failing to periodically alter the plan or adapt it to changes in the business environment b) deviation from

original objectives and c) lack of confidence about success. According to Cole, (2004), all development aspects during the planning phase are fundamental for execution as there is no time to do that during execution. It is critical that everyone in the team understands and agrees upon the details of the plan.

Brannen’s (2005) study concluded that in order to improve execution certain issues have to be tackled. These include inadequate or unavailable resources, poor communication of the strategy to the organization, ill-defined action plans, ill-defined accountabilities, and organizational/cultural barriers. Brannen’s survey unearthed another significant obstacle to effective strategic plan development namely, “failing to Empower or give people more freedom and authority to execute.” Hrebiniak (2005) observations of items on “what’s getting in the way of execution” point to “habit and past experience reflects on new strategy” as another factor that could affect strategy development. Bariti (2009) whose focus was on management perception of strategic plan development Nature Kenya and Gekonde (2011) who assessed the role of stakeholders in determining the content of the strategic plan at Nature Kenya where they established that stakeholders never put emphasis on strategic plan development.

**2.3 Conceptual Framework**

This study conceptualized that the independent variable (influence of human resource) will affect the dependent variable (strategic plan development among SMEs in Kenya). The strategic plan development of the SMEs was evaluated in terms of human resources.

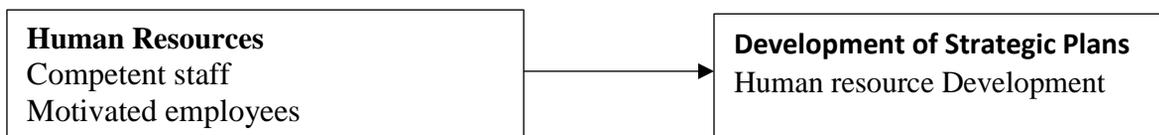


Figure 1: Conceptual Framework

**3.0 Research Methodology**

Descriptive survey design was employed in carrying out this study to achieve the set objectives. The target population was made of all the SMEs in Machakos Town licensed by the Government of Kenya as at 31st December 2013. The total number of SMEs is 50. These included micro, small and medium enterprises. To determine sample size for respondents, this study used census method where all SMEs were selected for study. This is because the study intended to collect facts as opposed to perception. For primary data collection, instruments like questionnaire, interview guide and document analysis form were used. Some secondary data was obtained from the Machakos county and National government offices. The major tool of data collection for this study was the questionnaire for primary data. A structured interview guide was used on all respondents so as the researcher would be able to reliably aggregate the answers and make comparisons with confidence between the various respondents. The statistics generated was descriptive statistics and inferential statistics. The specific descriptive statistics included percentages and frequencies while the inferential statistics included a simple regression model and Pearson correlation. The simple regression models were used to measure the relationship between the independent variables and the dependent variable that are explained in the model.

**4.0 Results and Discussion**

**4.1 Descriptive Statistics**

*4.1.1 Human Resource and Strategic Plan Development*

This section presents the objective of the study which was to find the influence of human resource on strategic plan development among SMEs in Machakos town. A general question with „Yes“ and No“ options was posed to respondents on whether human resource factor influences strategic plan development in your organization and 88% answered in the affirmative that it does influence while 12% had a divergent view.

The objective of the study sought to find the influence of human resource on Strategic Plan Development. On this key objective question of the study, the responses were generated on a five-point Likert scale; 1= strongly agree, 2= agree, 3= Not Sure, 4= disagree and 5= strongly disagree. The respondents were required to state their level of agreement by ticking on the appropriate space. The study findings are as shown on Table 1.

Table 1: The Influence of Human Resource on Strategic Plan Development

Human Resource	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	Mean	Standard deviation
Competent staff	4	4	4	22	16	3.84	1.201

Motivated Employees	4	4	4	32	6	3.64	1.064
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\*SD=strongly disagree D=Disagree N=Not sure A=Agree SA=Strongly Agree f=Frequency.

Descriptive statistics frequencies, mean and standard deviation were used to summarize the study findings as shown on Table 1. From the findings, respondents disagreed that SMEs have competent staff to assist in developing a strategic plan as shown by the mean of 3.84 and standard deviation of 1.201. This represents a variation of 31%. In addition, respondents disagreed that there are motivated employees as represented by mean of 3.64 and a standard deviation of 1.064 representing a variation of 29%. The implications of these finding are that there is no competent staff and motivated employees to participate in Strategic Plan Development.

These findings are in agreement with Brannen’s (2005) study that concluded that, in order to improve execution certain issues have to be tackled. These include inadequate or unavailable resources, poor communication of the strategy to the organization, ill-defined action plans, ill-defined accountabilities.

## 4.2 Hypothesis Testing

*4.2.1. H<sub>0</sub>: There is no significant relationship between Human Resource and Strategic Plan development among SMEs in Machakos town.*

To further test the influence of human resource on strategic plan development, the data on Table 1 were subjected to ANOVA to test the hypothesis that the there is no significant relationship between human resource and strategic plan development among SMEs in Machakos Town. The ANOVA results are summarized on Table 2.

Table 2: Summary of ANOVA on Human Resource and Strategic Plan Development

	Sum of squares	df	Mean Square	F	$\alpha$
Between groups	20.671	15	1.477	Fo = 7.468	$\alpha_o = .050$
Within groups	6.133	35	.198	Fc = 2.663	$\alpha_c = .000$
<b>Total</b>	<b>26.804</b>	<b>50</b>			

Note: df = degrees of freedom; F = Anova;  $\alpha$  = level of significance; Fo = calculated value of F; Fc = the critical value of F;  $\alpha_o$  = calculate value of  $\alpha$ ;  $\alpha_c$  = the critical value of  $\alpha$ .

This means that there is significant relationship between human resource and strategic plan development among SMEs in Machakos Town. The hypothesis that the there is no significant relationship between human resource and strategic plan development among SMEs in Machakos Town was therefore rejected and the alternative hypothesis accepted. This was because the Fo was higher than Fc. Thus, there is significant relationship between human resource and strategic plan development among SMEs in Machakos Town implying human resource affects strategic plan development.

## 4.3 Correlation Analysis

Further the study applied Pearson’s Product Moment technique to establish the relationship and the direction of the relationship between strategic plan development and Human resource development and Strategic Plan Development. The study findings on Table 3 show that there is a positive relationship between Human resource development and Strategic Plan Development (0.505). This implies that an increase in human resource incompetence will decrease strategic plan development chances in Machakos Town.

Table 3: Correlations between Dependent and Independent Variables Correlations

		Human Resource	Strategic Plan Development
Human Resource	Pearson Correlation	1.000	.505**
	Sig. (2-tailed)		0.000
	N	50	49
Strategic Plan Development	Pearson Correlation	.505**	1.000
	Sig. (2-tailed)	0.000	
	N	49	49

\*. Correlation is significant at the 0.05 level (2-tailed).  
\*\*. Correlation is significant at the 0.01 level (2-tailed).

#### 4.4 Regression Analysis

In order to understand the relationship between the independent and depend variables as shown in the conceptual framework and articulated in the research objectives, the researcher conducted a simple regression analysis so as to assess the relationship between the independent and depend variable. The regression equation is;

$$Y = \beta_0 + \beta_1 X_1 + e$$

$\beta_0$  = constant

Where Y = Strategic plan Development

X1 = Human resources

Table 4: Regression Analysis

Coefficients						
Model		Unstandardized Coefficients	Standardized Coefficients	T	Beta	Sig.
B		Std. Error				
1	(Constant)	1.002	1.024	0.978	9.604	.000
	Human Resources	0.303	.054	-.684	-5.572	.000

a. Dependent Variable: Strategic Plan Development

The goodness of fit was tested using the F statistics (F=14.022 and P-value <0.05) this implies at least one of the beta coefficients is not equal to zero therefore there is a significant relationship between the Strategic Plan Development and Human resource development. Results of the study showed that the explanatory power (coefficient of determination) was 0.978 which means that 0.978 of Strategic Plan Development can be explained by human resource.

#### 4.4 Analysis of variance

The probability value (p-value) of a statistical hypothesis test is the probability of getting a value of the test statistic as extreme as or more extreme than that observed by chance alone, if the null hypothesis  $H_0$  is true. The p-value is compared with the actual significance level of the test and, if it is smaller, the result is significant. The smaller it is the more convincing is the rejection of the null hypothesis.

Analysis of Variance (ANOVA) consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance, because the data are noisy and the regression line doesn't fit the data points exactly, each reported coefficient is really a point estimate, a mean value from a distribution of possible coefficient estimates. So the residuals  $e$  (the remaining noise in the data) are used to analyze the statistical reliability of the regression coefficients.

Table 5: ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
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	Regression	4.247	15	1.416	2.094	.011b
	Residual	29.753		35		.676
<b>Total</b>		<b>34.000</b>		<b>50</b>		

Note: df = degrees of freedom; F = Anova;  $\alpha$  = level of significance;  $F_o$  = calculated value of F;  $F_c$  = the critical value of F;  $\alpha_o$  = calculate value of  $\alpha$ ;  $\alpha_c$  = the critical value of  $\alpha$ .

a. Dependent Variable: strategic plan development

b. Predictors: (Constant), human resource. The above summary of the basic logic of ANOVA is the discussion of the purpose and analysis of the variance. The purpose of the analysis of the variance is to test differences in means (for groups or variables) for statistical significance.

The accomplishment is through analyzing the variance, which is by partitioning the total variance into the component that is due to true random error and the components that are due to differences between means. The ANOVA analysis is intended to investigate whether the variation in the independent variables explain the observed variance in the outcome – in this study the strategic plan development.

The ANOVA results indicate that the independent variables significantly  $F(df_b, df_w) = 2.094$   $p < 0.05$ ;  $F(5, 150) = 2.094$   $p < 0.05$  explain the variance in strategic plan development. In this context, as have been presented in the Table 5, the dependent variable is the strategic plan development while the independent or the predictor, human resource. The variable stated have a level of significance of 0.011 which is less than 0.05 and therefore reject the null hypotheses. In conclusion human resource influence strategic plan development in Kenya.

### 5.0 Conclusions

The study concluded that human resource influences strategic plan development and are poorly practiced among SMEs in Machakos town thus strategic plan development is never embraced among these SMEs. Respondents disagreed that SMEs have competent staff and motivated employees to participate in strategic plan development. This implied that there is no human resource competent in strategic plan development among SMEs in Machakos Town. Further tests lead to the rejection of the research hypothesis (H01) that there is no significant relationship between human resource and strategic plan development among SMEs in Machakos town. This was because the  $F_c$  was less than the  $F_o$  at 2.263 and 7.468 respectively.

### 6.0 Recommendations

Based on the findings and conclusion of the study, it is recommended that; the government through the ministry of trade and ministry of labor should frequently organize training programs to education the SMEs managers on strategic plan development. The managers should also initiate motivation schemes for their employees in order to encourage them to participate in strategic plan development in their respective SMEs. Finally, the owners of the various SMEs should formulate policies that would promote citizenship behavior and job performance. This should include Job security, empowerment of employees and distribution of leadership while at the same time reducing role stress by providing flexible working environment. The managers should practice participative management and also practice contingency approach to management.

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## Integration of Design Thinking in Leather Product Development Within Kenya's Informal Sector

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### Abstract

Design is an integral part of the productivity of the leather sector. The leather industry is shifting from its traditional roots in an attempt to revive its fortunes, through the adoption of design and design thinking approaches. While Kenya boasts of abundant availability of raw hides and skins, constituting the main raw materials for the leather industry, the weak position of the manufacturing sector and its inability to produce higher value-added products has hampered the full exploitation of these resources. The growing awareness of design thinking as a key driver in the craft industries has the potential to transition the leather industry in a completely new and more sustainable direction. Employment in Kenya's leather industry is estimated at 14,000 with the informal sector accounting for 10,000 workers (over 71%). The informal leather sector is however severely disadvantaged by low adoption of professional design expertise leading to poor quality products. Insufficient funding coupled with a lack of access and/or awareness on design services to aid in product development and differentiation has resulted in most Kenyan leather being produced and sold as a commodity with little quality or design differentiation. With limited access to the domestic market occasioned by the influx of second-hand leather goods and competition from cheap/synthetic leather substitutes from China and other countries, many Kenyan producers are seeking to diversify their export markets. Following an urgent need for competitiveness in design and product development for accelerated economic growth and eradication of poverty, this study sought to conduct an audit on the uptake and integration of design thinking among the leathersmiths in the informal sector in Kenya. Using an exploratory study, the authors engaged respondents from Kariokor Market in Nairobi City County, Kenya. Purposive sampling was used to select stall owners who doubled up as representatives of Kenya Cobblers Association. Semi-structured research questionnaires and interviews were administered to the sampled respondents and the findings were used to answer the key objective of the study. Study findings show that Kenya's informal leather sector did not engage professional design knowledge and services in product development. Results further showed the concepts of branding and packaging design were similarly not adopted.

**Keywords:** *design differentiation; Design Thinking; informal sector; leather craft; sustainable product design and development; value chain.*

### 1.0 Introduction

Globally, leather is one of the most traded commodities. World leather trade is constantly growing and is estimated at over US\$100 billion a year. In 2013, trade in leather footwear accounted for US\$53.5 billion, representing approximately 50% of the global revenue from general leather trade. Demand for leather and leather goods is outpacing supply around the world. Despite Africa's leather industry having many natural advantages (as a valuable by-product of the pervasive livestock and allied meat industries), it risks losing out on emerging opportunities in a robust and dynamic global market. Subsequently, the expanding global demand for leather goods such as boots, fine leather, handbags, and auto upholstery, has remained an unrealized industrial and entrepreneurial opportunity for African countries such as Kenya – these countries unfortunately remain marginal and far too frequently, insignificant players in the global business of leather products.

The main concerns are on Kenya's ability and capacity to expand its leather industry, improve its competitiveness in leather and leather goods, increase exports and employment, and build a viable and sustainable industry that could propel the country towards inclusive prosperity. Kenya, like most African countries, is primarily an exporter of raw hides and skins, as well as wet blue leather, and have a low production capacity for finished leather wherein lies the value-addition that would generate meaningful economic activity (Ministry of Industrialization and Enterprise Development, 2015).

Additionally, Kenya which was once a major leather footwear center for East Africa, has presently relegated to being a small exporter of leather and leather goods worth a paltry US\$140 million (or 0.14 percent of global exports) in 2013. Kenya is also substantially less competitive in all productivity metrics than global leaders such as China, Italy and Vietnam, with the exception of raw material supply and access. Consequently, the former loses out on opportunities for increases profitability through the design and production of quality leather products (Mudungwe, 2012).

Global imports of new low-cost footwear entering Kenyan and East African markets, as well as second-hand imported footwear flooding domestic markets, have weakened its competitive position. Kenya is now a low-cost manufacturer of undifferentiated, low-end shoes and boots, with an annual production of 3.3 million pairs of leather footwear, mainly for domestic consumption. According to the Kenya National Bureau of Statistics (2013), Kenya's leather sector accounted for just 2% of formal manufacturing jobs and 1.3 percent of manufacturing value-added products in 2013. The leather industry's current structure distributes capital very broadly and unevenly to a limited number of traders/manufacturers (Mutinda, Onyancha, & Muchiri, 2019). The dearth of affordable and accessible capital within the broader *jua kali* (or informal) sector has been identified as a significant challenge to small, micro and medium entrepreneurial actors (*ibid*).

The largest leather goods subsector in Kenya is footwear, with the handbag subsector being the most competitive in global markets. Kenya's exports of leather handbags, travel ware, and cases in 2013 (US\$2.2 million) were nearly quadruple those of Ethiopia (US\$0.57 million) in the same year. Kenya can enhance its reputation for high-quality handbags, travel accessories, and cases by enhancing product quality, establishing the “Made in Kenya” brand, and establishing a mass customization delivery capacity. Opportunities also exist for the manufacture of other leather product categories, such as belts, industrial boots, and gloves.

Due to the fact that tanneries constitute the most capital-intensive and jobs-light segment of the value chain, the industry has failed to generate any significant levels of employment due to the sociotechnical and socioeconomic barriers to entry. The current model of competition in the leather industry, as well as the dominant business models, both struggle to capture growth opportunities and spread wealth extensively (Ministry of Industrialization and Enterprise Development, 2015).

Another significant barrier to competitiveness (both domestically and internationally) is the preponderance of imitated popular product ranges. The tendency of most producers to be risk-averse and more inclined towards copying, rather than ideating and designing innovative products has been observed in the context of study (Mutinda *et al.*, 2019). To ameliorate the aforementioned situation, a creative design-led strategy is deemed to not only to be desirable, but arguably more pragmatic and profitable approach for both producers and customers alike. This realization informed the focus of this study towards interrogating ways by which designerly thinking could be integrated into leather product development within Kenya's informal sector – such a design-led approach is deemed germane within the context of the country's unrealized potentiality in the leather sector.

## 2.0 Design Thinking for Leather product development

*Design Thinking* is a *Human-Centred Design* approach that seeks to generate deep insights in the quest for innovation solutions. Design Thinking (as popularized by the Stanford d-school) is found at the intersection of three essential components: *social desirability*, *economic viability*, and *technical feasibility*. Further, there are five key iterative stages in a typical Design Thinking process - *empathize*, *define*, *ideate*, *prototype*, and *test* (see Figure 1).

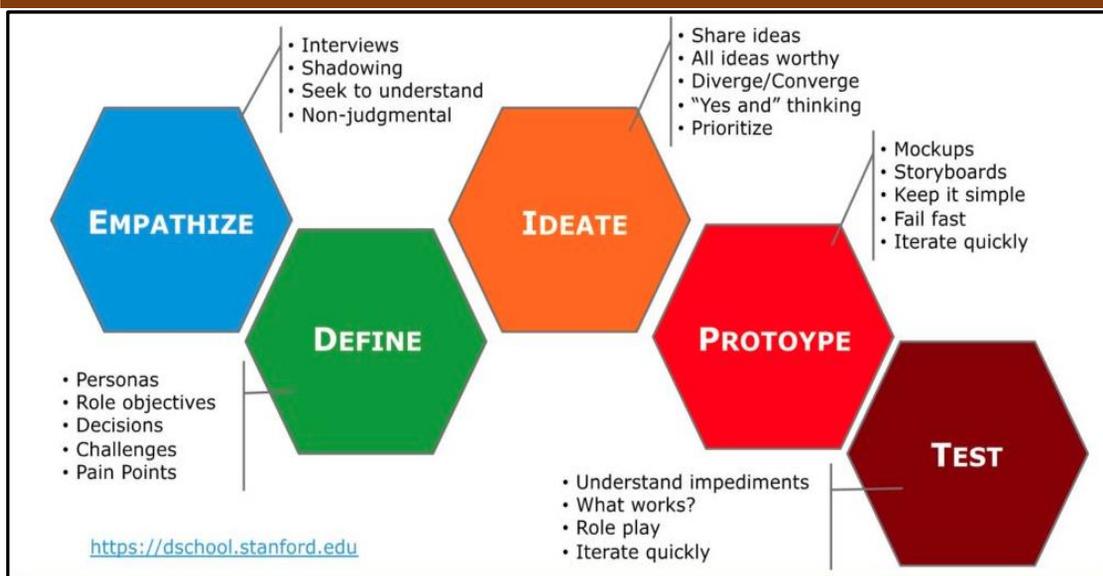


Figure 1. The Stanford Design Thinking process (source: <https://lvivcity.com/design-thinking-process>)

As discussed herein at its heart, Design Thinking seeks to provide innovative solutions to diverse sociotechnical and socioeconomic challenges by snagging with potential end users in an empathic way so as to generate useful and meaningful insights (M'Rithaa & Jamie, 2012). In so doing, Design Thinking offers a cost-effective set of tools to participants that should result in superior products, services and solutions by employing a participatory and inclusive ethos focusing on latent needs that would otherwise pass unappreciated and unexplored. To this end, producers can deploy Design Thinking to co-create more user-friendly, desirable, sustainable and profitable leather products.

### 3.0 Infusion of Design Thinking for Sustainable Leather Finishes

Leather is viewed as one of the most durable and repairable materials available and thus considered a sustainable material. Contrary to the belief that animals are raised for leather use, the leather industry could be viewed as one that plays out a circular economy capacity to upcycle the waste (hides and skin) produced from the meat and dairy ventures (Omoloso, Wise, Mortimer & Jraisat, 2020). This makes leather one of the most sought materials for footwear and bag manufacturers around the world.

However, the production, processing, and finishing of leather is not entirely sustainable and thus it is essential to beware of this fact. Vezzoli (2018) points out that design choices should be aimed at resources (materials and energy sources) with lower impact while offering equal terms of service or functional unit with the life cycle of a product. In leather finishing, for instance, some of the processes including dyeing employ the use of chemical-based dyes that harm the environment hence not meeting the sustainability threshold. This accordingly implies that eco-design is fundamental in leather product design and development.

A sustainable supply chain offers several benefits. It helps to reduce waste generated which leads to considerable cost savings across the whole supply chain as well as helps in earning reasonable profits by each member in the supply chain. The solid waste from the leathercraft also ends up in dumping sites resulting in pollution of air and water sources. This poses an environmental threat and if not appropriately treated, could present genuine ecological, social, and monetary issues. (Singh & Gupta, 2013).

Hides and skins are the primary crude material for the leather industry, and by using them, we decrease potential piling landfills with animal hides, thus supporting the "circular economy industry" nature of leather. Be that as it may, tanneries are characterized by the utilization of critical amounts of synthetic substances, energy, and water, and could be labor or capital intensive, contingent upon the locales of the world and level of innovation or potentially development. This is contrary to the sustainability goal in the design practice. Solid and liquid wastes are also discharged, which if not properly treated or managed, could pose serious environmental, social, and economic issues. As a result, research to improve the sustainability of the industry processes has continued to proliferate (Omoloso *et al.*, 2020.)

Leather as a raw material for product design is assessed to check the status of the surface, to be sure that it does not have any structural or/and mechanical defects such as holes, uneven continuity of finish, or even cracks. For instance, in footwear, frequent use of shoes exposes

them to water, which can, in time, infiltrate into the layers of leather and after a while deteriorate the inner structure of leather (Serenko *et al.*, 2014) and finally destroy it. It is therefore essential to ensure that they are given a waterproof treatment to mitigate this.

This study observed that the majority of producers focused on prototyping and finishing – this is analogous to the *prototype* stage of the aforementioned design-led methodology – only one of five stages. There is therefore a need to embrace Design Thinking right from the outset of the leather product development process so as to ensure innovative ways of finishing leather that yield leather products that are sustainable and socially desirable. Finished leather results in varied textures, flexibility, colour, and finish. Applied finishes for leather products include dyeing, brush colouring, printing, embossing, oiling, napping, embroidery, beading among others. Some of these processes employ environmentally friendly inputs, but unfortunately, the significant majority of processes employed in dyeing, printing, and painting have been found to make use of toxic chemicals – these are harmful to both the users and the environment (Kanagaraj, Senthilvelan, Panda & Kavitha, 2015). Consequently, there is a need to move towards eco-friendly finishes that will in effect lead to better health for the producers as well increasing productivity hence resulting in improved incomes (*ibid*). Cleaner, eco-friendly waste management approaches are also essential for a sustainable leather industry in Kenya and around the world.

#### 4.0 Leather Product Branding and Packaging Design

According to *Kenya Leather Industry Diagnosis, Strategy and Action Plan* (2015), the leather industry needs to think and experiment with long-term restructuring to improve its competitiveness. Many producers of leather goods in Kenya have expressed difficulty in accessing global markets. In the formal sector, different brands or workshops rarely collaborate to amass the scale the industry lacks. In rare cases where there are opportunities to create linkages with international clients and where generation of product orders occur, producers in Kenya often fail to meet the size and quality requirements of the orders. Part of this could be linked to poor product differentiation, branding, and packaging. Despite the increasing quality and scale of companies like Sandstorm, Kenyan brand recognition is insignificant, due to lack of accessibility to the global market (*ibid*).

All successful and competitive industries require a continuous supply of critical skills and new competencies and Kenya's leather sector is no exception. The sector needs to have a competitive edge by attracting new customers while maintaining the existing ones better than its competitors.

According to the Strategic Plan (KLDC, 2017), change of consumer preferences and fashion drives product development thereby improving industry earnings. One of the strategies that have been proposed is product differentiation. Leather product differentiation strategies include product development, product branding, and packaging design. For brands to distinguish themselves from similar products in the markets, Bhasian (2016) suggested the adoption of a differentiation strategy at the product level. This suggestion implies that product differentiation involves making a product to have features that are distinct from others by making it more fascinating to a specific target market.

Among the proposed drivers of change in the global leather and leather products industry is branding. According to Turner (2000), branding will continue to be important not only for sport but for all kinds of shoes. According to Carter (2014), the creation of a strong brand and strong differentiation is the key to achieving success in the business world today. This research opines that a good brand name can make a difference, helping to communicate something important about Kenya's leather products. Carter (*ibid*) also indicated that characteristics of a product, its presentation, the emotional response it brings about, pricing, brand story, and the experience of the end-users are key factors to interrogate and incorporate.

According to the *United Nations Industrial Development Organization* (UNDP) 2010 report, most developed markets for leather goods are saturated. Promoting products with a local identity is imperative for producers as a means of maintaining market share. Previously seen as a social investment, cultural heritage has been revitalized and given an economic value. Just like is the case with most leather goods in Kenya's informal sector, UNDP (2010) opines that products, styles, and uses linked to each country's cultural heritage may provide a valuable instrument for growth for small and medium enterprises. This approach could lead Africa to transfer to her products the shapes, colors, and styles of her culture thereby gaining an independent developmental and marketing path in the leather and footwear industry.

A total leather product is much more than a physical product and probably needs packaging as well as branding. Although known to offer protection to the commodity and aid in product identity, packaging design is majorly concerned with promotion. According to Verghese (2015), packaging is one of the elements that can support the implementation of efficiency and sustainability-oriented strategies. Packaging can become the major factor in a new marketing strategy by significantly improving the total products in Kenya's informal leather sector. Better packaging may enable some relatively small enterprises to compete successfully in the leather goods market. In today's market, design requirements have been added in product packaging to improve the differentiation, with Bramklev (2009) identifying the commercial, the logistics, and the environmental functions as three major aspects in packaging,

While several related studies have been carried out on product branding and performance, these studies focused on well-established outlets in varied industries. Ahmed, Parnar and Amin (2014) in a study on the function of packaging on consumer buying habits found a positive relationship between packaging and consumer buying decision. The study identified packaging elements such as wrapping design, material, color, and originality as key considerations by consumers when purchasing a product. Dhurup, Mafini and Dumasi (2014) opined that business success greatly depends on the augmentation of product packaging through good pricing and brand knowledge strategies that advance brand loyalty. In seeking to explain the function of packaging on consumers' buying behavior Mazhar, Daud and Bhutto (2015) found that packaging was the most essential factor in brand success. Onyedikachi and Ugochukwu (2015) recommended sufficient packaging strategies by manufacturing companies, at the point of package designing. In a Kenyan study on differentiation strategy and performance of Bata Shoe company outlets in Nairobi, Kobia (2018) found that product development, product branding, and packaging design positively impacted customer performance. The study recommended the allocation of sufficient resources to product design and product improvement.

Similar to Ethiopia which is set to brand its leather and leather products made of sheepskin to the Japanese market and beyond, Kenya can also find ways to brand and distinguish its sheep and goat skins and hides to other countries. Among the recommendations given by the Kenya *Leather Industry Diagnosis, Strategy and Action Plan* (2015) to increase access to markets and induce greater demand for Kenyan leather and leather products is the development of a leather marketing entity to increase awareness, coordinate branding, and promote exports. This is a task that is achievable if the informal sector which employs 10,000 workers (over 71%) out of the 14,000 in the leather industry is effectively engaged in such strategies.

## **5.0 Research Approach**

The study utilized the case study design in order to satisfy the objective of the study. Purposive sampling was used in identifying and selecting three informants who were especially knowledgeable about or experienced with a phenomenon of interest (Cresswell & Plano Clark, 2011). This provided the researchers with the justification to make analytical generalizations from the sample studied (Sharma, 2017). The selected participants were two males and one female respectively. Selection of the participants was based on their position as the representatives of Kenya Cobblers Association and leather artisans in Kariokor. Their wealth of knowledge regarding the operations in the informal leather sector in Kenya was also considered and was the basis of 'deep-dive' insights offered by the participants

The participants were briefed about the intention of the study. Consent of participation was sought from each participant. Personal interviews for each participant were then administered using the questionnaire guide. The responses were recorded in audio and also written down. Each respondent was allowed to provide additional information deemed relevant to the issues under investigation. The researchers also captured supportive images of leather products, tools and equipment through photography.

### **5.1 Location of Study**

The study was conducted in Kariokor Market, a facility located in Starehe constituency, Nairobi City County. Built in 1924 during the colonial era, the market is situated on the North Eastern side of the city. It borders Racecourse Road to the north, Ziwani to the east, Ngara to the west and the Nairobi Central Business District (CBD) to the south. The map of the study location is presented in Figure 1.

The study area is located on the North Eastern side of the city. The Kariokor cluster borders the CBD to the south, Ngara to the west, Ziwani to the east and old Racecourse Estate to the north. The study area borders the CBD which is the hub of many important activities including

commerce, administration, education, religion and culture, recreation, communication and so on. Its evolution is strongly attached to the establishment and growth of the CBD area and the neighbouring residential estates and activities. Many commercial enterprises were attracted to this part of the town to tap the opportunities offered by the numerous residents who inhabit the neighbouring estates.

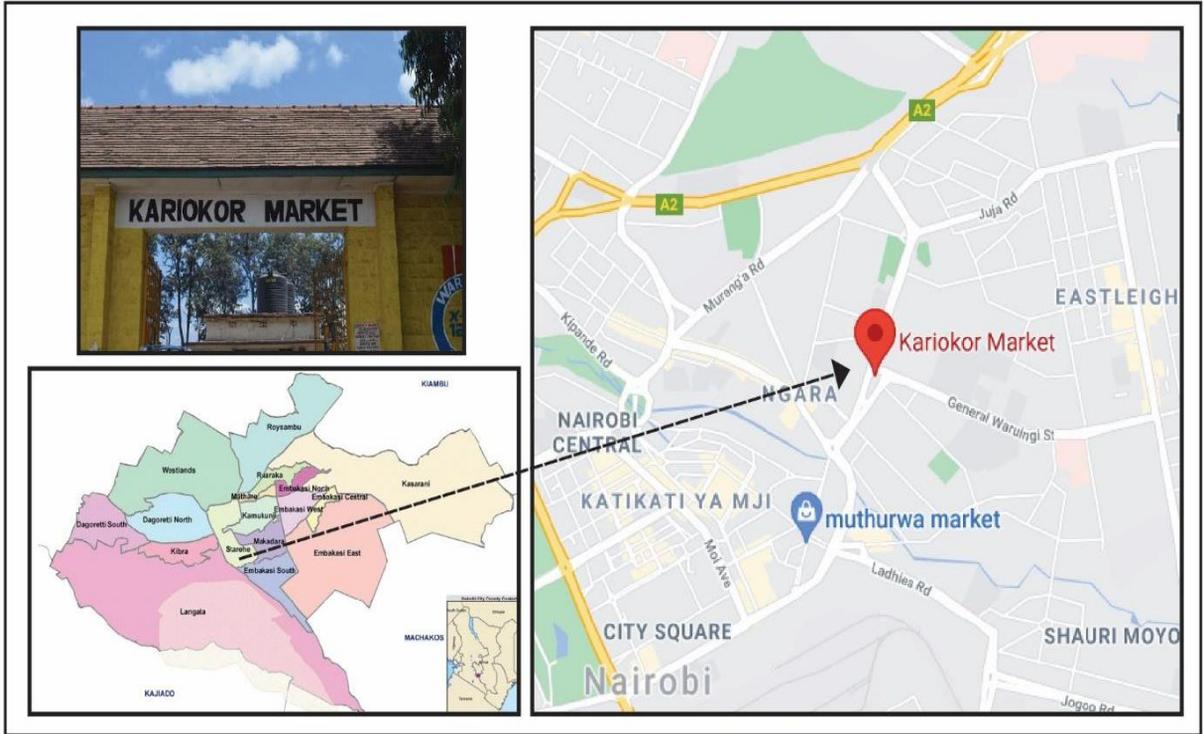


Figure 2: Map of Kariokor Market. Source: Google maps (2021)

### 6.0 Findings and Discussion

This study sought to establish the integration of designerly ways of thinking in leather product development within Kenya’s informal sector. The study further sought to establish the adoption of branding and quality packaging design among practitioners in this sector. Kariokor Market in Nairobi City County, having the highest number of workers in the informal leather sector was selected as the study site. A summary of the findings is presented in the sections below.

#### 6.1 Demographic details of the respondents

Findings show that the market has a membership of 7000, with 5000 members actively operating within stalls in the market. 55% of the workers in the informal leather sector are aged between 18-30 years. Those aged between 31-50 years form 35% of the population, while those above 50 years are only 10%. The summary is provided in Figure 2 below:

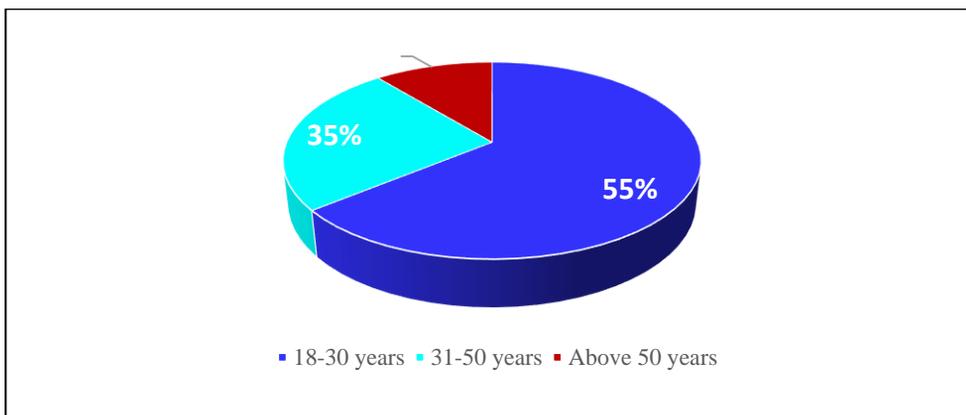


Figure 3: Age range of workers in the informal leather sector in Kenya

While all the three respondents had acquired tertiary education, the highest level of education attained by an estimated 56% of these workers was primary school level. 34% of the workers

had attained secondary education while only 7% had skilled technical training beyond secondary school. The remaining 3% had college and tertiary education. These findings are in line with the observation by Mudungwe, (2012) that the majority of the artisans in the Kenya leather sector had secondary school certificate-level qualifications. The findings also resonate with the 2015 report by the *United Nations Development Program* (UNDP) that Kenya's informal sector is characterized by low levels of education and training.

Findings show that the participants had undertaken additional training courses in leatherwork at the *Animal Health and Industry Training Institute* (AHITI) - *Kabete*, a public Technical and Vocational Training Centre (TVC) located in Nairobi County. However, the training did not have substantial coverage on product design. All the respondents concurred that they needed additional training in other relevant areas as expressed by one male participant:

*“Most of our members try very much to cope with challenges in the leather market. However, the general feeling of the membership is that training in areas like business technology, product designing, book keeping and marketing would offer added advantage to the practitioners in this industry.”*

Although findings showed that most members had not embraced design thinking in product development, there was great awareness of the need for creative design input in the leather industry among the members. One participant expressed concern over poor design skills as quoted below:

*“Although we are aware that good design contributes much to the likeability of leather products by clients, we have no design knowledge and much of the time we have to copy designs from each other”.*

This resulted in poor product differentiation, since everyone copies from another. One participant expressed the frustration of coming up with a new design as quoted below:

*“It is very difficult to come up with a new product in this market. When your product sells well, everyone will rush to copy from you, thereby flooding the market. This in turn will force you to lower the cost of your product in order to stay afloat”.*

The study established that the informal leather sector lacked creativity with respect to product development. While the *world bank report* (2015) on the Kenya leather sector indicated lack of qualified personnel as one of the impediments in the development, this study found lack of design knowledge and competence as one to be another key factor ailing this sector. It was reported that none of the practitioners engaged the services of qualified designers as this was beyond their financial muscle. While Kenya Leather Development Council strategic plan (2017/2018-2021/2022) opines that consumer preferences and fashion drives product development leading to improved earnings, this has not been the case in Kenya's informal leather sector. The sector attracts clientele of low income; hence their preference may not drive product development substantially. While the respondents agreed to the need for serious designing, most practitioners were not very enthusiastic about exploring beyond the commonly accepted designs. The sentiments expressed by one respondent were as follows:

*“We in the jua kali leather sector cannot afford the services of qualified designers. Although we need new and beautiful designs, I am not sure if the products would sell quickly. The kind of clients we serve are not sophisticated and they don't even have the money to pay for new designs”.*

Regarding the sources of their designs, the study established that most design were obtained from sample pieces provided by the clients. In other cases, leather items obtained from the second hand goods market would be dismantled and the templates traced out to create new designs. The internet was also quoted as a major source of design ideas. The respondents acknowledged that the use of mobile phone of technology was an interesting eye opener. Mobile phone technology was reported to have enhanced access to design ideas for leather goods. They were able to copy such designs in an effort aimed at creating new products in the Kenyan market. They were also enabled to access new markets/clients. This led to increased amount of work, resulting in job creation opportunities for the youth as expressed by a participant:

*“The mobile phone has been the most useful too since the outbreak of COVID 19 pandemic. It has been interesting accessing new designs online because we work for fewer hours due to the curfew restriction in Nairobi. Although these designs are not originally ours, they still help us a lot in coming up with new ideas. Evening hours are spent searching for design and communicating with clients. I think it's a good gadget”.*

All respondents concurred that there was a need to engage with qualified designers in co-creation of leather products so that there would be no need to copy from each other. This according to them could result in a healthy co-existence among the practitioners, where one would not need to hide their designs to prevent it from being copied by other competitors. In seeking to compare products across different stalls, the researchers found minimal difference in design of similar products and lack of creativity or very basic design in other leather goods.

Figure 3 shows a comparison of leather sandals across stalls in Kariokor market, Nairobi

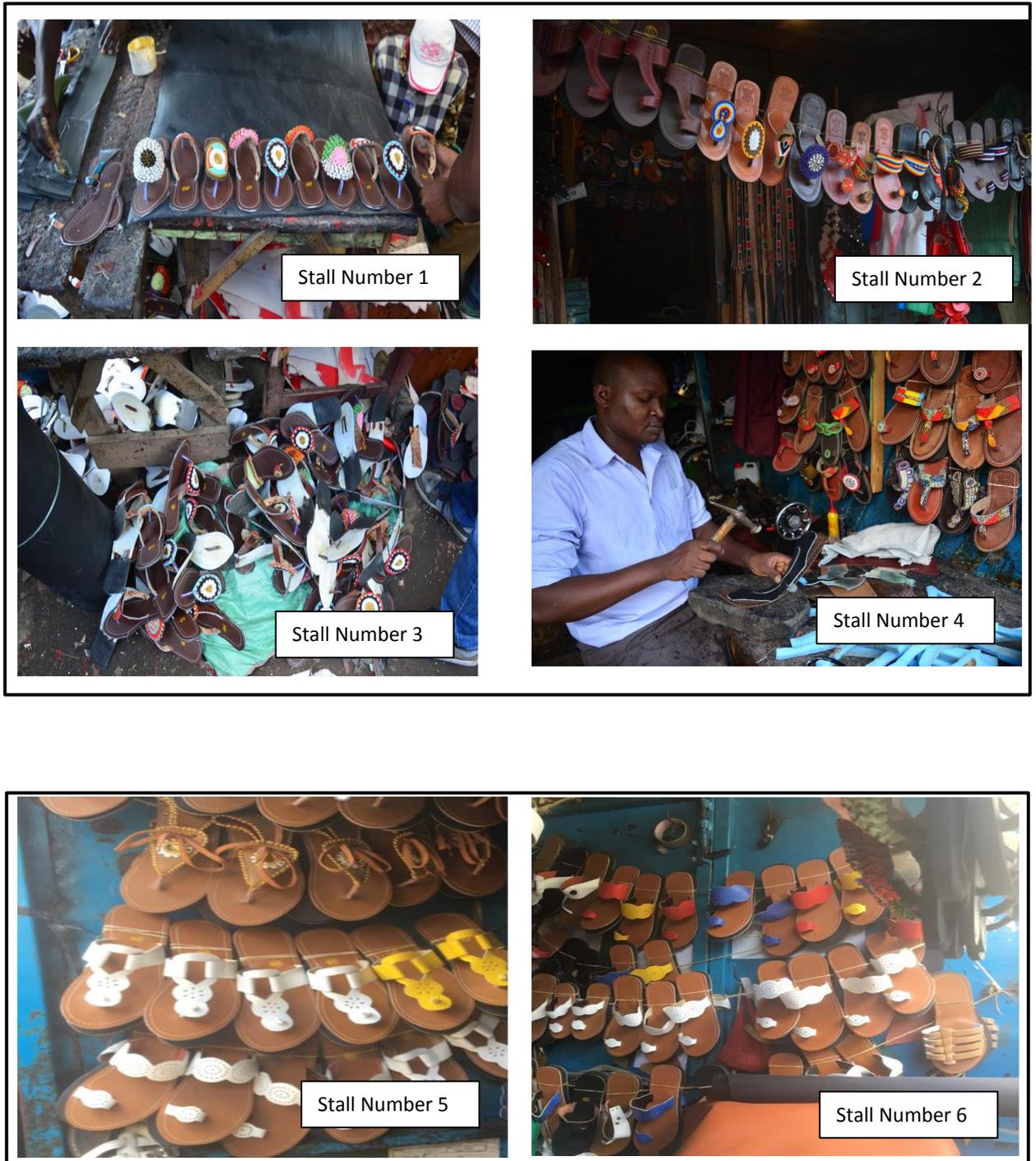


Figure 4: Leather sandals across stalls in Kariokor market, Nairobi  
Source: Researchers' Collection (2021)

Figure 5 shows other leather goods found in Kariokor market.



Figure 5: Leather goods across stalls in Kariokor market, Nairobi. Source: Researchers' Collection (2021)

While Adimo (2018) confirms differentiation as one of the strategies that firms employ in order to gain a competitive advantage over other firms, findings of this study showed minimal product differentiation in Kenya's informal leather sector. Mutinda, Onyonka & Muchiri (2019) suggest a positive correlation between SME growth and development and education and training of workers. This could partially explain the low uptake of design in Kenya's informal leather sector.

This study also sought to understand the adoption of branding and good packaging in Kenya's the informal leather sector. Findings show that most stall owners did not adopt any form of branding and hence it was difficult to differentiate between leather goods from most stalls. This is despite the suggestion by Bhasian (2016) on the adoption of differentiation strategy at the product level for brands to distinguish themselves from the similar products in the markets. The few practitioners who attempted to brand simply screen printed the company name on the product. This was seen as a temporary measure since the printed image would fade after a short period of time. Most did not own registered companies and their products did not go through any quality assessment process. The respondents noted that the type of clients served did not care about brand name and simply needed affordable leather goods. Most stall owners had no contact with majority of their clients to get feedback on the quality of their products. They mainly relied on return customers to know if their products were good.

The study also established that products were packaged in ordinary carrier bags with no company name. These packages were however reported to be environment friendly and recyclable. Any form of elaborate packaging design was seen as added cost that the clients would not afford. It was also evident that most practitioners in Kenya's informal leather sector did not link good packaging design to marketability of a product. One responded explained:

*"The concept of branding and good packaging is foreign around here. We cannot afford to package like big companies such as Bata. This will only add costs and our clients cannot pay for that. Most of us are in this trade for survival, so any extra input that involves money cannot work, unless we get support from elsewhere".*

These sentiments point to greater need for collaboration between the informal sector and the institutions offering design courses.

## 7.0 Conclusion and Recommendations

There is urgent need for Kenya's informal leather sector to embrace Design Thinking in product development. The study recommends collaborative engagements between the informal leather

sector in Kenya and design schools in various universities in the country. This could result in better design and product development that could boost productivity, export and employment opportunities in this sector.

The study also recommends the deployment of Design Thinking methodology through a design-led conceptual framework that could be adopted by Kenya's informal leather sector as detailed in Figure 6.

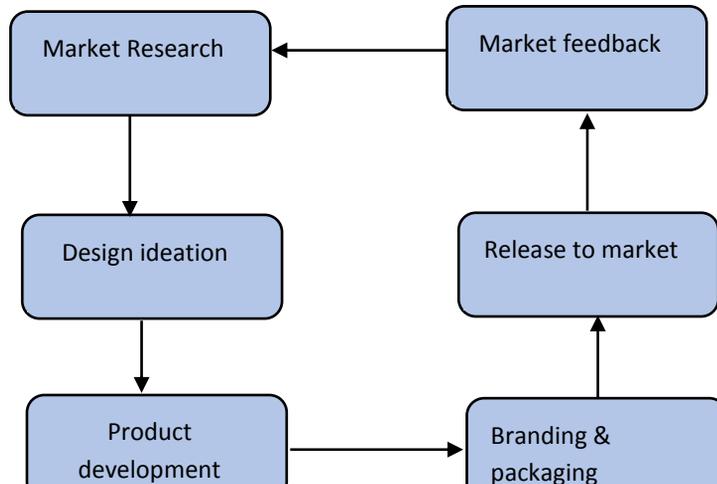


Figure 6: Design-led Approach for leather product development. Source: Researchers' model (2021)

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utilized in leather product development. As elaborated in Figure 1, Design Thinking has five distinct stages for the process to lend its full utility and potentiality to users, namely: *empathize*, *define*, *ideate*, *prototype*, and *test*. The leather producers participating in this study only focused their attention on the *prototype* stage. Consequently, specific design interventions should be implemented in future with an emphasis on a holistic and integrated approach to Design Thinking - this approach will arguably result in superior leather products that are socially desirable, technically feasible and economically viable.

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## Credit Risk, Firm Size and Financial Performance of Microfinance Banks in Kenya

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### Abstract

Microfinance banks (MFBs) in Kenya have continued to record huge annual losses contrarily to their counterpart, commercial banks that have been resilient and reported improved financial performance. The aim of the study was to explore the effect of Firm Size, credit risk on financial performance of Microfinance banks in Kenya. The target population was MFBs regulated by Central Bank of Kenya (CBK). The study employed census method. Secondary data for thirteen (13) MFBs was collected from published annual reports for the period 2011-2019. The study employed explanatory research design. Unbalanced panel regression model was employed to examine the impact of independent variables on dependent variable using unbalanced panel data. The dependent variable, financial performance was measured by Return on Equity (ROE). The independent variable credit risk was measured with following ratios Net non-performing loan ratio, Asset quality ratio, Loan Loss Provision to total Loan ratio and Loan Loss Provision to total equity ratio while the total asset of MFBs was the indicator of the moderating variable, firm size. The finding depicted Credit risk had negative significant effect on financial performance. The model F statistics indicated a strong statistical significance of credit risk on financial performance of MFBs at 5% level of significance. The finding further showed that the firm size had a positive significant moderating effect on the relationship between credit risk and financial performance, thus depict that large sized MFBs were better placed in managing credit risk. In conclusion, the negative and significant relationship between credit risk and financial performance indicate poor asset quality or high non-performing. The study recommends that management of MFBs establish stringent credit policy and robust credit risk management framework to reduce non-performing loans and default levels.

**Keywords:** *Financial Performance; credit risk; liquidity risk; Microfinance Bank; Firm Size*

### 1.0 Introduction

In developing and underdeveloped countries, microfinance sector is considered as a strategic means to the poverty reduction which is promoted by both governments and donors for social and financial being of a society (Founanou & Ratsimalahelo, 2016). Microfinance thrives in economies of developing and transiting countries. Their main objective being provision of financial services to poor section of the society excluded by providers of formal financial services or in general consider as an unbankable or undeserving. They are commonly referred as the Undeserved, these segments mainly consist working poor, majority of whom survive on less than US \$ 2 per day, they further include self-employed or micro-entrepreneurs, running a micro-business. Majority of these poor people toil in the informal sector, which developing nations constitute up to 80 percent or more (Benedetta, 2015). Availing financial resources to the poor segment is a vital mechanism for poverty alleviation and wealth generation in underdeveloped economies where enormous unmet demand for financial facilities is existent. There exist limited inclusion and use of financial services by underprivileged in commercial banks, which is attributable to high expenses of market agreements and limitations (Demirgüç-Kunt & Klapper 2012). The ability of the poor to borrow, pay moderate interest charge and save continuously has been well proved by Microfinance institutions (MFIs), which as a result leads to great improvement in credit markets for developing nations.

The World Bank's survey, The Global Findex (2015) reports impressive progress of financial inclusion of undeserved between 2011 and 2014. The survey found substantial number of people approximately 700 million opened an account with a prudential and non-prudential form of financial institutions such as commercial banks, MFBs, credit-only MFIs, cooperatives as well mobile banking providers service providers. It further, reported an increase of adults holding banks accounts from 52% to 61% while the financially excluded people fell by 20%, to 2 billion adults.

The Moroccan microfinance sector is the most developed in Middle East and North Africa (MENA) region with outstanding portfolio of 64% for the entire region. Despite Moroccan MFIs

rapid growth in MENA region, the sector has lacked comprehensive risk management guidelines and concrete institution framework. This as attributed rapid growth of portfolio and wide spread multiple borrowing hence higher levels of indebtedness and loan defaults (MicroFinanza, 2014)

According to FinAccess Household 2016 survey, financial inclusion in Kenya increased to 75.3% in 2016, a 50% increase in the last ten years. The financially excluded Kenyan stood at 17.4% in 2016 compared to 41.3% in 2006 which translates more than half reduction of excluded. However, financially excluded Kenyan remained high at rural areas at 22.0% compared to urban areas at 9.5% in year 2016. In addition, uptake from informal financial service from *chamas*, ROSCAs, shopkeepers, shylocks and employers remained relatively high for women at 10.2% in 2016 compared to men at 4.1% in the same period in 2016.

According CBK (2013), Credit risk refers to the anticipated risk to bank's earnings and capital as a result of failure of the obligor to comply with the contract requirements with the financial institution or otherwise the borrower defies contractual agreement. Afriyie and Akotey (2012) observe that level credit risk in bank is performance indicator of financial institution's capital which numerous bank regulatory authority consider. They further notes that effective CRM tools and strategies are key factors to a banks' success or failure as well as future growth. It is a structured approach of uncertainty management through risk assessment, development of strategies to manage it and mitigation of risk using managerial resources. CRM tools and techniques involves risk transfer to other parties or total avoidance of risk and defusing negative eventualities within the bank incases when faced with high credit defaults (Afriyie & Akotey,2012).

A survey on risks facing microfinance industry conducted in 70 countries based on 306 responses by CSFI (2014) reported that top ten ranking risks internationally included over-indebtedness, credit risk, competition, risk management, governance, strategy, political interference, management, regulation and staffing. However, in Africa, they found that credit risk, governance, over-indebtedness, risk management, management strategy, completion liquidity and technology management ranked highest among the 19 risks under consideration. According to FinAccess (2016) report there has been a tremendous increase of uptake of financial products of prudentially governed service providers, supervised and monitored by authorized statutory body in the last ten years to 42.3 % in year 2016 from 15.0% in 2006. Despite the impressive use of financial service, the Central Bank Kenya bank supervision report 2016 reported that MFBs' Earning before tax declined by 169% from Kshs 549 million for the year ending 2015 to a loss of Kshs. 377 million for the period ended 2016 (CBK, 2016). Addition, CBK Bank supervision report 2017, indicated an overall drop in performance of MFBs with joint loss before tax of Ksh 622 million in 2017 (CBK, 2016; CBK, 2017). It on this background the study intends focus on effects of credit risk on financial Performance of MFBs.

## **2.0 Objectives**

1. To examine the effect of credit risks on the financial performance of Microfinance banks in Kenya.
2. To determine the moderating effect of firm size on financial performance of Microfinance Banks in Kenya.

## **3.0 Theoretical Framework**

Marashdeh (2014) posit that fundamental argument for agency theory is that corporate interaction between the shareholders and the firm managers cause conflicts of interest dues to divergent interest. The central postulation of agency theory is that managers pursue and maximize their own utility rather than enhancement of shareholder's economic welfare; contracts are expensive when writing and executing; information is disseminated asymmetrically between partners in the agency relationship; and the principal and agent have restricted or confined rationality Marashdeh (2014). However, information asymmetry arises between firm' management and shareholders since the latter cannot accurately determine or quantify the output of managers, who are more knowledgeable on daily operation of the firm. Therefore, due to imperfect information, shareholder's face adverse selection problem since they cannot perfectly evaluate the suitable skills or abilities the managers assert to possess at employment contracting, thus may fail to select well suited applicant to execute responsibilities and duties within the company or improperly gauge their output (Jensen & Meckling, 1976). In microfinance institutions agency problem is likely to arise if the managers have individual vested interests in the organization. Some issues would be that the managers allocate themselves loans at the expense of the members and failure to carryout due diligence before

extending credit facilities. This theory has critical link to credit risk and their respective impacts on financial performance of MFBs.

#### **4.0 Literature Review**

A study on determinants of MFIs profitability in Sub Saharan countries in Africa was conducted by Murui (2011), using Generalized Method of moments (GMM) system on unbalanced panel data of 210 MFIs for periods within year 1997 to 2008. The study used ROA and ROE as indicators of profitability while using PAR-30, write-off ratio (WOR), loan loss reserve ratio (LLR) and risk coverage ratio (RC) as indicators of credit risk. The study did find evidence of negative and significant impact of credit risk on profitability. The study suggested that credit risk exposure results to lower profitability of MFIs. In conclusion, the study recommended for improvement in information capital to enhance better client screening procedures and mitigation of adverse selection problems.

According to Ayayi (2011), MFIs that have credit risk management systems resulted to higher profitability measured by ROA in Vietnam. Additionally, the study found due to proper governance structures within the institutions lead to low-credit risk, low loans write-off and higher portfolio quality. Bedecarrats et al (2011) intimated that MFI's quality of service delivery and reasonable interest rates resulted to reduced Portfolio at Risk (PAR-30) and write off ratio which in turn would strengthen customers' reimbursement capacity, which consequently lowers loan delinquency and defaults. The study further concluded improved MFI's portfolio quality would be observed through establishing a good working condition and staff training. Tanui et al (2015) conducted an investigation of the effect of credit risk management practices on profitability of SACCOs Nakuru east sub-county Kenya. The study was based on descriptive survey that targeted credit officers and credit managers in deposit taking. The study found out evidence of a strong association between credit risk management practices- credit scoring and credit administration- and financial performance.

Gatehum, Anwen and Bari (2015) investigated the correlation between credit risk management and financial performance of Ethiopia's commercial banks for period of five years between 2009 to 2014. Using panel data set from the commercial banks the established there exist a strong relationship between credit risk and performance of commercial banks. Commercial banks performance was measured using ROA and ROE while indicators for credits risk management were capital adequacy ratio (CAR), Non-performing loan ratio (NPLR), loan provision to total loan ratio (LPTLR), loan provision to non-performing loan ratio (LPNPLR) and loan provision to total asset ratio (LPTAR). Using multiple regression model to carry out analysis on cross sectional data of Pakistan's microfinance banks on relationship between credit risk management practices and loan performance in, Ahmed and Malik (2015) found a that credit terms and client appraisals as indicators of credit risk management practice to have positive and significant influence on loan performance while the collection policy and credit risk control to having positive though insignificant impact on dependent variable

#### **5.0 Conceptual Framework**

According Cooper and Schindel (2008) defines conceptual framework as a graphical representation of constructs of variables studied and their relationship. The conceptual framework consisted of independent variable, credit risk (measured by Net non-performing loan ratio, Asset quality ratio, Loan loss Provision to total loan ratio and loan loss provision to total equity ratio), dependent variable, financial performance (measured by Return on Asset and Return on equity) and moderating variable, Firm size (Total Assets).

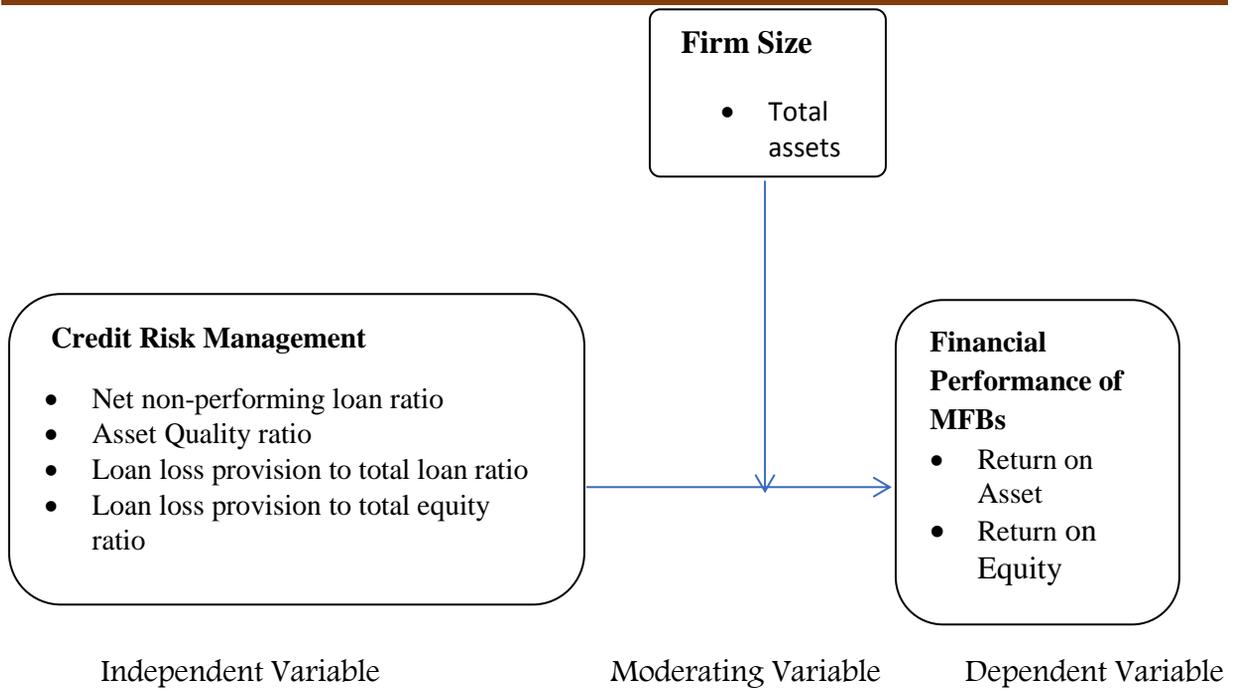


Figure 1 Conceptual Framework

## 6.0 The Study Methodology

The study employed combination of explanatory research design and quantitative research design. Panel data regression was used to determine the extent to which credit risk affects financial performance of MFBS in Kenya for the periods 2011-2019. Further, the study examined the moderating effect of firm size on financial performance. Panel data will be considered as appropriate since it measures and demonstrates effects that hardly detectable through use of cross-sectional data or time series data. (Pascal,2012; Gujarati & Porter, 2010). The target population was the thirteen (13) MFBS licensed and regulated by Central Bank of Kenya (CBK) as at December 2019. The study adopted Census method. The census approach enhance validity on data collected by minimizing errors associated with sampling techniques (Saunders, Lewis & Thornhill, 2009). The study was based on secondary data collected from audited annual financial statements of MFBS between years 2011 and 2019.

## 7.0 Model Specification

### 7.1 Empirical Model

$$ROA_{it} = \beta_0 + \beta_1 NNPLR_{it} + \beta_2 AQR_{it} + \beta_3 LLPTLTR_{it} + \beta_4 LLPTER_{it} + \mu_{it} + \varepsilon_{it} \quad (7.1)$$

$$ROE_{it} = \beta_0 + \beta_1 NNPLR_{it} + \beta_2 AQR_{it} + \beta_3 LLPTLTR_{it} + \beta_4 LLPTER_{it} + \mu_{it} + \varepsilon_{it} \quad (7.2)$$

Where;

$ROA_{it}$  is Return on Asset for MFB  $i$  at time  $t$ ;  $ROE_{it}$  is Return on Equity for MFB  $i$  at time  $t$ ;  $\beta_0$  is the constant or intercept;  $\beta_i$ ; ( $i = 1,2,3,4$ ) is coefficient of regression;  $NNPLR_{it}$  is independent variable, Net Non-performing loan ratio of MFB  $i$  at time  $t$ ;  $AQR_{it}$  is independent variable, Asset Quality Ratio for MFB  $i$  at time  $t$ ;  $LLPTLTR_{it}$  is independent variable, Loan Loss Provision to Total Loan Ratio of MFB  $i$  at time  $t$ ;  $LLPTER_{it}$  is independent variable, Loan Loss provision to Total Equity ratio for MFB  $i$  at time  $t$ ;  $\mu_{it}$  is the individual level effect;  $\varepsilon_{it}$  is the idiosyncratic error

### 7.2 Moderating Effect Model

$$ROA_{it} = \beta_0 + \beta_1 NNPLR_{it} + \beta_2 AQR_{it} + \beta_3 LLPTLTR_{it} + \beta_4 LLPTER_{it} + \mu_{it} + \varepsilon_{it} + FSIZ \quad (7.3)$$

$$ROE_{it} = \beta_0 + \beta_1 NNPLR_{it} + \beta_2 AQR_{it} + \beta_3 LLPTLTR_{it} + \beta_4 LLPTER_{it} + \mu_{it} + \varepsilon_{it} + FSIZ \quad (7.4)$$

Where FSIZ is the moderating effect of firm size.

## 8.0 Empirical Results and Discussion

**Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021,  
Machakos University, Kenya**

Descriptive statistics were used to summarize data and to identify patterns. Though descriptive statistics doesn't allow coming up with conclusion, the nature of data was presented in terms of their mean, maximum and minimum, standard deviation, Jacque-Bera (JB) statistic in Table 1.

Table 1: Descriptive Statistics

Variable	min	max	Mean	St. Dev	JB	P-value (JB)
<i>Credit risk (CR)</i>						
CR	-18.569	207.58	23.296	21.672	1.673	0.450
NNPLR	-50	57.246	8.116	12.152	1.548	0.497
AQR	0	65.942	17.222	15.323	1.115	0.564
LLPTLR	0	61.538	8.653	9.813	1.257	0.459
LLPTER	-177.778	900	25.037	96.223	1.285	0.781
<i>Moderating variable</i>						
FSIZ	1.771	4.507	3.004	.833	1.095	0.806
<i>Dependent variable</i>						
<i>Financial Performance</i>	-764.338	165.748	-	86.794	1.233	0.834
			19.106			
ROA	-54.217	3.804	-6.898	-	1.563	0.915
				54.217		
ROE	-1487.5	355.556	-	-	0.968	0.678
			31.314	1487.5		

*Source: Study Data (2021)*

The outcome in table 1 shows the mean value of financial performance of microfinance banks for the years 2011-2019 was negative 19.106% depicting that the overall sector of microfinance was incurring losses. The results showed that the return on equity as key measure of financial performance, having minimum value of -1487.5% and maximum value of 355.556% with a mean value of -31.314%. The results depict on average that banks earned -31.314% return on equity with standard deviation of -1487.5% indicating that banks were not utilizing owner's equity appropriately, likewise the mean value of Return to Asset was -6.898%, implying that that MFBs asset were not utilized optimally. As indicated in the table above the overall credit risk mean for the microfinance banks was 23.296% implying high customer defaults. As shown from the table 1, the mean value of net non-performing loss ratio was 8.116%, Asset quality ratio 17.222%, Loan loss provision to total loan ratio 8.653% and Loan Loss provision to total equity ratio 25.037%, the positive mean indicates existence of high exposure of credit risk.

### Correlation Matrix

The table 2 depicts correlation of explanatory variable and return on equity as on measure of the financial performance of microfinance banks. It is observed that all credit risk indicators are inversely correlated with return of equity for MFBs. The Loan loss provision to total equity ratio is negatively and significantly correlated to ROE, with a correlation coefficient values of -0.952.

Table 2: Correlation Matrix of ROE and Credit risk components

Variables	ROE	NNPLR	AQR	LLPTLR	LLPTER	FSIZ
ROE	1.000					
NNPLR	-0.059	1.000				
AQR	-0.096	0.421***	1.000			
LLPTLR	-0.127	-0.214**	0.439***	1.000		
LLPTER	-0.952***	0.055	0.127	0.199*	1.000	
FSIZ	0.116	0.026	-0.100	-0.294***	0.014	1.000

*Source: Study Data (2021); \*\*\* p<0.01, \*\* p<0.05, \* p<0.1*

The results in table 3 depicts positive and significant correlation between Net Non-performing loan ratio and firm size with Return on Assets (ROA). The indicate that as the rate of NNPLR

and firm size assets increases, the ROA increases with a correlation coefficient values of 0.230 and 0.544. Further, as observed from the above table 3, Loan loss provision to total loss ratio (LLPTLR) and Loan loss provision to Total Equity Ratio (LLPTER) is negatively and significantly correlated with ROA.

Table 3: Correlation Matrix of Credit risk components, Firm Size and ROA.

Variables	ROA	NNPLR	AQR	LLPTLR	LLPTER	FSIZ
ROA	1.000					
NNPLR	0.230**	1.000				
AQR	-0.054	0.421***	1.000			
LLPTLR	-0.405***	-0.214**	0.439***	1.000		
LLPTER	-0.229**	0.055	0.127	0.199*	1.000	
FSIZ	0.544***	0.026	-0.100	-0.294***	0.014	1.000

*Source: Study Data (2021); \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*

From the outcome of table 4, the independent a variable, credit risk is strong negatively and significantly correlated with the Return to Equity (ROE) at correlation coefficient value of -0.884. Similarly, the firm size has a weak positive and insignificant correlation coefficient with ROE ( $r = 0.116$ ).

Table 4: Correlation Matrix of Credit risk components, Firm size and ROE

Variables	ROE	CRM	FSIZ
ROE	1.000		
CRM	-0.884***	1.000	
FSIZ	0.116	0.040	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

*Source: Study Data (2021)*

From the results of table 5, the independent a variable, credit risk is weakly correlated and insignificantly correlated with the Return to Assets (ROA) at correlation coefficient value of -0.125. On the other hand, the firm size has a fairly moderate, positive and significant correlation coefficient with ROE ( $r = 0.544$ ).

Table 5: Correlation Matrix of Credit risk, Firm size and ROA

Variables	ROA	CRM	FSIZ
ROA	1.000		
CRM	-0.125	1.000	
FSIZ	0.544***	0.040	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

*Source: Study Data (2021)*

### **Serial Correlation Test**

The results presented in table 6 indicated that serial correlation test has not been violated since the Wooldridge test was insignificant at 0.05.

Table 6: Wooldridge test for autocorrelation in panel data

Test	F	Prob > F	Conclusion
Wooldridge test for autocorrelation	0.2336	0.792	Autocorrelation not present

*Source: Study Data (2021)*

### **Model Determination and Regression analysis.**

#### *Hausman Specification Test.*

Hausman test for specification was conducted to determine whether to use the random effects model or the fixed effect model. Hausman tests the null hypothesis that the preferred model is random effects versus the alternative to the fixed effects. The test rejects the null when the p-value is less than 0.05. Table 7 shows that Hausman specification test favors Fixed effect model (chi-square=14.458.,  $P < 0.05$ ) at 5% level of significance the diagnostic tables and the conclusion are all based on the fixed effect panel regression model.

Table 7: Hausman specification test

	Coef.
Chi-square test value	14.458

P-value .002

Source: Study Data (2021)

*Fixed effect panel regression estimates of Credit risk on ROA.*

The fixed effect panel regression estimates provided in table 8 shows that model R<sup>2</sup> explains 20.3 percent of the variability in ROA as result of credit risk. The remaining percentage of variation in ROA may be as a result of Variables not included in the model. The model F statistic indicated a strong statistical significance at 5% level of significance (F-statistic =4.895, P<0.05). This implies that the Credit risk affects the financial performance (ROA) of MFBs in Kenya.

Table 8: Fixed effect panel regression estimates of Credit risk components on ROA.

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
NNPLR	-0.015	0.081	-0.19	0.850	-0.176	0.146	
AQR	0.044	0.060	0.73	0.466	-0.075	0.163	
LLPTLR	-0.028	0.092	-0.30	0.762	-0.212	0.156	
LLPTER	-0.032	0.007	-4.31	0.000	-0.047	-0.017	***
Constant	-6.485	1.178	-5.51	0.000	-8.830	-4.140	***
Mean dependent var	-6.898		SD dependent var		12.034		
R-squared	0.203		Number of obs		94.000		
F-test	4.895		Prob > F		0.000		
Akaike crit. (AIC)	590.243		Bayesian crit. (BIC)		602.960		

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Study Data (2021)

The loan loss provision to total equity ratio (LLPTER) of microfinance banks in Kenya was found to be negatively related to financial performance of microfinance banks in Kenya. The coefficient was 0.032 and significant at 5% level of significance. This implies that a unit increase in the loan loss provision to total equity ratio (LLPTER) would result in 0.032 units decrease financial performance (ROA) of MFBs in Kenya. The results were agreement with Alshatti (2015).

The Net non-performing loan ratio (NNPLR) and Loan Loss Provision to Total loan Provision (LLPTLR) of MFBs in Kenya were found to be negatively related to financial performance of MFBs in Kenya. The asset quality ratio (AQR) was found to be positively related to financial performance of microfinance banks in Kenya. The coefficient was 0.044 and insignificant. The results were consistent with results from previous study Al-khouri (2011) and Ogboi & Unuafe (2013).

*Fixed effect panel regression estimates of Credit risk components on ROE.*

The fixed effect panel regression estimates provided in table 9 shows that model R<sup>2</sup> explains 95.3 percent of the variability in ROE as results of credit risk components. The remaining percentage of variation in ROE may be as a result of Variables not included in the model. The model F statistic indicated a strong statistical significance at 5% level of significance (F-statistic =394.253, P<0.05). This implies that the Credit risk affects the financial performance (ROE) of microfinance banks in Kenya.

The Net non-performing loan ratio (NNPLR) of microfinance banks in Kenya was found to be positively related to financial performance and statistically significant. The coefficient was 2.755 and significant at 5% level of significance. This implies that a unit increase in the Net non-performing loan ratio (NNPLR) would result in 2.755 units increase financial performance (ROE) of MFBs in Kenya. The finding was in agreement with Million, et al (2015).

The loan loss provision to total equity ratio (LLPTER) was found to be negatively related to financial performance of MFBs in Kenya. The coefficient was -1.698 and significant at 5% level of significance. This implies that a unit increase in the loan loss provision to total equity ratio (LLPTER) would result in -1.698 units decrease financial performance (ROE) of MFBs in Kenya.

Table 9: Fixed effect panel regression estimates of Credit risk components on ROE

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ROE	Coef.	Std.Error.	t-value	p-value	[95% Conf	Interval]	Sig
NNPLR	-0.189	0.475	-0.40	0.692	-1.134	0.757	
AQR	-0.066	0.352	-0.19	0.851	-0.766	0.634	
LLPTLR	2.755	0.543	5.07	0.000	1.673	3.837	***
LLPTER	-1.698	0.044	-39.01	0.000	-1.785	-1.612	***
Constant	-9.956	6.918	-1.44	0.154	-23.732	3.820	
Mean dependent var	-31.314			SD dependent var		169.013	
R-squared	0.953			Number of obs		94.000	
F-test	394.253			Prob > F		0.000	
Akaike crit. (AIC)	923.143			Bayesian crit. (BIC)		935.859	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

*Moderated Fixed effect panel regression estimates of CRM on ROA by firm size*

Table 8 shows that for Model 1,  $R^2 = .203$  and  $[F = 4.895, p < .05]$ . The value of  $R^2$  indicates that 20.3% of the variance in the ROA is explained by credit risk components. Model 2 shows the results after the interaction term (firm size) was included in the equation. Table 10 also indicates that the inclusion of the interaction term resulted into an  $R^2$  change of  $[.418-.215 = .215, [F = 5.749, p < 0.05]$ . The results show a presence of significant moderating effect. To put it differently, the moderating effect of Firm size explains 21.5% variance in the ROA, above and beyond the variance by credit risk.

Table 10: Moderated Fixed effect panel regression estimates of Credit risk components on ROA by firm size

ROA	Coef.	Std.Error	t-value	p-value	[95% Conf Interval]	Sig	
NNPLR	-0.234	0.426	-0.55	0.583	-1.083	0.614	
AQR	0.501	0.317	1.58	0.118	-0.130	1.132	
LLPTLR	-0.896	0.511	-1.75	0.084	-1.915	0.124	*
LLPTER	0.105	0.091	1.16	0.250	-0.076	0.287	
FSIZ	11.248	3.095	3.63	0.001	5.079	17.418	***
NNPLR_FSIZ	0.034	0.176	0.19	0.847	-0.317	0.385	
AQR_FSIZ	-0.161	0.122	-1.32	0.192	-0.405	0.083	
LLPTLR_FSIZ	0.337	0.214	1.57	0.120	-0.090	0.764	
LLPTER_FSIZ	-0.055	0.037	-1.48	0.142	-0.129	0.019	
Constant	-38.780	8.725	-4.45	0.000	-56.173	-21.388	***
Mean dependent var	-6.898			SD dependent var		12.034	
R-squared	0.418			Number of obs		94.000	
F-test	5.749			Prob > F		0.000	
Akaike crit. (AIC)	570.634			Bayesian crit. (BIC)		596.067	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Study Data (2021)

*Moderated Fixed effect panel regression estimates of Credit risk components on ROE by firm size*

Table 9 shows that for Model 1,  $R^2 = .962$  and  $[F = 394.253, p < .05]$ . The value of  $R^2$  indicates that 96.2% of the variance in the ROE is explained by credit risk components. Model 2 shows the results after the interaction term (firm size) was included in the equation. Table 11 also indicates that the inclusion of the interaction term resulted into an  $R^2$  change of  $[.962-.953 = .009, [F = 204.388, p < 0.05]$ . The results show a presence of significant moderating effect. The results were in agreement with Misman and Bhatti (2020).

Table 11: Moderated Fixed effect panel regression estimates of Credit risk components on ROE by firm size

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
NNPLR	3.073	2.633	1.17	0.247	-2.175 8.321	
AQR	-2.358	1.958	-1.20	0.233	-6.261 1.546	
LLPTLR	6.035	3.163	1.91	0.060	-0.271 12.340	*
LLPTER	-3.414	0.562	-6.07	0.000	-4.535 -2.293	***
FSIZ	18.915	19.146	0.99	0.326	-19.251 57.081	
NNPLR_FSIZ	-1.340	1.090	-1.23	0.223	-3.513 0.832	
AQR_FSIZ	0.813	0.757	1.08	0.286	-0.695 2.322	
LLPTLR_FSIZ	-1.601	1.326	-1.21	0.231	-4.245 1.043	
LLPTER_FSIZ	0.695	0.229	3.04	0.003	0.239 1.152	***
Constant	-62.482	53.973	-1.16	0.251	-170.075 45.111	
Mean dependent var	-31.314		SD dependent var		169.013	
R-squared	0.962		Number of obs		94.000	
F-test	204.388		Prob > F		0.000	
Akaike crit. (AIC)	913.232		Bayesian crit. (BIC)		938.665	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Study Data (2021)

### Conclusion and Recommendations

The study found that there exists relationship between credit risk and financial performance. The regressions results reveal that credit risk metrics are highly statistically significant with adverse effect on financial performance of MFBs in Kenya. The study further concluded that banks firm size affected the relationship between credit risk and financial performance. Credit risk metric, LLPTLR and LLPTER had statistically significant on ROE of MFBs. The study recommends that MFBs to manage their credit risk through adopting effective credit policy and diversify investment portfolio. Additionally, MFBs should establish stringent credit policy and robust credit risk management framework to reduce non-performing loans and default levels.

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## Multiple Delivery Channels and Service Delivery in Huduma Centers in Kenya

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### Abstract

Most public service institutions are generally different in design and operation compared to several years back. The advances in technology and consumer demand have resulted to public institutions adjusting periodically (Banham, 2010). New technological development and innovations has pushed most governments to modernize their systems in order to address their citizens' demands for reliable and efficient services. As such, the Huduma Program of Kenya was launched in 2013 as a framework through which, a variety of channels which advance citizen-centric public services are supported through the use of digital technology and one stop centres throughout the country. The purpose of the study was to establish the effect of Multiple Delivery Channels in Huduma centers in Kenya. The Researcher used quantitative and qualitative analysis techniques to quantitatively and qualitatively evaluate the effect of Multiple Delivery Channels in Huduma centers in Kenya. A researcher administered questionnaires was used as a data collection tool to study a target population of 51 Huduma Centres and a sample of 153 respondents working at the management level in all operational Huduma centres in Kenya. The study revealed that the Huduma centers employ the use of multiple delivery channels that affects the delivery of public services they offer. The key purpose of this study is to establish the significance and core use of multiple delivery channels and how it affects service delivery in public institutions in relation to Huduma centres. The goal of the study therefore is to enable public institutions enhance adoption and application of multiple delivery channels in delivery of their services to the public to enhance efficiency and effectiveness.

**Key words:** *Multiple Delivery Channel*

### Introduction

The public sector is the world's largest service provider. The government's primary duty is to provide various public goods and services and has a critical role to play in providing basic public goods and services that guarantee a minimum level of well-being to everyone who requires them. In general, such services would be required in large numbers but there are still limited financial and other resources available. There is thus the need to ensure that services are delivered effectively and efficiently for attaining desired outcome and within a short time span (Ramakrishnan Ramachandran, 2013). The public sector reforms aimed at facilitating and improving service delivery to its citizens have received tremendous focus over the previous decade. The global trends in public sector reforms and changing demographics have strongly influenced the atmosphere under which the public service delivery works and the rising customer expectations, budget constraints, and global investment competition (Hansen & Jacobsen, 2016).

The conservative paradigm of the management and delivery of public services is supplemented by a market-oriented public sector or corporate system centered on the concepts of bureaucratic governance, strategy and centralization, central regulation and self-reliability (ECA, 2010). Taking account of these growing demands, the public sector is continuously required on to redefine its position, improve its consumer emphasis and create integrated models of service delivery. Unless such models are to gain the desired benefits, they must be more robust and reliable in addressing consumer needs (Bhatti, Olsen & Pedersen, 2011). This ensures that all choices, from policy development, architecture, to execution, are focused on consumer requirements.

Many countries have undertaken public sector reforms to improve the quality of public service delivery. Increasingly powerful and user-friendly technology creates opportunities for governments to offer new ways of interacting with citizens to more effectively respond to their needs and participate in them fully. The private sector has long utilized multiple channels through the introduction of devices such as smartphones, interactive voice response system and digital television. Such programs inspire people to devise new means of engagement with the desire that public and private service providers be as affordable and flexible as digital technology permits. While many policymakers know the pattern, few developed countries use the full capacity of a multi-channel service delivery strategy as a means of serving their people.

The distribution of public services in an interconnected and organized form through different means is a multi-channel service delivery. Citizens will pick their preferences and situations and access consistent information and resources through platforms that maximize their government loyalty and confidence. Multi-platforms can make it possible for consumers to benefit from improved emerging technology and networks like wireless connectivity. Huduma Kenya is a multichannel public service delivery initiative for the government of Kenya that aims to improve the quality of services delivered through one-stop service centres. It is built with the concept of an integrated public service system and with the goal of creating integrated public services that change the delivery of services (Magara & Muturi, 2019).

Modern technology advancements and their ubiquity have provided a number of resources for users to access these facilities. Digital technologies such as self-service terminals, interactive answer platforms, laptops, social networking, e-mails, video telephoning, online applications and many more are used as networks for service delivery throughout the private sector. These initiatives encourage end-users to envision new forms of interaction with the desire that service providers be as accessible and responsive as modern technology allows (UN DESA, 2012). Although governments are conscious that they can provide services through a wide variety of networks, many do not completely exploit the capacity of these multi-channel delivery schemes to support residents and people. In developed economies this is particularly true (UN DESA, 2012). Some citizens want public services and information through their personal devices, but many governments are not equipped to meet the need of the citizens (Microsoft, 2013). The citizens' services using mobile technologies are not yet a common practice (UN, 2016). Some Countries are proving public services using different channels, whereas other Countries have done relatively little beyond enabling basic Internet self-service (Kenneth Kernaghan, 2012).

#### **Statement of the Problem**

Public institutions in developing countries face significant challenges as they respond to the pressures of providing more customer-focused services. Public sector organisations' need for effective and efficient strategic management tools has seen the Multiple Channel Delivery derived from their requirement to make decisions on how government services may be delivered and accessed by customers. These decisions include deciding on the communication type, channels of communication, media used and access devices, and whether to serve customers directly or through an intermediary. Multiple Delivery Channel strategy decisions are also influenced by customer preferences, content type, media and device capability (Andrew Pinder, 2002). Globally, governments have opened One Stop Shops that act as service delivery points for citizens (Howard, 2015). In 2013, the Kenyan government started the Huduma Kenya program to facilitate the establishment of Huduma centers throughout the country in all the 47 counties. The centers are designed to offer citizens efficient services through multiple delivery channels model using integrated technology platforms (GoK, 2016). Though government services have been integrated in Huduma centers, there lacks a coordinative multichannel system through which services can be efficiently delivered, and also a systematic innovation culture, which can drive massive innovative service delivery. A number of challenges have been reported that hamper effective service delivery in Huduma centers. The problems range from poor relationships between departments of government and Huduma centers which cause delays, long queues and internet breakdowns. These problems raise questions as to why service delivery at Kenya is facing hiccups, even with the efforts that the government has made in order to meet citizen demands efficiently (Ng'aru & Wafula, 2015).

Several studies have been conducted focusing on public service delivery in one stop shops, as well as in strategic innovation management in public institutions. Prof. Ken Opalo (2018) in his article 'Huduma Centers working, but do more to improve service delivery' alludes that it is fair to say that the delivery of government services through Huduma Centers has markedly increased public service efficiency. However, gaps still exist in the system that contributes to an incredible wastage of people-hours as Kenyans queue for days to get basic services. Amir Ghalib Abdalla *et al* (2015) in their study found out that majority of the customers were pleased with the level of transparency and reliability of public services offered, however, there were low levels of service awareness and clarity of procedures of accessing the relevant service coupled by the issue of adequacy of staffing levels. Mutia Mamu Mutinda (2017) in her study strategic role of Huduma centre suggests that the role of the Huduma centre staff training to be examined in relations to its influence on public service delivery.

Janenova and Kim (2016) in their study found that one-stop shops are significantly increasing service provision, but countries must adopt suitable service models to ensure that shops serve the citizens' interests, which demonstrated the need for innovative management strategies to

serve effectively. In their study Rachel Sohn Firestone and Berenike Schott (2016) identified the primary challenges encountered in the rollout of the Huduma Centers to concern the coordination among the various institutions involved in their management, staffing, and oversight; and the deployment of staff incentives related to compensation and professional development. They also allude that, researches done do not necessarily reflect on the holistic problems faced by innovative management strategies at the One Stop model Huduma centers across the country. This is because each Huduma center in the 47 counties in Kenya experiences diverse and unique challenges and successes. From the problems herein recorded, the scarcity of agile model research recommendations for the multiple channel strategy and public service delivery expresses a cause for novelty. As such, this study aims at establishing the effect of innovative strategic management tool; Multiple Delivery Channel, on public service delivery in the Huduma centers in Kenya.

### **Literature Review**

The purpose of the literature review was to investigate the outcomes of other researchers on Multiple Delivery Channels and how this can be related to our study on Huduma Centers in Kenya. For instance, Tarveres et al (2016) argue that the delivery channel needs to be looked at when examining public services. The delivery channels of services encompass a number of points of contact and interaction through which a citizen or company can request a public service. A study carried out by the Aberdeen Group shows that a multi-channel customer care strategy can increase customer satisfaction by more than twice (9.7 percent versus 3.9 percent) year-on-year compared to its peers using a single channel. Though this justifies the need to migrate towards multichannel contact centres for delivering enhanced customer delight, it does not mean that simply adding a channel can improve performance results. Driving the incremental performance gains through the add-on channels requires a well-defined strategy (PWC, 2013).

PWC (2013) in their survey study Multichannel strategy conclude that the three dimensions of service, channel and customer results in optimization strategy for service, thus, redefining channel strategy. Ensuring that the redefined strategy is successful depends on how the organization can encourage its customers to move to more effective and efficient service delivery channels. Not only do re-engineering and technology need to be implemented, but also convincing tactics to encourage people to move in where effective management of training and change is evident. Technology is the key to equipping staff with multi-channel customer interactions, but contact center analytics also help businesses to analyze the effective nature of each channel, while reducing costs for contacts.

Bhatnagar, Subhash (2014) in their research paper Public Service Delivery: Role of Information and Communication Technology in Improving Governance and Development Impact allude that Governments provide the largest information and services for the poor. The governments' service delivery models have not changed for decades, making them inefficient and corrupt. Thus, well-designed e-government projects with process reforms to improve transparency and accountability have to reduce discretion, increase efficiency and reduce corruption. However, very few such projects have had their full potential implemented. There is a necessity to accelerate the pace of implementation of Multiple Delivery Channels and build capacity to reform the process of service delivery.

Verhoef, Kannan, and Inman (2015) in their study to understanding of omni-channel marketing found out that whilst new channels (mobile, tablet, and social media) have been integrated in business day to day by organisations due to the latest and significant advances in technology, managers are still facing a challenge to develop a multi-channel strategy. Verhoef, Kannan and Inman (2015) point out that adequate studies on the effects of multi-channel strategies and additional channels on performance are now underway, but more research on the effects of channel elimination is needed.

Most multi-channel companies traditionally have silo structures with independent operation by each channel division. Managing isolated channels often causes confusion and frustration for the customer, diluting the value offered to the customer e.g., prices, offers, sales, etc (Herhausen et al. 2015). By coordinating and integrating their marketing channels, companies can improve their customer experience in an omni-channel environment. Integrating channels makes it possible for companies to offer customers what they want every time they buy. Customers may thus collect as much information as they want, decrease their uncertainty in the purchase process and expose them to more marketing stimuli that can strengthen the relationship further and improve sales (Cao and Li 2015). As a result, customer satisfaction and loyalty have increased and sales have greater opportunities.

Thomas and Sullivan (2005) reported that while brick and mortar customers tend to show a larger purchases number than only catalog and internet customers, catalog-only customers seem to spend more than either group. Neslin et al. (2006) indicate that channels such as the Internet, ATM and call centers involve little human contact and reduced switching costs, which may lead to missing cross selling opportunities and lower customer loyalty. Shankar, Smith, and Rangaswamy (2003) show that fidelity to the service provider is superior when the service is purchased through the Internet than through an offline channel. In contrast, Ansari, Mela, and Neslin (2005) find that Internet usage is associated with less loyal customers in the long run. They also argue that the explanation of this outcome is that online buyers have lower search costs and are therefore more likely to buy elsewhere.

According to Andrew Pinder (2002) in his paper Channels framework Delivering government services in the new economy he notes that there are a number of competing government priorities and customer needs that impact the channel decision-making process. A public sector organization's business strategy should, for example, reconcile different objectives such as customer access, customer satisfaction, social inclusion and cost. The effects of one goal on another should therefore be evaluated. This strategic view of organisational activity is essential if the delivery channel strategy is not to be developed in isolation. In order to provide integrated services effectively for public sector organizations, developing multiple channel delivery strategies to coordinate the delivery of services among public sector organizations is essential. It also concludes that the development of delivery channel strategies is an important part of the broader existing processes in business planning – not a separate exercise resulting in a stand-alone, one-off document divorced from the overall business strategy.

### **Research Methodology**

Locharoenrat (2017) states that; analysis model explores the decision: what methods for data collection have been used? Which styles of testing techniques and tools have been used? How time and budget constraints have been tackled. Thomas (2013) asserts that cross sectional studies involve the study of a group or groups of people with the similar traits at matching time. The researcher adopted a descriptive research study design in order to establish how business process re-engineering affects service delivery in Huduma centers in Kenya. The management of Huduma centers is made up of the center manager, deputy center manager and the ICT manager.

The study population was 51 Huduma centers in all the 47 counties with a sample size of 153 respondents working at management level. The researcher believes that by looking at the whole population as the sample size the study will give a more conclusive result given that each center has its own dynamic range of success and challenges.

A researcher administered questionnaire was used as the primary tool to collect data from the sample so as to achieve a higher feedback rate. The questionnaire contained both open and closed questions set prior to the study using nominal and ordinal scales of measurement. Questions included topics on innovative culture, leveraging ICT, integration of services, multiple delivery channels, citizen participation and business process reengineering. The researcher also clarified orally the intent and questions of the study to help the respondents comprehend the questions presented to them in order to obtain accurate input. Statistical software SPSS was used to analyze data for quantitative data research and then frequency tables, mean scores, charts used to interpret the data. To determine relationship between dependent variables and independent variable and how they relate, statistically based inferential tools such as correlation and regression were used.

### **Findings and discussion Descriptive Results**

The goal of the research study was to find out the extent to which multiple delivery channels affect service delivery in Huduma centers in Kenya. The respondents were asked to indicate their level of agreement with the fact that multiple delivery channels have affected service delivery in their organization. The responses are shown in table 1.

**Table 1: Multiple Delivery Channels**

Response	Frequency	Percent
Strongly Disagree	2	1.4
Disagree	7	5.0
Moderately Agree	15	10.6
Agree	39	27.7
Strongly Agree	78	55.3
Total	141	100.0

**Source: Research Data, 2019**

The study findings showed that majority of the respondents (83%) agreed that multiple delivery channels had affected service delivery in their organizations. In addition it was found that 10.6% of the respondents moderately agreed that multiple delivery channels had affected service delivery in their organizations. Only 6.4% of the respondents disagreed that multiple delivery channels had affected service delivery in their organizations. Further, the respondents were asked to indicate the extent to which they agreed that the provided aspects of multiple delivery channels had affected service delivery in their organization. The findings are presented in table 2.

The respondents were asked to indicate their opinion on the statement that Use of online services has reduced waiting time for their customers. The findings showed that 79.29% of the respondents strongly agreed and 17.41% agreed summing up to 96.14% of the respondents who agreed that Use of online services has reduced waiting time for their customers. On the other hand, 0.71% of the respondents neither agreed nor disagreed, while 2.86% disagreed that Use of online services has reduced waiting time for customers. This implies that Huduma Centers have used online services to reduced waiting time for customers which could have contributed to efficient service delivery and customer satisfaction. This corroborates the findings by Miller, Droge and Toulouse (2014) who asserted that citizens expect to receive on-line services instead of having to go to a specific location to complete paperwork. Citizens feel more empowered to deal with “governments on-line anytime, saving time of paperwork, the inconvenience of traveling to a government office and time spent waiting in line.

**Table 2: Descriptive results for multiple delivery channels**

	SD	D	N	A	SA	Mean	Std Dev
Use of online services has reduced waiting time for our customers	1.43%	1.43%	0.71%	17.14%	79.29%	4.71	0.69
Online delivery has increased the level of customer satisfaction	0.71%	1.42%	2.13%	20.57%	75.18%	4.68	0.66
Mobile services has enabled us to reach out to the most remote areas of the country	0.72%	2.88%	11.51%	27.34%	57.55%	4.38	0.85

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Use of mobile services has facilitated flexible delivery of services	0.71%	2.14%	10.00%	28.57%	58.57%	4.42	0.81
We have adopted multiple one stop kiosks	0.71%	2.14%	8.57%	23.57%	65.00%	4.5	0.8
Emailing has enabled us to reach a wider scope of our customers	1.42%	5.67%	16.31%	34.04%	42.55%	4.11	0.97
Multiple delivery channels has enhanced service delivery in Huduma centers	0.71%	1.42%	4.96%	26.24%	66.67%	4.57	0.72
<b>Average</b>						<b>4.48</b>	<b>0.78</b>

Source: Research Data, 2019.

### Online Service Delivery

The respondents were asked to indicate their opinion on the statement that Use of Online delivery has increased the level of customer satisfaction. The findings showed that 75.18% of the respondents strongly agreed and 20.57% agreed summing up to 95.75% of the respondents who agreed that online delivery has increased the level of customer satisfaction. On the other hand, 2.13% of the respondents neither agreed nor disagreed, while another 2.13% disagreed that online delivery has increased the level of customer satisfaction. This implies that Huduma Centers online delivery of services has increased the level of customer satisfaction which could have contributed to efficient service delivery and customer satisfaction. This corroborates the findings by Mwangi and Iravo (2018) that for customers, multi-channel service delivery options drive customer satisfaction by enabling flexibility for customers in how, when and where they access government services.

### Mobile services

On the statement that mobile services has enabled us to reach out to the most remote areas of the country, 57.55% strongly agreed, 27.34% agreed summing to 84.89% of the respondents who agreed and 11.51% were neutral. Some 2.88% disagreed and a further 0.72% strongly disagreed on the statement that that mobile services has enabled them to reach out to the most remote areas of the country. The results implied that mobile services have enabled Huduma centers to reach out to the most remote areas of the country. This finding corroborates that of McCabe, Rosenbaum and Yurchisi (2011) who reported that; multiple channels provide a means for public sector Departments or Agencies to deliver services to citizens across the country and for citizens to access government through a variety of communication and delivery methods such as mail, telephone, face-to-face, online, mobile, SMS, fax and kiosks.

### Flexible Delivery of Services

The researcher wanted to know from the study participants if use of mobile services has facilitated flexible delivery of services. Majority of the respondents, 58.75% (58.57%) strongly agreed and 28.57% agreed, totaling to 87.14% who agreed that use of mobile services has facilitated flexible delivery of services, while 10% were neutral. On the other hand, 2.14% and 0.71% disagreed and strongly disagreed, respectively, that use of mobile services has facilitated flexible delivery of services. This means that use of mobile services has facilitated flexible delivery of services in Huduma Centers which could have influenced customer satisfaction and service delivery.

### Multiple One Stop Kiosks

On the statement that they have adopted multiple one stop kiosks, 65% strongly agreed, 23.57% agreed summing to 88.57% of the respondents who agreed and 8.57% were neutral. Some 2.14% disagreed and a further 0.71% strongly disagreed on the statement that that they have adopted multiple one stop kiosks. The results implied that Huduma Centers have adopted multiple one stop kiosks. This could have influenced service delivery and citizen satisfaction. This finding corroborates that of McCabe, Rosenbaum and Yurchisi (2011) who reported that; multiple channels provide a means for public sector Departments or Agencies to deliver

services to citizens across the country and for citizens to access government through a variety of communication and delivery methods such as mail, telephone, face-to-face, online, mobile, SMS, fax and kiosks.

**Emailing**

On the statement that Emailing has enabled us to reach a wider scope of our customers, 42.55% strongly agreed, 34.04% agreed summing to 76.59% of the respondents who agreed and 16.31% were neutral. Some 5.67% disagreed and a further 1.42% strongly disagreed on the statement that Emailing has enabled them to reach a wider scope of our customers. The results implied that Huduma centers have adopted Emailing as a service delivery channel to reach a wider scope of customers. This could have influenced service delivery and citizen satisfaction.

**Multiple delivery channels**

The researcher wanted to know from the study participants if multiple delivery channels has enhanced service delivery in Huduma Centers. Majority of the respondents, (66.67%) strongly agreed and 26.24% agreed, totaling to 96.91% who agreed that multiple delivery channels has enhanced service delivery in Huduma Centers, while 4.96% were neutral. On the other hand, 1.42% and 0.71% disagreed and strongly disagreed, respectively, that multiple delivery channels has enhanced service delivery in Huduma Centers. This means that multiple delivery channels has enhanced service delivery in Huduma Centers which could have influenced customer satisfaction. This finding agrees with that of Kiriinya (2018) whose study found that multiple delivery channels has a positive and significant influence of the performance of pharmaceutical companies. This also agrees with the findings where most respondents agreed that multiple delivery channels have affected service delivery in their organizations.

**Relationship between Multiple Delivery Channels and Service Delivery**

Correlation analysis was done to determine the relationship between multiple delivery channels and service delivery in Huduma centers in Kenya. The results were used to determine the linear relationship between multiple delivery channels and service delivery. It indicated the rate at which a unit increase in multiple delivery channels leads to change in service delivery in Huduma Centers.

**Table 3: Correlation Analysis between Multiple Delivery Channels and Service Delivery**

		Service delivery	multiple delivery channels
Service delivery	Pearson Correlation	1	
	Sig. (2-tailed)		
multiple delivery channels	Pearson Correlation	0.355**	1
	Sig. (2-tailed)	0.000	

**Source: Research Data, 2019.**

The results in table 3 revealed that there was a positive and significant association between multiple delivery channels and service delivery ( $r = 0.355$ ,  $p = 0.000$ ). This implies that an increase in delivery channels resulted in an improvement in service delivery. This finding agrees with that of McCabe, Rosenbaum and Yurchisi (2011) who reported that channels provide a means for public sector Departments or Agencies to deliver services to citizens and for citizens to access government through a variety of communication and delivery methods such as mail, telephone, face-to-face, online, mobile, SMS, fax and kiosks. This finding also supports that of by Oke, Walumbwa and Myers (2012) whose study findings revealed that public sector departments or agencies, engaging and communicating with citizens through their natural channels such and online social networks enables quick, direct and cost effective method to engage with their citizens. **Regression Analysis**

Regression analysis was used to examine whether multiple delivery channels can be used to explain service delivery in in Huduma centers in Kenya. **Table 4: Model Fitness for multiple delivery channels**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.355 <sup>a</sup>	.126	.120	.41467

**Source: Research Data, 2019**

The results in table 4 presented the fitness of model of regression model used in explaining the study phenomena. Multiple delivery channels was found to be satisfactory in explaining service delivery. Multiple delivery channels explains 12% of service delivery. The results meant that the model applied to link the relationship. This also implies that 88% of the variation in the dependent variable is attributed to other variables not captured in the model.

**Table 5: ANOVA for multiple delivery channels**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.457	1	3.457	201.03	.000 <sup>b</sup>
1 Residual	23.901	139	.0172		
Total	27.358	140			

**Source: Research Data, 2019**

Table 5 shows the results on the analysis of the variance (ANOVA). The results indicated that the model was statistically significant. This was supported by an F statistic of 201.03 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level. The results implied that multiple delivery channels are a good predictor of service delivery.

**Table 6: Regression of coefficients for multiple delivery channels**

	$\beta$	Std. Error	t	Sig.
(Constant)	3.128	.295	10.617	.000
multiple delivery channels	0.355	.065	4.484	.000

**Source: Research Data, 2019**

Regression of coefficients results in table 4.36 revealed that multiple delivery channels and service delivery are positively and significantly related ( $\beta = 0.355$ ,  $p = 0.000$ ). This implies that a unit increase in multiple delivery channels would lead to improvement in service delivery by 0.355.

Regression model:

$$Y_1 = 3.128 + 0.355 \text{ MDC} + \varepsilon$$

Where  $Y_1$  = Service Delivery, MDC- multiple delivery channels and  $\varepsilon$  - Error term

### **Conclusion and Recommendations Conclusion**

The study concluded that online service delivery is essential for enhancing customer satisfaction and service delivery efficiency. Further, it was concluded that utilization of mobile and email delivery of services leads to customer's satisfaction. The study further concluded that use of mobile service facilitates flexible delivery of services and eventual customer satisfaction.

The study also concluded that use of email in communication with customers improves customer satisfaction. Furthermore, it was found that adoption of multiple delivery channels improves customer satisfaction. It was also concluded that multiple delivery channels enhances efficiency in service delivery.

### **Recommendations**

The study recommended that in order to boost on reliability and efficiency, ICTs systems need to be improved further on user-friendliness, usability, and for convenience, they need to be integrated for better management. Online systems that provide public services in Huduma Centers should converge such that one person is able to serve clients with different needs from the same work station not necessarily going to different work stations to obtain different

services. This strategy will improve on reliability of services as well as boost on the efficiency and effectiveness in service delivery.

The study found that there were no mobile applications for most of the services in Huduma Centers; this study therefore recommends that the government ensures that services available at Huduma Centers are also available through mobile services to enhance accessibility by all customers.

One element of the context of complexity for public service organizations is that they are embedded in society, producing not only benefits (and obligations) for individuals but also providing public goods and services, establishing collective efficiency, and creating collective rules and purposes. The expansion and alteration of rationalization strategy has to be aligned to a particular service to be offered to customer needs. The study found that there were no mobile applications for most of the services in Huduma centers; this study therefore recommends that the government ensures that services available at Huduma centres are also available through mobile services to enhance accessibility by all customers.

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## **Findings and discussion**

### *Descriptive Results*

The goal of the research study was to find out the extent to which multiple delivery channels affect service delivery in Huduma centers in Kenya. The respondents were asked to indicate their level of agreement with the fact that multiple delivery channels have affected service delivery in their organization. The responses are shown in table 1.

Table 1: Multiple Delivery Channels Response

	<b>Frequency</b>	<b>Percent</b>
Strongly Disagree	2	1.4
Disagree	7	5.0
Moderately Agree	15	10.6
Agree	39	27.7
Strongly Agree	78	55.3
Total	141	100.0

THE ROLE OF KNOWLEDGE SHARING IN ENHANCING INNOVATION PERFORMANCE  
AMONGST COMMERCIAL BANKS IN KENYA

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**Abstract**

Modern organizations are exposed to challenges arising due to a complex and an unpredictable competitive environment. Over the years, knowledge sharing has become a major strategic necessity that organizations require to succeed in the global business atmosphere. Knowledge as one of the most vital assets of all corporate organizations must be effectively shared in order to achieve sustainable competitive advantage. The study sought to examine the role of knowledge sharing in enhancing innovation performance amongst Commercial banks in Kenya. The study adopted descriptive survey research design. This study targeted 15 commercial banks in Kakamega County. Structured questionnaires were used to collect data targeting forty five managers who were purposively sampled. A census study was done. Data was analyzed using descriptive and inferential statistics. For descriptive statistics mean and standard deviation were used. For inferential statistics the study utilized Pearson's product moment correlation and simple regression analysis. Data was presented in form of tables. Study findings revealed that knowledge sharing had a positive and significant influence on innovation performance. The study recommends that bank managers should pay keen interest to knowledge sharing strategies in order to enhance innovation performance. The paper contributes to scholarly debate on the role knowledge sharing plays in enhancing innovation performance. The results may assist managers to facilitate knowledge sharing in commercial banks in order to boost innovation performance.

**Key words:** *Commercial Banks, Knowledge Sharing, Innovation Performance*

**1.BACKGROUND**

The globalized business environment has experienced changes in business conditions, liberalization of markets, high costs of production, flexible organizational structures, improved ICT and increase in partnership development (Jelenic, 2011). This shows that there is stiff competition and companies have been left with just a few aspects that they may effectively compete on. Tanaji (2012) posited that in a world having demanding business, a firm's competitive edge depends on its ability to manage as well as deploy its assets. The assets can either be tangible or intangible. Knowledge is an example of intangible asset of a firm. A firm's knowledge is a vital asset that guarantees its survival in a business environment that is fiercely competitive.

Due to the rise of knowledge-based economy businesses have found it necessary to initiate ways of effectively acquiring and managing varying organizational knowledge. Choi, Kim, Kim and Kim (2006) posited that the production and dissemination of knowledge in organization can add value. According to Pinho, Rego and Cunha (2012) knowledge management practices is the process of acquisition, creation, utilization, and also sharing of knowledge. Dahiya, Gupta and Jain, (2012) defined knowledge management as being a management strategy that is systematic and integrated which can improve a firm's efficiency and effectiveness through developing, transferring, transmitting, storing, and implementing. Feleagă, Feleagă, Dragomir and Răbu (2013) regarded Knowledge management as a businesses' organizational as well as technological infrastructure that enhances knowledge sharing and reuse and the business' ability to identify, manage, and also share all organizational information. According to Gray (2011) the process of Knowledge management protects assets of intellectual nature from decay, seeks opportunities for enhancing decisions, services as well as products through addition of intelligence, increasing value and also provision of flexibility.

Knowledge sharing has been recognized as a central theme in knowledge management practice and it has also been extensively researched on as it has presented a pressing as well as a challenging research issue for understanding and advancing knowledge management (Heisig, 2009; Chen & Mohamed, 2010). Hsiu-Fen (2010) explained that knowledge sharing involved to capture, organize, reuse and transfer experience-based knowledge which resides within the firm by availing it to others in the business.

Knowledge sharing is the process of exchanging personal as well as organizational knowledge. Frappaolo (2006) defined knowledge sharing as a process of conveying knowledge from an

individual to another, from individuals to groups or from one firm to another firm. Nonaka (1994) postulated that through knowledge sharing firms are able to integrate any knowledge that is emerging into its strategic development. Knowledge sharing can enable firms to create new knowledge and also develop new products at a lower cost and even at a faster rate than competitors. Hawamdeh (2005) alluded that knowledge sharing resulted to new knowledge creation and innovation that would enhance organizational performance. Geiger and Schrevogg (2012) pointed out that sharing of knowledge was critical in using and leveraging of knowledge resources which were considered as being vital resources by most organizations. Bhatt (2001) Cyr and Choo (2010) identified factors that affected knowledge sharing in organizations such as organizational culture, Individuals attitudes and values towards knowledge sharing and the technology utilized to share knowledge.

Knowledge sharing leads to firm success through faster deployment of knowledge to specific parts of the firm that can benefit from it in a great way (Syed-Ikhsan & Rowland, 2004). Andrews and Delahaye (2000) ascertained that knowledge sharing could result to individual and organizational learning. Bartol and Srivastava (2002) noted that it leads to creation of knowledge, organizational learning and even to improved performance. According to Foss (2009) and Foss and Husted and Michailova (2010), knowledge sharing fosters a person's problem-solving ability, resulting to superior knowledge-based capabilities as well as better performance outcomes within an organization. Knowledge sharing establishes a link between an individual and the firm as knowledge is transferred from the individual to the firm level which can create economic value and be a source of competitive advantage (Hendriks, 1999). Davenport and Prusak (1998) reiterated that it was necessary to develop strategies for spontaneous knowledge exchanges with special emphasis on informal relations.

Vision 2030 for financial services is to create a vibrant and even a globally competitive financial sector in Kenya resulting to job creation and also promoting savings in order to finance the overall financial needs (GOK, 2013). Banks play a crucial role in the economic development of nations and according to Kariuki (2015) they have been envisioned to deliver an economic growth rate of 10 percent per annum. Commercial banks provide payment services as well as financial products which enables households and organizations to take part in the wider economy.

### **1.1 Problem Statement**

In Africa, the banking sector's stability has been threatened due to the likelihood of a sharp increase in non-performing loans (Tyson, 2020). The COVID-19 shock has posed downside risks to the credit profiles of banks in Kenya. Moreover, competition is so intense in the banking sector and it has been noted that banks come up with products that are imitable leading to the products being copied by competitors and being modified (Omondi, Rotich, Katuse & Senaji, 2017). Competition may be due to increased level of innovations amongst players and the threat of new entrants into the arena. Banks must identify strategies to assist them to stay on top of competition. This study assumes that through knowledge sharing as a strategy, banks can enhance their innovation performance.

Studies on knowledge sharing have been done in diverse industries such as manufacturing firms (Kombo, k'obonyo & Ogutu, 2015, Naisiae & Gitari 2018), Software Outsourcing Vendors (Yang, 2011) and legal firms (Nguthari & Kwasira, 2015). Further an array of studies done have also established that knowledge sharing is significant with regards to different organizational performance aspects such as individual and organizational learning (Andrews & Delahaye, 2000, Bartol & Srivastava, 2002); Knowledge creation (Bartol & Srivastava, 2002); Organizational innovation (Kombo, K'obonyo & Ogutu, 2015) and Product innovation (Yang, 2011). Still, there is a dearth of research into knowledge sharing, especially with respect to its role in enhancing innovation performance. Thus, there is a need to understand the role of knowledge sharing in commercial banks in order to amplify its benefit in terms of innovation performance.

### **1.2 Study Objective**

The study sought to examine the role of knowledge sharing in enhancing innovation performance amongst Commercial banks in Kenya

### **1.3 Hypothesis**

H<sub>0</sub> Knowledge sharing has no significant influence in enhancing innovation performance amongst Commercial banks in Kenya

## **2. LITERATURE REVIEW**

### **2.1 Theoretical review**

This study was embedded on Nonaka and Takeuchi's (1995) theory of organizational knowledge creation. Earl (2011) pointed out that, when there was an interaction between tacit and explicit knowledge, they would result into four knowledge conversion steps which included socialisation, externalisation, combination and internalisation. Chong (2010) viewed socialisation, externalisation, combination and internalisation as the basis for knowledge creation and even transfer process. Thus, on-going collaboration results to knowledge sharing and creation which may be captured and also retained in a firm. The theory views the interaction of tacit knowledge and explicit knowledge as being essential in knowledge management. The theory explains the creation, sharing and conversion and management of organisational knowledge. Socialization refers to sharing of tacit knowledge and also experiences possessed by persons with other group members. According to Nonaka and Konno (1998) this can be achieved by capturing knowledge by interacting with external agents and internal organizational members, by physical proximity or even virtual interaction, The socialization of the tacit knowledge is disseminated through externalization (Nonaka, 1994; Nonaka & Takeuchi 1995; Nonaka & Konno, 1998). According to Nonaka (1994), combination involves conversion of the explicit knowledge into the firm's tacit knowledge that rests in an intangible form. It is transformed and shared into tacit form. Knowledge sharing is a critical knowledge process for a firm's knowledge creation (Nonaka & Takeuchi, 1995). Knowledge needs to be moved from individuals to the entire organization so that it may be utilized to fulfil organizational goals.

## **2.2 Review of Variables**

### *2.2.1 Knowledge Sharing*

Knowledge sharing is the exchange of knowledge among organizational employees. According to Lin (2007) knowledge sharing involves exchanging of employees' knowledge, experiences and also skills throughout the firm so as to devise new routines as well as mental models. Sharing knowledge can leverage expertise across a firm thus accelerating organizational performance. Knowledge can be shared through departmental meetings, knowledge exchange seminars, informal and even formal workshops, summary reports, mentoring, brainstorming, notice boards, face to face interactions and emails (Wamundila, 2008). According to Dalkir (2011) knowledge sharing can be facilitated by communication and even collaboration technologies that are produced within the firm. Information can be distributed through tools for instance internet, phones, emails, video conferencing, chat rooms, messages, discussion forums, twits, wikis, webinars, social networks and various other work flow management tools.

### *2.2.2 Innovation Performance*

Daft (2016) posited that Performance was a firm's ability to achieve its goals by utilizing its resources effectively and efficiently. It is a firm's results in comparison to outputs expected. Innovation entails introducing new products, new methods of production, new market entry, new sources of supply and new ways of competition. (Schumpeter, 1934). Griffith, Huergo, Mairesse and Peter (2006) asserted that innovation was an imperative cornerstone in performance with regards to improvement of productivity, performance and also growth. Innovation performance can be attained by firms through the devising certain cultural as well as behavioural practices (Anne, 2012). As such the culture of knowledge sharing can be considered by banks. This study focused on product and market innovation as aspects of innovation performance.

## **2.3 Empirical Review**

Yang (2011) established examined the Knowledge Management effect on Product Innovation of Software Outsourcing Vendors in china and found that internal knowledge sharing and also external knowledge assimilation significantly and positively affected product innovation. However, the study just focused on product innovation and was done in china. Lin (2007) found that an employees' willingness to donate and also collect knowledge enabled the firm to enhance its innovation capability. Hsiu-Fen (2010) contended that knowledge sharing facilitated generation of new ideas and development of new business opportunities by socialization and workers learning process. Ipe (2013) confirmed that knowledge sharing accelerated learning and innovation. Further, O'Neill, Beauvais and Scholl (2012) suggested that knowledge sharing positively affected organizational outcomes of company's innovation, product improvement as well as employee improvement.

Using cross sectional research design Kombo, k'obonyo and Ogutu (2015) conducted a study to examine whether knowledge strategy affected organizational innovation. The study targeted 655 manufacturing Kenyan firms. Structured questionnaires were administered on managers. The results showed that knowledge strategy positively and significantly affected the firm's

innovation activities. However, the study focused on knowledge exploration and knowledge exploitation unlike the current study which focused on knowledge sharing.

Nguthari and Kwasira (2015) carried out a study on the influence of knowledge management practices on legal firms' performance. The study utilized descriptive research design and established that knowledge management practices such as knowledge sharing, knowledge implementation amongst others influenced performance. Focusing on Kenyan Commercial banks, Gakuo and Rotich (2017) researched on the effect strategic knowledge management had on performance. The study used descriptive research design and data was collected from a sample of 116 management staff. Results indicated that knowledge acquisition knowledge conversion knowledge protection and knowledge applications influenced performance. The study focused on performance generally unlike the current study which focused on innovation performance. Using descriptive research design Naisiae and Gitari (2018) conducted a study in Nakuru County's manufacturing firms and confirmed that between strategic knowledge management practices. Specifically, the study found that knowledge transfer, application and management policy had a statistically significant positive influence on organizational innovation. Knowledge transfer was significantly and positively correlated to organizational innovation. Knowledge transfer significantly influenced organizational innovation. However, the study was done in a different setting which is the manufacturing firms unlike the current study which was done in Commercial banks.

### 3. METHODOLOGY

The study adopted descriptive survey research design. According to Kothari (2004) descriptive survey as a research design is flexible as it provides an opportunity for taking into account diverse aspects of the problem being studied. This study targeted 15 commercial banks in Kakamega County. Structured questionnaires were used to collect data from forty five managers who were purposively sampled. The respondents included branch managers, operations managers and customer relations managers. A census study was done as the study population was small. The questionnaires were administered using a drop and pick later method. Data was analyzed using descriptive and inferential statistics. Descriptive statistics employed were standard deviation and mean. Inferential statistics used were Pearson moment correlation and simple regression analysis. The simple regression model below was used;

$$Y = \beta_0 + \beta_1 X_1 + e$$

Where Y = innovation performance,  $\beta_0$  = Constant,  $\beta_1$  = Coefficients of determination,  $X_1$  = knowledge sharing,  $\varepsilon$  = Error term

### 4. RESULTS AND DISCUSSION

#### 4.1 Response Rate

45 questionnaires were issued and 40 were filled and returned which represented a response rate of 88% response rate. Fincham (2008) concerted tha researchers should aim at 60 percent as the response rate.

#### 4.2 Descriptive statistics

##### 4.2.1. Descriptive Analysis results for knowledge sharing

Having regards to table 4.1, majority were in agreement with the statements on knowledge sharing that staff meetings were held to discuss business trends and developments with a of mean 4.12 (SD =.790), employees exchange knowledge and experiences with coworkers with a mean of 4.30 (SD =.648), knowledge is shared between supervisors and subordinates with a mean of 4.35(SD =.622) and that technology is used to disseminate knowledge which had a mean of 4.17(SD =.780).

Table 4. 1 Statements on knowledge sharing

	N	Mean	Std. Deviation
Staff meetings held to discuss business trends and developments	40	4.12	.790
Employees exchange knowledge and experiences with coworkers	40	4.30	.648
Knowledge shared between supervisors and subordinates	40	4.35	.622
Technology used to disseminate knowledge	40	4.17	.780
Valid N (listwise)	40		

#### 4.2.2 Descriptive Analysis results for innovation performance

In relation to table 4.2 majority were in agreement with the statements on innovation performance that new products introduced in last 3 years with a mean of 4.25(SD =.898), the organization has improved on quality of its products and services with a mean of 4.35(SD =.632), new products has made us better than our competitors mean of 3.82 (SD =.747), the organization has identified new potential market mean of 3.85(SD =.833) and that the organization has generated new ways to serve target market with a mean of 4.35(SD =.622).

Table 4.2 Statements on innovation performance

	N	Mean	Std. Deviation
New products introduced in last 3 years	40	4.25	.898
The organization has improved on quality of its products and services	40	4.35	.622
New products has made us better than our competitors	40	3.82	.747
The organization has identified new potential market	40	3.85	.833
The organization has generated new ways to serve target market	40	4.35	.622
Valid N (listwise)	40		

### 4.3 Inferential Statistics

#### 4.3.1 Correlation Results

Pearson's product moment correlation analysis was used to assess the relationship between knowledge sharing and innovation performance.

Table 4.3; Correlation

		Knowledge sharing	Innovation performance
Knowledge sharing	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	40	
Innovation performance	Pearson Correlation	.734**	1
	Sig. (2-tailed)	.000	
	N	40	40

\*. Correlation is significant at the 0.01 level (2-tailed).

Table 4.3 shows that Knowledge sharing is strongly positively correlated with innovation performance and its significant at 99 % confidence level ( $r=0.734$ ;  $p<0.01$ ). These findings are in agreement with those of Nguthari and Kwasira (2015) who established that there was a strong positive and significant association between knowledge sharing and law firm performance ( $r = 0.664$ ). The findings are also consistent with those of Naisaei and Gitari (2018) who confirmed that knowledge transfer was positively and significantly correlated to organizational innovation ( $r = .696$ ,  $p=0.000$ ,  $\alpha= 0.05$ ).

#### 4.3.2 Simple Regression Analysis Results

Table 4.4: Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson	
					R Square Change	F Change	df1	df2		Sig. F Change
1	.734 <sup>a</sup>	.539	.526	.37876	.539	44.359	1	38	.000	2.213

a. Predictors: (Constant), knowledge sharing

b. Dependent Variable: innovation performance

The regression results in table 4.4 shows that 73.4% of the innovation performance can be explained by knowledge sharing (R squared = 0.734) while the remaining 26.6% can be attributed to other factors which are not covered in the study. According to Alsaed (2005) when Durbin-Watson is between (1) and (3) there is no autocorrelation problem. Thus, Durbin Watson value is 2.213 therefore no autocorrelation problem exists on the regression model.

Table 4.5: ANOVA<sup>a</sup>

Model	Sum Squares	of df	Mean Square	F	Sig.
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**Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021,  
Machakos University, Kenya**

	Regression	6.364	1	6.364	44.359	.000 <sup>b</sup>
1	Residual	5.451	38	.143		
	Total	11.815	39			

a. Dependent Variable: innovation performance

b. Predictors: (Constant), knowledge sharing

Regarding table 4.5, the F change was statistically significant because the p-value was 0.000 and thus significant at 99% confidence level. Therefore, the regression model can be used to assess the association between the dependent and independent variable.

**Table 4.6: Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error				Beta	Tolerance
1	(Constant)	.536	.542		.988	.330		
1	Knowledge sharing	.847	.127	.734	6.660	.000	1.000	1.000

a. Dependent Variable: innovation performance

From the regression findings the substitution of the equation  $Y = \beta_0 + \beta_1 X_1 + \varepsilon$  became

$$Y = .536 + 0.847X_1$$

This implies that a unit increase in knowledge sharing leads to 0.847 increase in innovation performance. Further the VIF are <10 hence no multi collinearity problem (Cooper & Schindler 2003). For testing the research hypothesis, regression results in table 4.6 were used. The null hypothesis that knowledge sharing has no significant influence on innovation performance in Kenyan commercial banks is rejected at 0.01 significant level,  $P(0.000) < 0.01$ . The findings of the study are congruent to those of Naisaei and Gitari (2018) who confirmed that knowledge transfer had a statistically significant influence on organizational innovation, however the study was done in manufacturing firms thus exhibiting a sectoral gap. Similarly, Yang (2011) confirmed that knowledge sharing influenced product innovation in China. Lin (2007) noted that an employees' willingness to donate and also collect knowledge enabled the firm to enhance its innovation capability.

## 5. Conclusion

The study concludes that knowledge sharing has an influence on innovation performance. The study affirms Nonaka and Takeuch's (1995) knowledge creation model that points out that through human interaction, socialization facilitates exchange of ideas, skills and even experiences in organizations. This subsequently results to innovation performance in Commercial banks. The study demonstrates the value of knowledge sharing for better innovation performance. Moreover, commercial bank managers should perceive the significance of Knowledge sharing in enhancing innovation performance especially in the wake of COVID 19 which has posed a serious challenge in the economy.

## 6. Recommendations

Commercial banks should encourage a corporate culture that prioritizes knowledge sharing for staff to actively pursue knowledge sharing activities. Bank managers should encourage information sharing through meetings where staff get to discuss new trends in business. Employees should also be encouraged to deliberately share information amongst themselves as colleagues so as to generate new knowledge. Knowledge should also be freely shared between employees and their supervisors. Moreover, appropriate information technology resources should be utilized to share knowledge within an organization such as internet, phones, emails, video conferencing, webinars etc. Lastly, managers need to understand the knowledge sharing key enablers.

## 7. Suggestions for Further Research

The study findings were derived from commercial banks in a Kakamega County. Future studies should be done on a larger sample to include commercial banks in other counties and countries. Future studies should be conducted in diverse industries in other sectors for instance higher education institutions and manufacturing sector. In addition, the study would benefit

from a qualitative investigation through interviews to provide more insights regarding the study phenomenon. Further studies may be done which incorporate intervening variables. Moreover, studies may be done on factors influencing knowledge sharing in organizations.

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## Economic Survival through Responsive Entrepreneurship in the Era of Global Disruption

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### Abstract

Global disruptions such as natural disasters, epidemics and financial crisis affect the flow of economic processes and destabilize the economic equilibrium. They also cause unprecedented labour market distortions and may render many business models ineffective. Global disruptions affect every part of the global economy, the Covid-19 pandemic, for example has led to logistical challenges, unavailability of strategic resources, supply chain disconnectedness, severe price and market distortions, government restrictions, consumer pessimism, loss of trust in international trade among others. In relations to Covid-19 pandemic, Initial forecasts indicates that this might be the most adverse economic crisis since World War II, substantially serious than the 2008 to 2012 global financial crisis. Some industries such as online businesses and healthcare related may have profited from these disruptions. To survive, many existing firms have had to change their products, services, customers or markets. The pandemic has led to closure of businesses, employees working from home and redundancies. This study will discuss both the positive and negative impact of the COVID-19 pandemic on firms by looking at the processes by which firms respond to the pandemic in order sustain and even accelerate growth. Extant literature shows that firms have had to apply responsive entrepreneurship in order to survive. In spite of the adverse effects, COVID-19 brings forth unique business opportunities for entrepreneurs to develop creative responses. In this era of global health crisis, responsive entrepreneurship can offer creative solutions by utilizing the knowledge of entrepreneurs and innovation across multiple sectors in order to solve the current issues facing the society worldwide. A clear strategy and operational resilience is crucial for firms not only to survive, but to thrive, during this pandemic and beyond.

**Key words:** *Economic Survival, Responsive Entrepreneurship, Global Disruption, Crisis, Pandemic, Covid-19*

### 1.0 Introduction

A number of global crises have hit national economies, businesses, and individuals in recent years. They have responded to the Asian economic crisis of 1997–1997, the dot-com bubble burst of 2000–2002 and the post-9/11 economic downturn, the 2008 economic and financial crisis, the Fukushima nuclear disaster in 2011, the 2015 migrant crisis, political crises such as populism's rise, Brexit negotiations, and trade wars, and the climate crisis. The pandemic outbreak is currently impacting people and organizations all over the world. The causes and scope of these and other crises can vary (Bansal, Kim, & Wood, 2018). However, they all have the potential to have catastrophic human, cultural, natural and economic consequences such as the collapse of businesses and industries, social precarity, natural disasters and major job losses (Hallgren, Rouleau, & de Rond, 2018). These massive impacts are often the result of international or cross-border effects, since responses are influenced by the varying government regimes of the affected countries and regions.

COVID-19 is unique in terms of the magnitude of its effects, as it is a humanitarian crisis that has disrupted both supply and demand in the global economy. The virus itself is neither uncommon nor unpredictable, but its consequences are. COVID-19 has placed, lockdowns, social distancing and mobility limits that have had immediate effects on communities all over the world, such as drastic dependence on the conveniences of E-commerce, teleconferencing and social media use. More than 90% of the world's population was once subjected to cross border travel bans, which resulted in extensive restrictions on public activities and, in many cases, a complete cessation of tourism (Gossling et al., 2020). The internationally linked world became a stay-at-home economy almost overnight (W.E.F, 2020); It is possible that cross border travel, predominantly non-essential movements, will continue to be difficult in the coming years, and that these restrictions will continue indeterminately (Benton, 2020).

All crises, of whatever nature, has an immediate and serious impact on global financial markets, which rapidly feeds through to the real economy via a reduction in credit supply and an increase in the cost of credit. Due to their informational opacity, small companies face very real and special problems when it comes to accessing external capital (Stiglitz and Weiss, 1981)

and the ownership structures of their private and closely held companies. These glitches are exacerbated by a shortage of tangible and physical assets that can be used as security for loans (Coco, 2000). As a result, many small businesses rely too heavily on funds generated internally to finance their activities and provide the cash they need on a day-to-day basis. As a result, the pandemic-induced economic lockout has the ability to put a significant number of small businesses at risk of going bankrupt. More than 50% all SMEs are expected to suffer significant sales losses as a result of the pandemic (OECD, 2020). The interplay of low cash reserves and poor sales has a dynamic effect, with different companies reacting in different ways to alleviate these financial constraints. Although some will adapt to the hostile environment by using financial bootstrapping strategies or using government assistance programs, others will succumb to liquidity stresses and become insolvent (Winborg & Landstrom, 2001).

Covid-19 effects have been many, and it would be difficult to cover them all in a single post. It is also more difficult to foresee its long-term effects, which are likely to differ from country to country. As a result, the content of this article is selective, concentrating on key developments that I believe are particularly relevant to entrepreneurship. This has the potential to influence a significant portion of the world. As a result, my presentation is limited by necessity. Other researchers could, understandably, see other issues not addressed here as particularly important.

## **2.0 Entrepreneurship and Global Disruption**

In times of an economic downturn, such as the ongoing COVID-19 pandemic, global studies have shown the value of entrepreneurship. Entrepreneurial personality, intrapreneurship, modesty, new business models, self-efficacy entrepreneurial spirit, creativity, empathy, opportunity appreciation, social entrepreneurship, minority entrepreneurship, dedication to a cause and resilience of entrepreneurial nature, to name a few, may all be important in mitigating economic hardship in such difficult times (Dai, Hu & Zhang, 2020). Things have transformed, and the future remains a mystery. In this article, we looked at entrepreneurship as a way to go from surviving to flourishing.

Entrepreneurs come in a variety of shapes and sizes, as is well known. One common classification is to divide them into those who start businesses because they want to and those who start businesses because they spot a chance (entrepreneurs focused on opportunity), and those who start companies out of desperation, not because they intend to start a company, but because they have exhausted all other viable options for survival (entrepreneurs focused on necessity) (Maritz, et al, 2020). Recent studies have also shown an unprecedented increase in prospects for entrepreneurs before and after the pandemic. Flexible production, healthcare analytics, supply chain resilience, emergency management, digital microfinance, networking networks, senior care, telemedicine, online education, remote fitness equipment, multiplayer entertainment and remote tech support have all been accelerated by long-term drivers such as secure separation, physical isolation, home centrality and even smarter cities (Dai, Hu & Zhang, 2020).

Many small and medium companies have recovered and maintained customers by quickly changing service and product they offer in order to keep their doors open and job prospects open, as shown by compelling evidence. During the peak of COVID, innovative entrepreneurial firms exchanged staff with organizations unable to satisfy increased demand (Weinhardt & Bartosch, 2020). People who are behind such initiatives share similar traits, such as: motivated, tenacious, adaptable, constructive, agile, action-oriented, flexible, innovative, visionary, confident, able to cope with volatility, appetite for calculated risk, open-minded, determined and resourceful. These skills exemplify a risk-taking mentality and the capability to build something out of need in a short amount of time once quick results are required. The advantages of implementing a positive development mentality are critical for the impending time and a necessity for future workers to not only succeed but prosper in future COVID-like scenarios, and for society to emerge stronger on the other side.

The shutdown has resulted in a significant move toward working from home and online shopping as well as concerns about crowded workplaces and public transportation. Because of these changes, most of the opportunities linked with the "old normal" will vanish until the "new normal" begins (Gossling, Scott, & Hall, 2020). Instead, we'll see work fragmentation, an increase in working from home self-employment, and the emergence of the "gig economy," in which people become more self-reliant. Firms and countries will be cautious of procuring products from international suppliers that leverage on economies of scale but also threaten supply chain disruption in case of another pandemic, in addition to instability of global and regional institutions and treaties. As a result, a new age for corporate and individual

entrepreneurship is on the horizon, with a new generation of entrepreneurs ready to take risks in the era of post-Covid.

### **3.0 Crisis Management**

Entrepreneurs should be concerned about the effect of a crisis or catastrophe on their company because it has an impact on current and potential business success. According to statistics, 75% of companies without a business continuity plan will collapse within 3 years of a crisis. (Cook, 2015). During disasters and crises, Quarantelli, Lagadec, and Boin (2007) emphasized the importance of monitoring and coordinating processes. They describe handling as crisis contingency tactics, while planning refers to the techniques that must be implemented in order to face a potential situation. The study's author views business continuity as a crisis management technique for entrepreneurs and business recovery planning as a post-crisis planning tool. A disaster recovery plan, which includes the resumption and reconstruction of operations, is typically included in a business continuity strategy (Cook, 2015).

McCarthy (2003) claims that the emergence of a crisis makes entrepreneurs to become more realistic and motivated by expected behavior. Entrepreneurs use survival tactics to combat the impact of a recession on their businesses, such as innovative marketing through pricing and alternative promotions (Naidoo, 2010), high-impact online campaign, product reengineering, an alternate distribution channel and the use of a low-cost, (Bourletidis & Triantafyllopoulos, 2014). The government's economic stimulus plan to mitigate the effect of the crisis on SME entrepreneurs is insufficient in the long run. As a result, in the crisis management period – namely, reacting, resuming, rebuilding, and repairing – entrepreneurs must prepare to continue operating the company by adopting a new or creative strategy (Cook, 2015). Many crisis management studies include three traditional stages, that are normally subdivided into more specific stages. These can include assessment of risk, risk prevention, preparedness, responding to the risk, recovery from the risk, and (vi) learning., which are especially useful in the area of disaster mitigation and continuity of business, as the ISO standard suggests.

### **4.0 Responses to the Covid-19 Pandemic**

Previous research has shown that economic downturns are a period of intense opportunity (and loss) for high performing companies. Gulati et al. (2010), for example, found out that firms that focus on balancing between cost reduction for economic survival and investment for future expansion perform better than their rivals. In addition, a Bain study of approximately 3900 businesses during the Global Financial meltdown of 2008 shows that while about 20% of firms fail to recover from the recession, the winners will reap substantial rewards, with multiples in creation of value for the firm (Lim, Morse & Yu 2020). The concerns for us are how and why. The following are the precautions taken by entrepreneurs in the event of a pandemic.

#### **4.1 Innovation**

Although crises can be disruptive to economies and communities, they can also provide a window of opportunity for strategic renewal. In this context, we define innovating as the achievement of strategic regeneration in the face of a crisis. In this regard, the analysis by Reymen et al. (2015) is instructive. Amplified environmental volatility, especially in times of disruption, is favorable to expanding a firm's field of business operations (Sarasvathy, 2001). Covid has put pressure on companies to innovate in their business models in order to keep their consumer relationships. Companies would have to rethink their supply chains and processes in order to keep producing and delivering goods. Others have attempted to refocus their manufacturing efforts to meet urgent consumer demands for medical equipment such as face masks and ventilators. In reality, several popular corporations have attempted to exploit on their abilities by changing their manufacturing emphasis. A shortage of ventilators in hospitals, for example has prompted companies such as Ford to manufacture medical equipment, in addition to health-care firms like Philips and Draeger (Meyer, Pedersen, & Ritter, 2020).

#### **4.2 Persevering**

Perseverance refers to steps taken to keep a company's operations running during a crisis. Rather than that the variety of operations by retrenchment, such interventions tend to retain the status quo while mitigating the crisis's negative consequences (Wenzel, 2015). Perseverance, as previous research has shown, can be a remarkably successful response to a crisis. In uncertain situations where firms are faced with changing circumstances on a daily basis, persisting firms may outperform competitors who conduct strategic renewal. As a consequence, one of the study's key findings is that perseverance is more important than slack resources for strategic renewal in terms of firm survival. External organizations that provide

companies with knowledge and intelligence, among other things, may also reduce the impact of a shock.

The value of perseverance as response to global disruption is also emphasized by De Carolis, Yang, Deeds, and Nelling (2009). They looked at company features that help mitigate the effects of acute adverse events. The authors looked at ventures that deal in pharmaceutical products in the wake of events that caused them to stop producing their products prematurely. This study avers that not all tools and skills are equally critical in surviving a crisis. The biggest bulwark against an adverse event, as this study demonstrates, is exploiting firm-specific core competencies. As these studies suggest, persevering in the face of adversity can be an efficient strategic response, so managers will be wise to avoid engaging in strategic renewal too soon. However, the availability of slack services, externally and internally is critical to this response. The possibility that a company (or an external entity providing debt financing) will hit the limit of available slack grows in tandem with the length of the crisis. As a result, we conclude that persevering will help a firm survive in the long run, but that implementing this strategy would be challenging, if not impossible, if the crisis lasts longer.

#### **4.3 Online Businesses**

The increased awareness and use of emerging technology at work and in daily life is one of the big changes brought about by Covid-19. With billions of people trapped at home and unable to function, digital technology has provided creative solutions for delivering drugs and other health care services, education and food while remotely at home. In the years leading up to Covid, there was a clear movement towards digital entrepreneurship (forming businesses that use these innovations to meet consumer needs) (Nambisan, 2017). Entrepreneurs in developing economies, for example, have taken advantage of the smartphone's rapid acceptance to provide creative commodities to their clientele. In order to grow globally, family businesses have also invested in digital technologies.

Similarly, book sellers, restaurants, grocers, banks and retailers all over the world have discovered that digital technology is critical to their survival in the face of Covid. Digital technology has also been used by institutions of higher learning and schools to keep training, research, and contact with sponsors and other key stakeholders going. As more people become aware of the power of digital technologies and gain confidence in placing orders online, this trend is likely to accelerate. Organic fresh vegetable farmers in Kenya, for example, were able to survive Covid by selling online to meet international customers; they believe that customers will continue to prefer such online businesses after Covid because they are easy, reliable, and cost-effective. If the digital entrepreneurship becomes more widely recognized, new ventures that focus on opportunities across national boundaries are likely to spring up (Jean et al., 2020).

#### **4.4 Retrenchment**

According to Bruton, Ahlstrom and Wan (2003), Retrenchment is a well-known strategy for dealing with crises. This response refers to expense, asset, commodity, product line, and overhead reductions (Pearce & Robbins, 1994). As a result, such measures can limit the reach of a company's operations. As previous research has shown, this proactive response will help businesses withstand a crisis in the short term by partly compensating for lost sales. The data on the long-term feasibility of austerity policies, on the other hand, is mixed at best: While some research see retrenchment as an indispensable step toward firm recovery and strategic renewal, others warn of the irreversible harm that retrenchment steps can cause, such as the forfeiture of collaborations.

Retrenchment narrows a company's reach, which has mixed results in terms of business recovery. Retrenchment, according to some researchers, is a vital aspect of long term company recovery because it alleviates performance deteriorations (Pearce & Robbins, 1994), increases the emphasis on existing operations by reducing uncertainty and increasing accountability, and alleviates performance deteriorations (Pearce & Robbins, 1994). (Benner & Zenger, 2016), as a result, a strong foundation for strategic renewal is created. Others contend that retrenchment causes long-term underperformance as opposed to non-retrenchers. The research of De Figueiredo, Feldman, and Rawley (2019) demonstrates why a reduction in market scope during a crisis will result in a net loss for affected firms. The authors showed that the closing of many hedge funds in 2007–2009 had a negative impact on the success of related sister funds in their report. If the funds were more strictly connected with one another, this pattern was exacerbated and seemed to continue for a longer period of time. As a result, the main takeaway from this research is that in times of crisis, managers must be mindful of the potential for synergy effects to be destroyed by downsizing steps. In the long run, the lack of

synergy effects hinders scope and economies of scale because entrepreneurs cannot allocate resources and costs across industries.

### 5.0 Conclusion and future research

The global economy has been devastated by the COVID-19 pandemic, which has outperformed the Great Recession of 2007–2008. Baker and colleagues (Baker et al., 2020). Due to its obvious economic significance, how this chronic uncertainty affects the entrepreneurial finance sector in the coming years will have a significant and long-term impact on entrepreneurial and creative growth (Howell et al., 2020). This study offers timely insights into the confusion created by the crisis, as well as how entrepreneurs were able to react to it.

Another argument is that the coronavirus has no effect on overall global entrepreneurial activity. This is unlikely to be the case due to the coronavirus's major effects on social systems. As a result of the coronavirus, the essence of entrepreneurship will change drastically, more entrepreneurial thinking will be needed to meet society's needs. As a consequence, it's important that entrepreneurs consider safety and security while planning their companies. This will enable a variety of businesses to respond to customers' concerns about the health crisis. Part of this change entails deciding whether or not the entrepreneurship varies from pre-corona virus forms. Researchers may be able to better understand how pandemics affect entrepreneurship and entrepreneurs' ability to cope with various pressures as a result of this study. Unlike other disasters, the coronavirus outbreak has helped businesses to respond quickly to a wide range of needs. As a result, one of the most important questions for entrepreneurs is whether customers' fears of a pandemic would lead to increased entrepreneurship based on safety and security, necessitating more innovative activity.

Crises have arguably been an ever-present part of corporate life since the 1970s (Wenzel et al, 2020). As a result, entrepreneurs are becoming more concerned about the appropriateness of their companies' business practices (Alvarez, Afuah, & Gibson, 2018). As a result, concerns about how entrepreneurs can effectively react to crises arise. Scholars of strategy have begun to react to this change, as this study shows. As our summary indicates, the importance of those responses is linked to various time horizons, with possible net benefits manifesting in the short, medium and long run, or at any point in time. However, given the pervasiveness and severity of crises like the current COVID-19 pandemic, we believe that further research is required to fully understand sensitive entrepreneurship in times of crisis. Despite the fact that uncertainty has lost favor in many strategic management theories (Alvarez, Afuah, and Gibson, 2018), it is a critical component of crisis responses. This makes predicting which response will lead to a company's survival and recovery following a crisis difficult, if not impossible (Pearson & Clair, 1998). As a result, we encourage future studies to look into the external internal and enablers that cause entrepreneurs to react (in)adequately to the situational conditions that the pandemic bring about.

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## Supply Chain Leagility and Performance of Humanitarian Aid Organizations in Kenya: An Effective, Efficient and Quick Way to Respond to Disasters.

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### Abstract

In today's volatile and uncertain humanitarian environment, adopting a purely lean or agile supply chain is not effective. Humanitarian organizations are struggling to obtain the highest possible performance from their supply chains by adopting various supply chain designs. This is upon realization that despite the huge chunks of money pumped into the sector, humanitarian supply chains respond in a sluggish, inefficient and poorly coordinated manner to emergencies. The purpose of this study was to explore the influence of supply chain responsiveness and waste management on performance of humanitarian aid organizations in Kenya. Survey research design was employed for this study. The study entailed a census survey of 330 humanitarian aid organizations carrying out their operations in Kenya. Questionnaires were used to collect primary data. Descriptive statistics and inferential statistics was used for data analysis. The data was presented using a combination of statistical and graphical techniques. The study findings revealed that supply chain responsiveness and waste management are positively associated with performance of humanitarian aid organizations. The findings of this study established that most humanitarian organizations had partially implemented supply chain leagility. The findings further showed the essence of the country to be prepared to reduce the effect of disasters. The culture of preparedness was lacking in the country despite increase in disaster resource allocation. The study recommended that in order to achieve a supply chain that is efficient and responsive to the needs of vulnerable people, humanitarian aid organizations should design, implement and fully adopt supply chain leagility. Humanitarian aid organizations were also recommended to embrace advanced technologies to improve their supply chain leagility.

**Keywords:** *Supply Chain Responsiveness, Waste Management, Supply Chain Leagility, Humanitarian Supply Chain*

### 1. Introduction

Supply chain management has come out as a common art with which organizations outflank each other competition wise. Organizations are making all efforts to obtain the highest possible performance from their supply chains by utilizing varied assorted means in the contemporary period (Chan, Ngai & Moon, 2017). Competitive edge can be achieved with no doubt when a company has adopted an effective supply chain strategy and design by utilizing its capabilities on supply chain to realize flexibility, rapid response and efficient cost. Several studies have come up with various supply chain designs, which are mutually exclusive or even collectively exhaustive such as the efficient versus responsive (Manning & Soon, 2016); risk hedging, and agile (Chen & Kitsis, 2017) and market of one versus mass market. There is evidence of movement from independent supply chain patterns to hybrid models such as leagile supply chain as proposed by Nakandala & Lau (2019). This backs the argument that in the current inconsistent and wavering environment, relying entirely on a purely lean or a purely agile supply chain is not guaranteed to pay off.

Conversely, natural and manmade catastrophes have substantially increased in magnitude as well as frequency in recent years. According to the United Nations, natural calamities in the coming years will increase in severity, frequency as well as damaging effect. Humanitarian supply chains are responsible for provision of services in emergencies during disasters by availing food, shelter, medicine, water and sanitation (Montz, Tobin & Hagelman, 2017). When disaster containment is involved, time is an important factor as time saved means lives saved (Apte, Goncalves & Yoho, 2016). Since 80% of disaster and relief operations involve supply chains, proper chain management concepts offer possibilities to increase efficiency and effectiveness of humanitarian operations (Papadopoulos *et al.*, 2017).

Worldwide, supply chain experts are in persistent quest for new and inventive methods for building productive and successful supply chains designs that will adjust to quick changes in catastrophic situations. One such design commonly adopted by humanitarian supply chains, all-inclusive is the use of leagile principles in supply chains (Datta, 2017). The leagile supply

chain is a hybrid of lean concept and agile paradigm to form a common supply chain design (Nayak & Choudhary, 2020). The development of lean concept is credited to Toyota Company and largely the Toyota Production Systems. Lean aims at doing more with less (Mostafa & Dumrak, 2017). The lean concept is essentially a combination of administrative operations with emphasis on eradication of waste in the production process inside and beyond organizations (Bortolotti *et al.*, 2016). Biazzo, Panizzolo and Crescenzo (2016) were of the view that basic principles of lean entails identifying, creating value as well as alleviating waste and generating flow. The agility paradigm, which evolved from flexible manufacturing systems, focuses on the integration of the organization's suppliers, business procedures, buyers and commodity consumption and disposition (Abdi, Labib, Edalat & Abdi, 2018).

An agile supply chain due to its ability to dependably meet market demands, at the same time minimize expenditure, and lowering security risks better suits a changing and unpredictable business environment. This integrates flexibility as pertains to both resources and coordination of activities (Gligor *et al.*, 2019). Attainment of resource and coordination flexibility make it possible for organizations to address the increasing environmental and operational unpredictability (Teece, Peteraf & Leih, 2016). Thus, when talking of agility, the focus is on responding to unexpected changes in a volatile marketplace within a useful timeframe, denoting flexibility, speed, responsiveness and quality as elements of agility.

Though lean and agile principles have been used within supply chains for some time, in practice leanness does not imply agility. When markets are volatile or uncertain like in the humanitarian context, leanness should be blended with agility into a hybrid leagile strategy to create a more responsive supply chain that will deliver aid in an effective and efficient manner. Lean paradigm function optimally in a predictable demand, where accurate forecast can be made. Through elimination of all forms of waste, lean systems have high competitive edge base on quality and cost. The agility is a much diverse concept, which needs participation of the whole organization, logistics processes and information systems (Christopher, 2016). The agile supply chain makes organization to respond effectively in situations where there is unstable customers demand and a highly volatile market. Lean and agile paradigms have attracted substantial interests currently forcing industries globally to upgrade their systems to the paradigms for purposes of fostering their performance (Christopher, 2016). The contemporary market trends call for a more practical proposition that assimilate the promising facets of both lean and agile structures. Through this inspiration, leagility paradigm has developed as features of the two paradigms have been combined for a robust strategy.

According to Namagembe (2020), humanitarian entities participate majorly in two forms of activities; relief and development activities. Despite the huge chunks of money pumped into humanitarian sector, stringent oversight by donors and expectations from vulnerable populations, humanitarian supply chains still respond in a sluggish, inefficient and poorly coordinated manner to emergencies (Paul, 2019). Mark you, about 80% of disaster and relief operations are related to supply chains (Maghsoudi, Zailani, Ramayah & Pazirandeh, 2018). The poor performance of humanitarian aid organizations is attributed to poor management of supply chain operations (Bealt *et al.*, 2016). Thus, the inference that humanitarian aid organizations are performing way below the expected levels.

Sinha (2019) supports this by concluding that 50% of humanitarian aid organizations have non-performing supply chains. This study aimed at bringing efficiency and effectiveness into humanitarian sector by looking into the concept of supply chain leagility. Predominantly, the concept was discussed in the context of commercial supply chains (Fadaki, Rahman & Chan, 2019) and only a few academicians and practitioners have linked supply chain leagility to humanitarian operations (Kuria & Chirchir, 2014; Purvis *et al.*, 2016; Koori & Chirchir, 2017). Qamar and Hall (2018) found that the two paradigms of lean and agility could not co-exist (mutually exclusive) where else Purvis *et al.* (2016) described them as complementary concepts. The concept of supply chain leagility has been globally accepted (Galankashi & Helmi, 2016). A number of humanitarian aid organizations have adopted leagility design despite its poor documentation limiting its full adoption, to increase efficiency in their supply chains (Ponnusamy, 2019). Concisely, the employment of the leagility concept is still immature and a comprehensive overview of the concept barely exists. Previously the lean and agile paradigms have been studied separately creating the need to study them as a hybrid design and supportive of each other. This therefore creates a gap for a specific study that focuses exclusively on supply chain leagility.

**Objectives of the Study**

The general objective of this study was to determine the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya. The specific objectives for this study were:

- i. To examine the influence of supply chain responsiveness on the performance of humanitarian aid organizations in Kenya.
- ii. To determine the influence of waste management on the performance of humanitarian aid organizations in Kenya.

**Research Hypotheses**

- i. **Ho:** Supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya.
- ii. **Ho:** Waste management does not significantly influence the performance of humanitarian aid organizations in Kenya.

**Conceptual Framework**

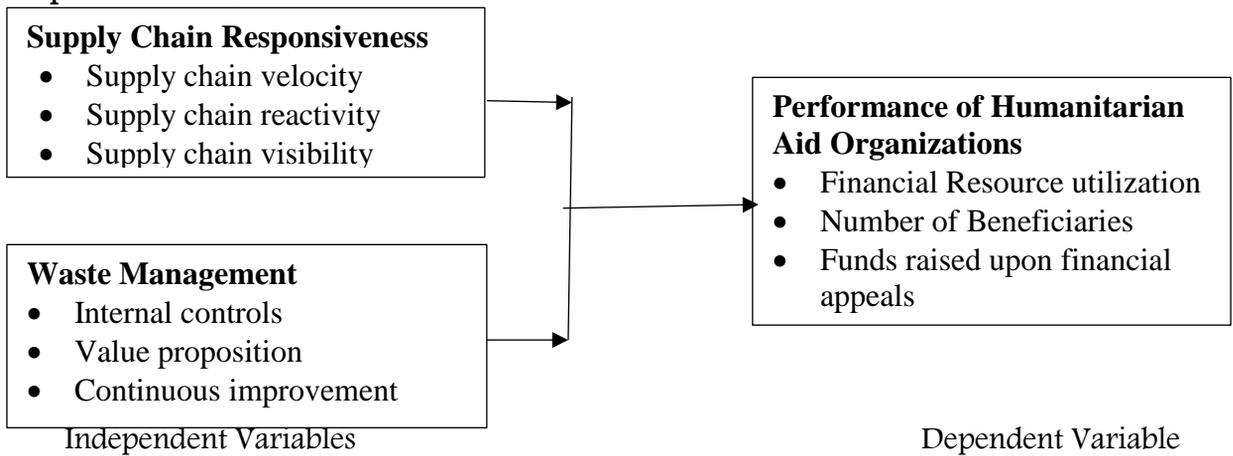


Figure 1: Conceptual Framework

**2. Methodology**

A survey research design was employed for this study. This research design is appropriate where large population geographically spread is involved which was the case in this study. The design enabled the study to apply both qualitative and quantitative research approaches as observed by Rahi (2017) that the two approaches reinforce each other. The target population of this study was 330 humanitarian aid organizations carrying out their operations in Kenya as derived from the NGO Coordination Board of Kenya (2018). This study was a census examining the entire population (Mujere, 2016), supply chain managers in this case, that have a particular set of characteristics such as specific experience, knowledge, skills or exposure to an event. Questionnaires were used to obtain primary data for the study. The questionnaires contained structured and semi-structured questions that captured the various variables of the study. The questionnaires were hand delivered by research assistants to the respondents using drop and pick technique. Concerning the qualitative aspects of the study (open-ended questions), the authenticity of the findings was considered primal thus the researcher hoped that respondents would be truthful by avoiding giving distorted accounts of events surrounding supply chain leagility.

With the study being quantitative and qualitative in nature, both descriptive statistics and inferential statistics was employed. The study adopted inferential data analysis in order to enable it make suppositions that extend beyond the immediate data alone to infer from the sample data about the whole population (Trafimow, 2017). The study used SPSS version 24 to facilitate the analysis of data. Inferential data analysis was done using Pearson correlation coefficient and regression analysis. Data was also analyzed using descriptive statistics; measures of central tendency, measures of dispersion and measures of symmetry and inferential statistics. Linear regression analysis revealed the correlation and strength of the relationship between both independent and dependent variables.

Analysis of Variance also sought to test the goodness of fit of the regression models and finally to test the hypothesis of the regression models. Data collected from open-ended questions was analyzed qualitatively through content analysis. The information was presented using a

combination of statistical techniques and graphical techniques. The hypothesis was tested by running an Ordinary Least Square regression model for the combined sub-constructs of each independent variable against the combined measures of the dependent variable. The acceptance/rejection criteria was that, if the P-value is greater than 0.05, the study fails to reject the  $H_0$  but if P-value is less than 0.05, the  $H_0$  is rejected.

### 3. Research Findings and Discussions

Descriptive analysis was used to describe the basic features of the data in the study providing a summary about the sample and the measure thus helping in simplifying massive amounts of data in a sensible and convenient style. It expressed the variables in frequencies, percentages, means and standard deviation. The study analyzed descriptive statistics for all the study variables.

#### Supply Chain Responsiveness

The study sought to examine the influence of supply chain responsiveness on performance of humanitarian aid organizations in Kenya. This objective was measured using the following indicators: supply chain velocity, supply chain reactivity and supply chain visibility in the opinion statements given. Respondents were asked to indicate the extent to which supply chain responsiveness influenced performance of humanitarian aid organizations in Kenya. This was based on a likert scale of not at all, small extent, moderate, large extent and very large extent. Therefore, in this study, a scale of not at all and small extent implied disagree while large and very large extent implied agreement. The results were expressed as percentages, mean and standard deviation as indicated in Table 1 below.

**Table 1: Descriptive Analysis of Supply Chain Responsiveness**

Statements on Supply Chain Responsiveness	1 %	2 %	3 %	4 %	5 %	Mean	Std Dev
Our supply chain evaluates, considers and covers needs quickly by providing basic essentials to alleviate suffering people.	0	0	24. 1	51. 7	24. 1	4.00	0.69 6
The supply chain has an element of visibility enabling the view of the movements along the supply chain, including identity, location and status of transit together with planned and actual dates and times for the events	0	0	20. 7	55. 2	24. 1	4.03	0.67 0
Leagility enables reliability of supply chains	0	0	20. 7	48. 3	31	4.10	0.71 3
The ability of humanitarian organizations to respond quickly to emergencies might be challenging due to issues of resources, funding and lack of information	0	0	3.4	51. 7	44. 8	4.41	0.55 9
A guarantee of the humanitarian supply chain to quickly deliver is a real selling point if that order arrives quickly, accurately and complete otherwise its termed as waste.	0	0	13. 8	51. 7	34. 5	4.21	0.66 4
Our organization has a close partnership with suppliers that enables delivery of requested supplies within the requested time and place especially when handling a disaster or an emergency	0	0	3.4	41. 4	55. 2	4.52	0.56 5
Our supply chain has high degree of flexibility in terms of assembling and transportation structure to meet the needs of suffering people	0	0	17. 2	44. 8	37. 9	4.21	0.71 5

Key: 1-Not at all; 2-Small Extent; 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent

Majority of the respondents (75.8%) agreed that humanitarian supply chains evaluate, consider and covers needs quickly by providing basic essentials to alleviate suffering of vulnerable people while 24.1% indicated moderate extent. Large number of respondents (79.3%) agreed that their supply chain has an element of visibility enabling the view of the movements along the supply chain, including identity, location and status of transit together with planned and actual dates and times for the events as 20.7% moderately agreed. Elsewhere, 79.3% of the respondents agreed that leagility enables reliability of humanitarian supply chains while 20.7% moderately agreed that reliability is enabled by leagility design of the supply chains. The ability of humanitarian aid organizations to respond quickly to emergencies might be challenging due to issues of resources, funding and lack of information as indicated by 96.5% of the respondents who agreed and 3.4% of the moderate responses. Majority of the respondents (86.2%) agreed that, a guarantee of the humanitarian supply chains to quickly deliver is a real selling point if that order arrives quickly, accurately and complete otherwise it is termed as waste while 13.8% moderately agreed.

Respondents were asked to indicate whether humanitarian aid organizations had a close partnership with suppliers that enables delivery of requested supplies within the requested time and place especially when handling a disaster or an emergency, 96.6% and 3.4% agreed and moderately agreed respectively to the statement. Lastly, majority of the respondents (82.7%) agreed that supply chain has high degree of flexibility in terms of assembling and transportation structure to meet the needs of suffering people as 17.2% indicated moderate.

In general, the findings in Table 1 found out that humanitarian aid organizations in Kenya have supply chains that are designed to be responsive to the needs of vulnerable populations. The humanitarian supply chain are designed to evaluate, consider and cover needs quickly while enabling a view of the movements along the supply chain. Further to increase the element of supply chain velocity and reactivity, humanitarian aid organizations have established close relationships with suppliers in the effort to improve responsiveness. The humanitarian supply chains are also designed to be flexible to meet the needs of vulnerable people in aspects of transportation, assembling and dispatch. However, the ability of humanitarian aid organizations to respond quickly to emergencies and disasters is a challenging task influenced by the various challenges facing humanitarian supply chains such as lack of information, insufficient resources and poor funding. This means that despite the supply chains being designed to be responsive to emergencies, there is still an element of sluggishness in most humanitarian supply chains in Kenya resultant from the challenges faced. This shows lack of preparedness by humanitarian aid organizations in responding to emergencies and disasters.

Preparedness entails all the activities undertaken before a disaster occurs that enhance the readiness of humanitarian organizations and the society to counter the emergency. Preparedness measures are crucial as they minimize the time spent in undertaking the immediate response and increase the odds of quick recovery. During the preparation phase, hazards/risks are acknowledged and strategies designated to address response and recovery necessities. The findings of this study concurred with Rodríguez-Espíndola, Chowdhury, Beltagui and Albores (2020) study that established the humanitarian supply chain management challenges as delayed delivery of the appropriate products, faulty information integration and uncertainty in demand among others.

### **Waste Management**

The study sought to determine the influence of waste management on performance of humanitarian aid organizations in Kenya. This objective was measured using the following indicators: internal controls, value proposition and continuous improvement in the opinion statements given. Respondents were required to indicate the extent to which waste management influenced performance of humanitarian aid organizations in Kenya. This was on a likert scale of not at all, small extent, moderate, large extent and very large extent. Therefore, in this study the scale of Not at all and small extent meant disagree while large and very large extent meant agreed. The results were expressed as percentages, mean and standard deviation as shown in Table 2 below.

**Table 2: Descriptive Analysis of Waste Management**

<b>Statements on Waste Management</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>Std Dev</b>
	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>		
Leagility creates checks and balances that improves waste Management process.	0	0	34.5	51.7	13.8	3.79	.664
Leagility enables systems use and improve waste management	0	3.4	20.7	37.9	37.9	4.10	.846
Through waste management practices, the organization have a better value proposition	0	3.4	13.8	31.0	51.7	4.31	.836
Waste management practices are continually improved	0	0	13.8	51.7	34.5	4.21	.664
Our supply chain emphasizes on reduction of waste of resources by identifying non-value adding activities and eliminating them.	0	3.4	13.8	55.2	27.6	4.07	.741
Wastes in the supply chains may include overproduction, waiting, transport, unnecessary motion, inappropriate processing, unnecessary inventory and defects.	0	3.4	20.7	34.5	41.4	4.14	.861
Minimization of waste or loss of product enhances resource utilization	0	3.4	27.6	31	37.9	4.03	.891
The organization has managed to eliminate non-value adding operations in the supply chain	3.4	3.4	17.2	48.3	27.6	3.93	0.946

Key: 1-Not at all; 2-Small Extent; 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent

Majority of the respondents (65.5%) agreed that leagility creates checks and balances that improves waste management process in supply chains as 34.5% moderately agreed that leagility design of supply chains provides for checks and balances. A large number (75.8 %) of respondents agreed that leagility enables systems use and improve waste management. 20.7% moderately agreed as 3.4% of the respondents disagreed that leagility enables systems use and improvement of waste management. Respondents agreed (82.7%) that through waste management practices humanitarian aid organizations have better value propositions. 3.4% of the respondents disagreed as 13.8% moderately alluded to the statement. The practice of waste management in humanitarian aid organizations is continuous improved as indicated by 86.2% and 13.8% of the respondents who agreed and moderately agreed respectively.

Majority of the respondents (82.8%) agreed that humanitarian supply chains emphasize on reduction of wastage of resources by identifying non-value adding activities and eliminating them. 13.8% moderate responded while 3.4% disagreed on the emphasize. Respondents were asked to respond on the various types of wastes in humanitarian supply chains and 75.9% of the respondents agreed that overproduction, waiting, transport, unnecessary motion, inappropriate processing, unnecessary inventory and defects are the common types of waste in supply chains as 20.7% moderately agreed and 3.4% disagreed with the assertion. A large number of respondents (68.9%) also agreed that minimization of wastes enhances resource utilization. Lastly, most humanitarian aid organizations (75.9%) had managed to eliminate non-value adding operations in their supply chains as indicated in the findings as 17.2% moderately responded. Still 6.8% of the organizations were yet to eliminate non-value adding operations in their humanitarian supply chains.

Based on the study findings in Table 2, leagility is an essential design of waste management in humanitarian supply chains. Leagility design creates checks & balances and enables systems use improving waste management. Waste management is a continuous exercise in humanitarian aid organizations involving identification of non-value adding activities in the supply chains and eliminating them. Majority of the organizations had managed to eliminate the non-value adding operations in their supply chains but still some humanitarian aid organizations were yet to. Overproduction, waiting, transport, unnecessary motions, inappropriate processing, unnecessary inventories & defects, theft, misappropriation, poor tracking and control as well as product deterioration were identified as the common types of wastes in humanitarian supply chains. Minimization of such wastages enhances resource utilizations in the organizations. Most humanitarian supplies fall into the relief items category that face specific challenges related to in-kind donations ranging from storage and transportation bottlenecks that bring about inefficiency.

The findings of this study agree with Iyengar and Bharathi (2018) study of analysis of lean, agile, and leagile supply chains that waste management is an important aspect of leagility supply chain. To eliminate wastes from all the elements of the supply chain calls for continuous improvement processes. Hassani, Ceaușu and Iordache (2020) on the other hand in their study on lean and agile model implementation for managing the supply chain found that volatile and unpredictable environments demand supply chains that minimize waste and ensure flexibility, as was the case in the findings of this study.

### **Qualitative Analysis**

Thematically, recurrent themes were drawn from qualitative responses received from the supply chain managers. As many potential themes as possible were manually coded for purposes of establishing patterns.

### **Supply Chain Responsiveness**

Exploration of the views of supply chain managers on supply chain responsiveness was conducted using three items on research instrument. First, the various disasters that disrupt communities triggering the need for supply chain responsiveness. Secondly, the strategies humanitarian aid organizations adopt to make their supply chains more responsive. Lastly, respondents were asked to identify the driving forces making humanitarian aid organizations design their supply chains to be responsive to societal needs.

The study sought to determine the various disasters and situations triggering the need for supply chains to be responsive by disrupting communities at large in Kenya. The findings indicated that Kenya has been subjected to various disasters, which are classified on basis of origin and cause as either manmade (anthropogenic) or natural in nature. Commonly identified natural disasters included disease outbreaks, plagues/invasions, floods, landslides/mudslides, droughts and famine. Additionally, though utterly devastating but

occurring less frequently in Kenya, other natural disasters (geographic in nature) include earthquakes and volcanic eruptions. Manmade disasters, commonly known as anthropogenic disasters because they occur from human activities, can be categorized into technological, sociological and transportation disasters. Common manmade disasters identified included structural/buildings collapse, chemical leaks, spillovers, manmade fires, terrorist activities, human conflicts, traffic accidents and politically instigated violence.

Four themes commonly emerged from the participating supply chain managers concerning the strategies adopted in increasing supply chain responsiveness. Modularity emerged as a strategy to increase supply chain responsiveness in humanitarian aid organizations. Modularization in supply chain management refers to division of a greater whole to interchangeable parts that fit together seamlessly and together in many different combinations and permutations make many different wholes. (Micheli, Trucco, Sabri & Mancini, 2019). Other strategies commonly identified from the views of supply chain managers to increase responsiveness in humanitarian supply chains were shortened lead-times, Transport and capacity planning and the postponement strategy. The driving forces making humanitarian aid organizations to design responsive supply chains emerged as the need to rescue lives, pressure from donors and the increased number of disasters and emergencies in the contemporary period.

### **Waste Management**

An examination of waste management practices in humanitarian aid organizations was conducted using open-ended questions to the supply chain managers. Two items were used seeking the various forms of wastes in humanitarian supply chains and the mechanisms humanitarian aid organizations employ to minimize wastes in their supply chains. There is a lot of wastage associated with humanitarian aid because the development of incessant supply chains has been ignored.

Forms of wastes in humanitarian supply chains emerging from the views of supply chain managers include corruption and diversion of funds. With the circumstances existing in most donor-funded humanitarian aid organizations, funds allocated for emergency response are prone to corruption as an external factor. Other ways of diversion of funds identified were sale of goods intended for relief and distribution of relief items to people to whom the aid is not intended in exchange for payment. Delaying the spending of emergency funds on the purpose they are meant for and investing them in the meantime. Those involved then pocket the earned profits. Certainly, the findings of this study support Bader (2020) findings that diversion of aid funds largely reduces the quantity, quality and appropriateness of assistance for the needy and instead serve the interests of hidden target groups to whom the aid was never meant. Concisely, disasters and pandemics provide a smokescreen for dubious transactions for personal benefit with no or little scrutiny. This explains the increase in money-minting schemes by disasterpreneurs.

Mechanisms of addressing supply chain wastage in relief operations identified included the eradication of import and tax fees. Furthermore, punishments were imposed for misuse of services, cancellations had to be done the soonest possible, and a binding clarification made. It was further declared that communication was to be made any time a service needed to be made. This is to avoid concentrating aid in some places while leaving others out. Checks and balances also emerged to be a control against theft and use of goods made for vulnerable people for private gains. Other internal control mechanisms include audits boosting effective resource utilizations.

### **Correlation of Study Variables**

Table 3 illustrates the correlation matrix between the independent variables. Correlation is essentially a tool for determining how a collection of variables relate thereby facilitating the testing for multicollinearity. That the correlation values are not close to 1 or -1 is an indication that the factors are sufficiently different measures of separate variables (Gogtay & Thatte, 2017). It also implies that the variables are not multicollinear. When there is no multicollinearity, the study is able to utilize all the independent variables.

**Table 3: Results for Correlation of Study Variables**

	Performance of HAOs	SCR	WM
Performance of HAOs	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	290	

Supply Chain Responsiveness	Pearson Correlation	.765**	1	
	Sig. (2-tailed)	0.000		
	N	290	290	
Waste Management	Pearson Correlation	0.661**	0.31	1
	Sig. (2-tailed)	0.000	0.062	
	N	290	290	290

\*\* . Correlation is significant at the 0.01 level (2-tailed); \* . Correlation is significant at the 0.05 level (2-tailed).

Correlation coefficient ranges from -1.00 to +1.00. The value of -1.00 signifies a perfect negative correlation whereas a value of +1.00 represents a perfect positive correlation. A value of 0.00 implies the absence of any relationship among variables being tested (Akoglu, 2018). The results show presence of a positive and significant relationship between supply chain responsiveness and waste management as proved by the p-value and the correlation coefficient ( $r=0.310$ ,  $p<0.05$ ). Usually waste within the supply chain makes the supply chain sluggish to react and respond to societal needs. Inefficiency in activities because of failed coordination results in poor responsiveness and time wastage in the acquiring of the items needed for a particular disaster.

### Regression Analysis Results

The research used regression analysis to establish the linear statistical relationship between independent and dependent variables of this study. The two hypotheses as stated in this study were tested using regression models.

#### a) Test of Hypothesis 1: Supply Chain Responsiveness and Performance of HAOs

A correlation analysis for the construct, supply chain responsiveness was conducted to find out how supply chain responsiveness correlated with performance of HAOs. Correlation coefficient can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation whereas that of +1.00 represents a perfect positive correlation. A value of 0.00 indicates absolute absence of a relationship between variables being tested (Akoglu, 2018). Table 4 shows that the Pearson correlation coefficient was 0.765. These findings indicate that there is a strong positive linear relationship between supply chain responsiveness and performance of HAOs.

**Table 4: Correlation Analysis for Construct Supply Chain Responsiveness**

Variables		Performance of HAOs	Supply Chain Responsiveness
Performance of HAOs	Pearson Correlation	1	.765**
	Sig. (2-tailed)		.000
	N	290	290
Supply Chain Responsiveness	Pearson Correlation	.765**	1
	Sig. (2-tailed)	.000	
	N	290	290

\*\* . Correlation is significant at the 0.01 level (2-tailed); \* . Correlation is significant at the 0.05 level (2-tailed).

The researcher conducted regression analysis to examine the influence of supply chain responsiveness on the performance of HAOs. The hypothesis to test for this specific objective was:

**H<sub>0</sub>:** Supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya.

The histogram in Figure 2 indicates that the data was normally distributed. The residual describes the error in the fit of the model to the  $i^{\text{th}}$  observation  $y_i$  and are used to provide information about the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance and in determining whether additional terms in the model would be useful.

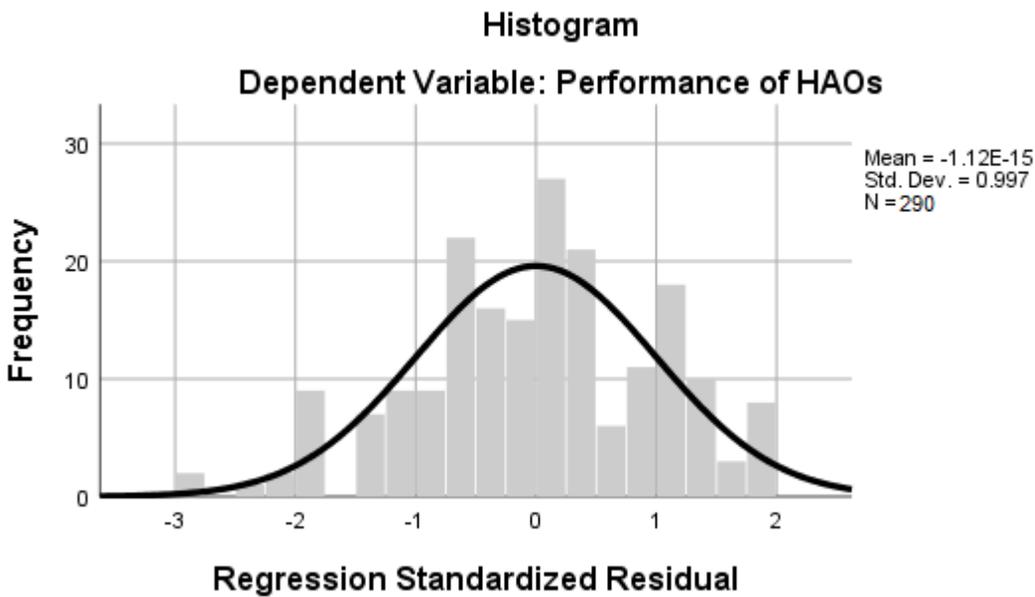


Figure 2: Histogram supply chain responsiveness on performance of HAOs

The linear regression model shows  $R^2=0.585$  which means that about 58.5 percent of the total variance in the performance of HAOs in Kenya can be explained by supply chain responsiveness. The result is shown in Table 5.

Table 5: Model Summary of Supply Chain Responsiveness

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.765 <sup>a</sup>	.585	.579		.74484

a. Predictors: (Constant), Supply Chain Responsiveness;

Further test on the ANOVA shows that the significance of the F-statistic ( $p<0.05$ ) is less than 0.05 as indicated in Table 6. This is an implication that supply chain responsiveness has a significant influence on performance of HAOs.

Table 6: ANOVA of Supply Chain Responsiveness

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.439	1	7.439	12.099	.000 <sup>b</sup>
	Residual	177.081	288	0.615		
	Total	184.52	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

b. Predictors: (Constant), Supply Chain Responsiveness

Presented in Table 7 are the coefficients and t-statistic of the resulting model. The constant term  $\beta_0 = 5.77$ , implies that if supply chain responsiveness is held constant, then there will be a positive performance of HAOs in Kenya by 5.77. The regression coefficient for supply chain responsiveness was positive and significant ( $\beta_1 = 0.224$ ,  $p<0.05$ ), with a t-value of 3.556. This implies that for every unit increase in supply chain responsiveness, performance of HAOs is predicted to increase by 0.224 units.

Table 7: Coefficients of Supply Chain Responsiveness

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.770	0.477		12.101	0.000
	Supply Chain Responsiveness	0.224	0.063	0.765	3.556	0.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

**Performance of Humanitarian Aid Organizations = 5.770 + 0.224 Supply Chain Responsiveness**

From the results in Table 4 to Table 7 above, the null hypothesis that supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya, is rejected. This result revealed that supply chain responsiveness contributes positively towards performance of HAOs in Kenya. Humanitarian organizations normally operate in unstable environments, necessitating strategies that enhance their response to risks and uncertainties in demand, supply and processes (Jahre, 2017). This calls for readiness, swift disposition of the needed resources, and capacity to cope proficiently in different settings. Extant research (Ganguly, Padhy and Rai, 2017; Behl and Dutta, 2019; Agarwal, Kant and Shankar, 2019) argue that the operational performance of humanitarian supply chains relies on their ability to respond swiftly to the needs of vulnerable populations and undertake dynamic operations. For this to be possible, humanitarian supply chains must be responsive, amenable and efficient. Sharing the same view is Munyoro (2020) emphasizing that proper response to the humanitarian needs in case of disasters is considered to be mitigation and satisfying the initial and vital needs of the survivors and thus must be done in the shortest time using the least amount of the resources to reduce the terrible effects of the disaster.

**b) Test of Hypothesis 2: Waste Management and Performance of HAOs**

A correlation analysis for the construct waste management was conducted to establish how waste management correlated with performance of HAOs. Table 8 shows that the Pearson correlation coefficient was 0.661. |These findings indicate the presence of a strong positive linear relationship between waste management and performance of HAOs

**Table 8: Correlation Analysis for Construct Waste Management**

Variable		Performance of HAOs	Waste Management
Performance of HAOs	Pearson Correlation	1	.661*
	Sig. (2-tailed)		.000
	N	290	290
Waste Management	Pearson Correlation	.661**	1
	Sig. (2-tailed)	.000	
	N	290	290

\*\* . Correlation is significant at the 0.01 level (2-tailed); \* . Correlation is significant at the 0.05 level (2-tailed).

Regression analysis was conducted to determine the influence of waste management on the performance of HAOs. The hypothesis to test for this specific objective was:

**H<sub>0</sub>:** Waste management does not significantly influence the performance of humanitarian aid organizations in Kenya.

The histogram in figure 3 indicates that the data was normally distributed. The residual describes the error in the fit of the model to the  $i^{th}$  observation  $y_i$  and are used to explain the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance, and in determining whether additional terms in the model would be useful.

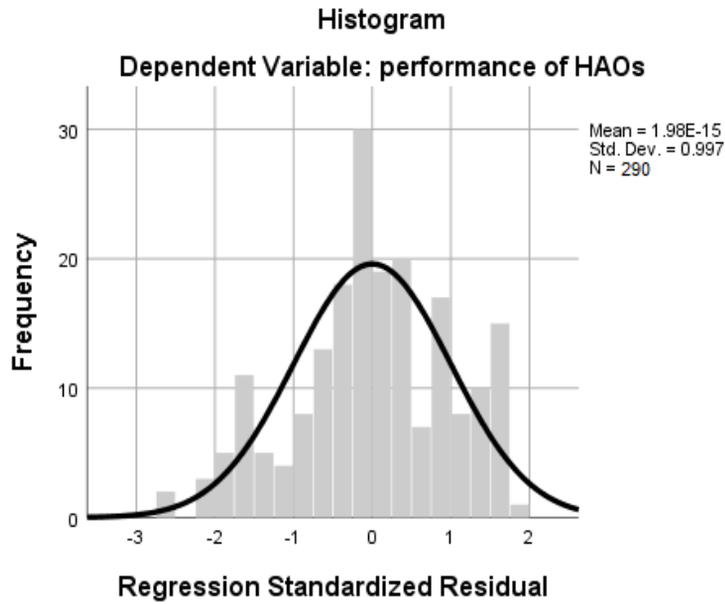


Figure 3: Histogram Waste management on performance of HAOs

Presented in Table 9 is the model summary of regression of waste management on performance of HAOs. The results show  $R^2=0.436$  which means that about 43.6 percent of the total variation in the performance of HAOs in Kenya can be attributed to waste management.

**Table 9: Model Summary of Waste Management**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661 <sup>a</sup>	.436	.427	.78413

a. Predictors: (Constant), Waste Management

b. Dependent Variable: Performance of Humanitarian Aid Organizations

Further test on the ANOVA shows that the regression model involving performance of HAOs as the dependent variable and waste management as the predictor, is very significant at 5% level of significance ( $F$ -statistic=35.587,  $p<0.05$ ), as indicated in Table 10. This is an implication that waste management has a very significant influence on the performance of HAOs.

**Table 10: ANOVA of Waste Management**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.743	1	19.743	35.587	.000 <sup>b</sup>
	Residual	159.777	288	.555		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

b. Predictors: (Constant), Waste Management

Further, Table 11 presents the coefficients and t-statistic of the resulting model. The constant term  $\beta_0 = 4.490$ , implies that if waste management is kept constant, then there will be a positive performance of HAOs in Kenya by 4.490. The regression coefficient for waste management was positive and significant at 5% level of significance ( $\beta_1 = 0.547$ ,  $p<0.05$ ), with a t-value of 5.965. This is interpreted to mean that for every unit increase in waste management, performance of HAOs is predicted to increase by 0.547 units.

**Table 11: Coefficients of Waste Management**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	4.490	.376		11.949	.000
	Waste management	.547	.092	.661	5.965	.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

From the results in Table 8 to Table 11 above, the null hypothesis that waste management does not significantly influence the performance of humanitarian aid organizations in Kenya, is rejected. This result revealed that waste management contributes positively towards performance of HAOs in Kenya. The findings of this study are in line with Balle, Jones, Chaize and Fiume (2017) that for organizational effectiveness and for gaining competitive advantage in cost, it is necessary for the organization to eliminate waste. In general, waste is the failure to add, or is a barrier to adding, value for the customer/beneficiary.

### Conclusion

From the study findings, it could be concluded that supply chain responsiveness had a positive significant influence on performance of humanitarian aid organizations in Kenya. The study showed that there was a strong relationship between supply chain responsiveness and performance of HAOs. The findings of the study revealed that humanitarian aid organizations in Kenya have supply chains designed to be responsive to the needs of vulnerable populations. The humanitarian supply chains are designed to evaluate, consider and cover needs of vulnerable people quickly while enabling a view of the movements of materials along the supply chains. However, the ability of humanitarian supply chains to respond quickly to emergencies and disasters is a challenging task influenced by various challenges facing humanitarian supply chains. This means that despite the supply chains being designed to be responsive to emergencies, there is still an element of sluggishness in most humanitarian supply chains in Kenya resultant from the challenges faced. This shows lack of preparedness by humanitarian aid organizations in responding to emergencies and disasters. Supply chain responsiveness reduces the time taken to respond to emergencies hence saving many lives and improving resource utilizations by the aid organizations.

Equally, it could be concluded that waste management had a positive influence on performance of humanitarian aid organizations. Waste management is a continuous exercise in humanitarian supply chains involving identification of non-value adding activities in the supply chains and eliminating them. Minimization of wastages enhances resource utilizations in the organizations. Majority of the organizations had managed to eliminate the non-value adding operations in their supply chains but still some humanitarian aid organizations were yet to. One of the major objectives of humanitarian supply chains is adeptness and scaling down the use of rare resources, as this goes against the aim of humanitarian supply chains of saving as many lives as possible. Internal control mechanisms including audits boost effective resource utilizations. Concisely, most humanitarian aid organizations had partially implemented leagility design in their supply chains knowingly or unknowingly. Despite the implementation of supply chain leagility, humanitarian aid organizations still witnessed elements of sluggish response, wastage in the supply chains and disruptions of the chains, all affecting the efficient and effective handling of emergency assistance.

### Recommendations of the Study

Humanitarian aid organizations operate in a volatile, uncertain, complex and ambiguous environment due to changing needs of vulnerable people. To achieve and sustain a supply chain that is responsive to the changing needs and volatile environment, there is a need for organizations to design and implement a supply chain that incorporates agility and lean operation across the value chain. Humanitarian aid organizations are recommended to improve their supply chain leagility by exploring and adopting advanced and emerging technologies such as big data analytics, internet of things, cloud computing, machine learning, artificial intelligence and block chain. Furthermore, it is advisable for humanitarian aid organizations to explore hybrid supply chain approach that allows it to switch between agile and lean depending on market dynamics and environment.

It is paramount that Kenya stays prepared to minimize the effect of calamities on people and sources of livelihood. While resource allocations for disaster preparedness are increasing, the culture of preparedness in Kenya is lacking. There is no legal framework and no clear coordination across different types of disaster or across actors. Developing Standard Operating Procedures containing many types of disasters is a vital approach that should be prioritized by the Kenyan government. Operating hand in hand with implementing agencies ensures all parties benefit from preparation. Once formulated, these procedures should be restructured from time to time to replicate new observations and internal and external changes.

The findings of this study established that most humanitarian aid organizations had knowingly or unknowingly partially implemented leagility design in their supply chains. This study therefore recommends that supply chains managers should fully adopt leagility design in their humanitarian supply chains. The supply chain professionals should establish strategic collaborative working partnerships and agreements with industry players and experts for example seasoned global freight forwarders, ocean carriers, airlines, overland transporters, critical suppliers and all other humanitarian supply chain actors to allow expertise and near precision responsiveness to needs. Each one of these players apply their operational expertise, assets and networks to what they do best hence creating a leagile supply chain.

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## Relationship Between Supplier Relationship Management and Implementation Level of Public Procurement Regulatory Framework in the Devolved Governments in Kenya

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### Abstract

*Purpose:* The purpose of this study was to establish the relationship between supplier relationship management and implementation level of public procurement regulatory framework in the devolved governments in Kenya.

*Methodology:* The study adopted census because of the small size of the population. A structured questionnaire was used as a data collection tool. The study also undertook a pilot test on the instrument's reliability and validity in the 3 counties; Nyamira, Kisii, Homa-Bay Counties where nine (9) respondents were engaged in the pilot study. The use of descriptive and inferential statistics for data analysis was considered. Study engaged the key informers from the 44 county Governments who positively responded hence achieving 100% response rate. The statistical tests were also done in the study. Presentation of data was in form of charts and tables as deemed appropriate.

*Results:* The findings obtained indicated that there was significant relationship between supplier relationship management on level of implementation of public procurement regulatory framework in the devolved governments in Kenya. The findings were found to be positively significant as the p-values 0.00000 which were less than 0.05. The findings indicated that for every unit of supplier relationship management the value of implementation level of public procurement regulatory framework in the devolved governments in Kenya changes with a positive significance increase of 1.105 in the presence of a moderator.

*Unique contribution to theory, practice and policy:* The study recommended that the devolved governments functions should embrace supplier's commitment level on quality of goods and services in their operations such as information sharing between the buyer, improve on their commitment on suppliers' payment, increase commitment level in supplier partnership and development to improve the supplier's commitment level and value addition or creation in service delivery.

**Key words:** *Supplier Relationship Management, Public Procurement, Regulatory Framework Devolved Governments*

### 1.0 INTRODUCTION

Supplier Relationship Management is a way and form of interacting with suppliers (Calvinato, 2012). Supply chain specialist viewed supplier relationship management to be a structured system approach in defining what they expect from a supplier and managing the links between the companies to achieve the desired needs. SRM plays an important role between the organization and the end user. Several Organizations have challenges within their chains of networks hence loss of business. It is advisable for such organizations to consider and adopt Supplier relationship management practice to increase their efficiency in the supply chain. Hughes (2010) states that inefficient and ineffective in the supply chains process are major causes of inadequacy in the organization achieving its set goals. He further insists that organizations with integrated supply chains network process posted a high profit than those who paid less attention to supply chains process.

Al-Abdallah and Aynman (2014) conducted a study on SRM impact on competitive performance of manufacturing firms in four countries, Japan, Korea, USA, and Italy. They revealed that buying firms improved the performance through relationship management with suppliers. The study findings showed that companies cannot only depend on the inner system to achieve higher productivity. Kepher and Ismael (2015) carried out research on the role of Supplier Management on Procurement Performance in Manufacturing Sector in Kenya. They recommended that EAB should review its buyer supplier integration to improve procurement performance. They further stated that EAB should improve its Supplier Training in promoting information sharing and supporting its ERP systems.

EABL should maintain or if possible, improve its Supplier collaboration in regards to forecasting, flexibility and having a contingency management system. The study further recommends that EABL should utilize procurement practices to strengthen its quality control. Nyamasege and Biraori (2015) researched on effect of SRM on effective of SCM in public

sector. They revealed that to manage supplier relationship the ministry should insist on centralized use of items. Also, the PEs to develop supplier base activities such as delivery schedules, complaints, quality management processes. Procurement officers should enhance communication standards with its suppliers. They further recommended that the interaction should provide suppliers on how information and flows provided.

Tangus (2015) researched on impact of SRM on performance of manufacturing firms in Kisumu County. Findings were the need for organization to establish supplier development programs to encourage firms to be interested in programs that enhance productivity of the supplier, hence higher performance of the organization are realized. Performance of firms may be improved through supplier development engagement activities. He further viewed that firms should manage strategically supplier base on basis of value of spending on items being procured. This enhances firms to be able to categorize the suppliers according to every supplier's importance. He recommended that information sharing increase productivity the firms. Therefore, production organization to share information to improve the performance.

Kitheka and Mulwa (2013) argued in the study on effect of supplier quality management on organization performance Kakamega County. They indicated that prior noticing of errors should be improved through pre-dispatch inspections so that discouragements are reduced at the customers. The top management in the supermarkets and supplier organizations should be part of the supplier quality management to eliminate frustrations in the process. According to Wachira (2013) ascertained that trust, communication, strategic supplier partnership as key supplier relationship elements in procurement productivity. This was scored by Kamau (2013) who in his finding concluded that trust, communication, commitment, cooperation to be key elements in achieving relationship objectives.

### **1.1 Statement of the Problem**

Public procurement is the platform through which most government projects are executed, hence there is a need for monitoring and evaluating the implementation processes to achieve service delivery to the citizens and realize value for money (Maurice Juma, 2015). The Commission of Revenue Allocation report 2018/2019 revealed revenues allocated to counties was about Ksh. 314 billion for development as demanded by the Constitution of Kenya 2010. Caroline (2018) argued that most county governments have been criticized and are under investigation for procurement malpractices, corruption cases, ghost projects and massive wastage of public resources due to non-compliance in the procurement processes. The PPOA, 2016 report indicates that 40% of the Procuring entities had no adequate procurement staff with enough skills to drive the procurement functions professionally in the Counties. This was confirmed by Ringa (2017) who established that majority of county procurement staff have limited knowledge and experience to undertake procurement professional roles to effectively implement procurement procedures as required by the Act and this has dealt a major setback on service delivery. The PPOA Annual Report 2017/2018 revealed an average score for all the county executives was 39.70% which is considered non-compliant of Procurement system and a high risk level of 60.30%. The audit discovered that Migori County Government failed to provide the necessary procurement documentation required to support their procurement processes and as a result the entity was scored zero (0) on compliance and thus a high risk score of 100% of non-adherence of the procurement procedures. The higher the risk score, the higher the possibility of a procuring entity failing to obtain value for money expenditure in procurement activities. It was also clear from the report that the aggregate compliance level and implementation score of all the County Assemblies was 46.6% with risk level of 53.4% of procurement non-compliance. It was also reported that Trans Nzoia County Assembly failed to provide the required documents for procurement processes and as a result the entity scored zero (0) on compliance and a high risk of 100%. The Public Procurement Regulatory Authority report 2017/2018 established that 223 complaints from suppliers and the public against County governments procuring entity was received. The 146 complaints had been resolved at the end of FY 2017/2018, while 77 were unresolved by the PEs. The complaints resulted from flaws in tender evaluation and specifications, on Supplier's delayed payments, lack of notification of awards, errors in tender notices, alleged corrupt practices during procurement proceedings, termination of procurement proceedings, failure by procuring entities to respond to bidder's requests for information regarding tenders. The PPOA Annual Report 2015/2016 revealed that most Procuring entities at the County governments have major challenges of failure in updating store records, security of store and failure to conduct regular stock taking. The Procuring entities have maintained Assets Registers that were not up to date as indicated in the report and this was non-compliance in implementing inventory controls and management. This was confirmed by Ombuki *et al.*, (2014) that implementation of Procurement practices remains a challenge to the county government despite efforts made by

Procurement regulatory authority to establish effective compliance levels. A study by Victor (2012) & Daniel (2010) discussed on the implementation of PP in the public organizations in general. Njeru and Silas (2015) explored the implementation of PP in tertiary training institutions and left a major knowledge gap on management practices and implementation for PPR in devolved governments in Kenya.

## 2.0 METHODOLOGY

The study adopted census because of the small size of the population. A structured questionnaire was used as a data collection tool. The study also undertook a pilot test on the instrument's reliability and validity in the 3 counties; Nyamira, Kisii, Homa-Bay Counties where nine (9) respondents were engaged in the pilot study. The use of descriptive and inferential statistics for data analysis was considered. Study engaged the key informers from the 44 county Governments who positively responded hence achieving 100% response rate. The statistical tests were also done in the study. Presentation of data was in form of charts and tables as deemed appropriate.

## 3.0 RESULTS

### 3.1. Supplier Relationship management and Implementation level of public procurement regulatory

The study sought to establish the relationship between supplier relationship management and implementation level of Public Procurement Regulatory frame work in devolved governments in Kenya. To measure County procurement officers' perception on supplier relationship management and level of implementation of public procurement regulatory frame work, a five point Likert scale of 1-5 were applied; where 5-strongly disagree, 4-Disagree, 3-undecided, 2-Agree, 1-Strongly Agree. The findings in Table 1 indicates that the respondents expressed their knowledge level of supplier relationship management in terms of the organization's commitment level in supplier partnership/development influence on level of implementation of Public Procurement Regulatory frame work which had 25(56.7%) of the respondents who felt that the organization's commitment level in supplier partnership/development influence on level of implementation of Public Procurement Regulatory, followed by 26(27.3%), 4(9.1%), 2(4.5%) and 2(2.3%). This implied that the majority 51(56.8%) of the procurement officers felt that organization's commitment level in supplier partnership/development influence level of implementation of Public Procurement Regulatory frame work ( $M = 3.22$ ,  $SD=0.75$ ). The level of information sharing between the buyer/supplier management relations influence on level of implementation of procurement regulatory had 22(50.0%) of the respondents who felt that level of information sharing between the buyer/supplier management relations have influence on level of implementation of procurement regulatory, followed by 16(36.4%), 4(9.1%) and 2(4.5%). This implied that the majority 22(50.0%) of the procurement officers felt that level of information sharing between the buyer/supplier management relations have influence on level of implementation of procurement regulatory framework ( $M = 3.38$ ,  $SD = 0.71$ ). The level of implementation of public procurement regulatory frame work had 16(36.4%) of the respondents who felt that organization's level of commitment on suppliers' payment influence level of implementation of procurement regulatory, followed by 12(27.3%), 10(22.7%), 5(11.4%) and 1(2.3%). This implied that the majority 15(34.1%) of the procurement officers felt that organization's level of commitment on suppliers' payment influence level of implementation of procurement regulatory ( $M= 3.11$ ,  $SD = 1.02$ ).

**Table 1 Descriptive analysis of Supplier relationship management and Implementation level of public procurement regulatory (N =44)**

STATEMENTS	5	4	3	2	1	Mean	Std. dev
The organization's commitment level in supplier partnership / development.	2 (4.5%)	12 (27.3%)	25 (56.8%)	4 (9.1%)	1 (2.3%)	3.22	0.75
The level of information sharing between the buyer / supplier management relations	2 (4.5%)	16 (36.4%)	22 (50.0%)	4 (9.1%)	0 (0.00%)	3.38	0.71
The organization's level of commitment on suppliers' payment	5 (11.4%)	10 (22.7%)	16 (36.4%)	12 (27.3%)	1 (2.3%)	3.11	1.02
The organization's Commitment level in appraising its suppliers	3 (6.8%)	9 (20.5%)	15 (34.1%)	14 (31.8%)	3 (6.8%)	2.83	1.05
The supplier's commitment level on value addition/creation on deliveries	2 (4.5%)	9 (20.5%)	23 (52.2%)	9 (20.5%)	1 (2.3%)	3.11	0.88

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Machakos University, Kenya**

The supplier's commitment level on quality of goods and services improvement	4 (9.1%)	10 (22.7%)	25 (56.8%)	4 (9.1%)	1 (2.3%)	3.51	2.1 2
Buyer/supplier collaboration level in new product development	2 (4.5%)	10 (22.7%)	20 (45.5%)	8 (18.2%)	4 (9.1%)	2.91	0.9 4
The organization Trust-based relationship with suppliers	3 (6.8%)	12 (27.3%)	20 (45.5%)	9 (20.5%)	0 (0.00%)	3.11	0.7 9
Delivered goods rejected due to non-conformity to specifications	2 (4.5%)	2 (4.5%)	15 (34.1%)	21 (47.7%)	4 (9.1%)	2.47	0.8 9
Supplier failure to honor the orders issued by the buyer	1 (2.3%)	5 (11.4%)	13 (29.5%)	22 (50%)	3 (6.8%)	2.56	0.8 6

The organization's Commitment level in appraising its suppliers on level of implementation of public procurement regulatory frame work had 15(34.1%) of the respondents who felt that organization's Commitment level in appraising its suppliers influence level of implementation procurement regulatory, followed by 14(31.8%), 9(20.5%), 3(6.8%). This implied that the majority 15(34.1%) of the procurement officers felt that organization's Commitment level in appraising its suppliers influence level of implementation of public procurement regulatory ( $M = 2.83$ ,  $SD = 1.05$ ). The supplier's commitment level on value addition/creation on deliveries on level of implementation of procurement regulatory had 23(52.3%) of the respondents who felt that the supplier's commitment level on value addition/creation on deliveries influence level of implementation of procurement regulatory, followed by 9(20.5%), 2(4.5%) and 1(2.3%). This implied that the majority 23(52.3%) of the procurement officers felt that the supplier's commitment level on value addition/creation on deliveries influence level of implementation of procurement regulatory ( $M = 3.11$ ,  $SD = 0.88$ ).

The supplier's commitment level on quality of goods and services improvement on level of implementation of public procurement regulatory had 25(56.8%) of the respondents who felt that supplier's commitment level on quality of goods and services improvement influence level of implementation of procurement regulatory, followed by 10(22.7%), 4(9.1%) and 1(2.3%). This implied that the majority 25(56.8%) of the procurement officers felt that that supplier's commitment level on quality of goods and services improvement influence implementation level of procurement regulatory ( $M = 3.51$ ,  $SD = 2.12$ ). The buyer/supplier collaboration level in new product development on level of implementation of public procurement regulatory frame work had 20(45.5%) of the respondents who felt buyer/supplier collaboration level in new product development influence level of implementation of procurement regulatory, followed by 10(22.7%), 8(18.2%), 4(9.1%) and 2(4.5%). The study findings implied that the majority 20(45.5%) of the procurement officers felt that that buyer/supplier collaboration level in new product development influence level of implementation of procurement regulatory framework ( $M = 2.91$ ,  $SD = 0.94$ ).

The organization Trust-based relationship with suppliers on level of implementation of public procurement regulatory frame work had 20(45.5%) of the respondents who felt that the organization Trust-based relationship with suppliers influence level of implementation of procurement regulatory, followed by 12(27.3%), 10(22.7%), 0(0.0%) and 3(6.8%). This implied that the majority 20(45.5%) of the procurement officers felt that the organization Trust-based relationship with suppliers influence level of implementation of procurement regulatory ( $M = 3.11$ ,  $SD = 0.78$ ). The delivered goods rejected due to non-conformity to specifications on level of implementation of procurement regulatory frame work had 21(47.7%) of the respondents who felt that delivered goods rejected due to non-conformity to specifications influence level of implementation of procurement regulatory, followed by 15(34.1%), 4(9.1%) and 2(4.5%). The study findings implied that the majority 21(47.7%) of the procurement officers felt that the delivered goods rejected due to non-conformity to specifications influence level of implementation of public procurement regulatory ( $M = 2.47$ ,  $SD = 0.89$ ). The Supplier failure to honor the orders issued by the buyer on level of implementation of procurement regulatory had 22(50%) of the respondents who felt that Supplier failure to honor the orders issued by the buyer influence level of implementation of procurement regulatory, followed by 13(29.5%), 5(11.4%), 3(6.8%) and 1(2.3%). The study findings implied that the majority 22(50%) of the procurement officers felt that Supplier failure to honor the orders issued by the buyer influence level of implementation of procurement regulatory ( $M = 2.56$ ,  $SD = 0.86$ ).

In summary, based on the supplier relationship management and how procurement officers perceived level of implementation of public procurement regulatory framework, the most important factor perceived by procurement officers to contribute to the level of implementation

of procurement regulatory was supplier’s commitment level on quality of goods and services (Mean=3.51), whereas the least important factor perceived by procurement officers to contribute to the level of implementation of procurement regulatory was delivered goods rejected due to non-conformity to specifications (Mean=2.47). The study findings imply that a lot more need to be done to improve on the two elements (trust and commitment). Trust and commitment serve a glue that binds the relationships together. Without trust and commitment, supply chain members may not be satisfied with the relationship (Maloni & Benton, 2005). The results also agree with the study by Kamau (2013) who viewed that communication, trust, commitment, mutual goals and cooperation are key in effective SRM which will impact on organization productivity.

Poor supplier record management leads to high costs incurred in prolonged order cycle times. This leads to poor organization productivity due to lack of maintaining good relationships with their suppliers. This was underscored by Kosgei & Gitau (2016) that SRM goal is to streamline and make efficient and effective process among the product and suppliers. SRM in the recent past achieved relevance and enhanced supplier’s positive relationship for better performance through minimization of costs in procurement and quality product deliveries. The results also concerned with findings of Tangus (2015) on the need for organizations to establish supplier development programs to encourage firms to be interested in programs that enhance productivity of the supplier, hence higher performance of the organizations is realized. Performance of firms may be improved through supplier development engagement activities. Successful management of SRM, reduces costs beyond traditional sourcing, improves the drive and monitoring of performance of supplies, manage supply risk and compliance with responsible sourcing, ethics and regulatory requirement (Deloitte, 2015). Treating county suppliers as a partner and maintaining effective communication goes a long way toward creating a sustained mutually beneficial relationship. This is one of the crucial aspects of supplier relationship management. This requires open and transparent supplier conversations as well as feedback sessions. Unfortunately, many procurement officers handling supplier relationships often have little regard for the regulations that guides the procurement processes that undermines the degree of the supplier’s trust.

### 3.2 Regression Analysis

#### 3.2.1 Regression Analysis for Supplier Relationship Management and Implementation level of Public Procurement Regulatory with no moderator

The study sought to describe the relationship between Supplier Relationship Management on implementation level of public procurement regulatory framework in devolved governments in Kenya. The objective was tested using hypotheses that; there is no significant association between Supplier Relationship Management and implementation of public procurement regulatory framework in devolved governments in Kenya. Analysis using Pearson’s product moment correlation statistic to test the relationship between the Supplier Relationship Management and implementation of public procurement regulatory framework in devolved governments in Kenya indicated that R -square value of 0.39921 was recorded showing that (39.91%) of implementation of public procurement regulatory framework in devolved governments in Kenya was explained by supplier relationship management. F-statistics values was 27.858 with p-values 0.00000 which were less than 0.05 in the models in the absence of moderator. It was clear from the table that the regression coefficient model obtained in the absence of moderator and were as follows:  $Y = 0.691 + 0.814X_2$ . The models indicated that for every unit of supplier relationship management the value of implementation level of public procurement regulatory framework in devolved governments in Kenya changes by 0.814 in absence of moderator.

Table 2: Regression Analysis for Supplier Relationship Management and Implementation level of Public Procurement Regulatory with no moderator

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	of the Durbin-Watson
1	.631 <sup>a</sup>	.399	.384	.35344	2.246

a. Predictors: (Constant), Supplier Relationship Management

#### Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	3.480	1	3.480	27.858	.000 <sup>b</sup>
	Residual.	5.247	42	.125		
	<b>Total</b>	<b>8.727</b>	<b>43</b>			

a. Dependent Variable: Implementation level of Public Procurement Regulatory

a. Predictors: (constant), Supplier Relationship Management.

#### Overall regression coefficients

	Un Std Coeff B	Std. Coeff Std. Er	Std Coeff Beta	t	Sig.	Collinearity Statistics	
						Tolerance	VIF
(Constant)	.691	.505		1.367	.179		
Supplier Relationship Mgt	.814	.154	.631	5.278	.000	1.000	1.000

### 3.2.2 Regression Analysis for Supplier Relationship Management and Implementation level of Public Procurement Regulatory with moderator

In the presence of moderator, the R- square value increased to 0.687 showing that 68.7% of the dependent variable was explained by supplier Relationship Management. Table 3 shows the model findings. Other parts of Table 3 also suggest that simple linear regression fitted model fitted to the data was good and it was supported with p-values 0.00000 which were less than 0.05 and F-statistics values 92.087 respectively for both models in the presence of moderator. Statistically this meant that there was a significant relationship between supplier relationship management and Implementation of public procurement regulatory framework in devolved governments in Kenya and this relationship was much better in the presence of moderator. The regression coefficient model obtained in the presence of moderator  $Y = -0.312 + 1.105X_2 + Z$  with corresponding p- values of 0.000000 being less than 0.05 significance level against t-statistics values. The models indicated that for every unit of supplier relationship management the value of implementation level of public procurement regulatory framework in devolved governments in Kenya changes by 1.105 in the presence of moderator.

These finding obtained clearly show that there was significant relationship between supplier relationship management on implementation of public procurement regulatory framework in devolved governments in Kenya. The findings agreed with Kosgei & Gitau (2016) results that SRM have achieved relevance and enhanced supplier's positive relationship for better performance. These were also supported by Al-Abdallah and Aynman (2014) findings that buying firms improved the performance through relationship management with suppliers and that companies cannot only depend on the inner system to achieve higher productivity.

Table 3: Regression Analysis for Supplier Relationship Management and Implementation level of Public Procurement Regulatory with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	of the Durbin-Watson
1	.829 <sup>a</sup>	.687	.679	.25511	2.315

a. Predictors: (Constant), Supplier Relationship Management \*Z

#### Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	5.993	1	5.993	92.087	.000 <sup>b</sup>
	Residual.	2.733	42	.065		
	<b>Total</b>	<b>8.727</b>	<b>43</b>			

a. Dependent Variable: Implementation level of Public Procurement Regulatory

b. Predictors: (constant), Supplier Relationship Management.

#### Overall regression coefficients

	Un Std. Coeff B	Std. Coeff Std. Er	Std Coeff Beta	t	Sig.	Collinearity Statistics	
						Tolerance	VIF

(Constant)	-.312	.383		-.815	.420		
Supplier Relationship Management*Z	1.105	.115	.829	9.596	.000	1.000	1.000

#### 4.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

##### Summary

The findings obtained indicated that there was significant relationship between supplier relationship management on level of implementation of public procurement regulatory framework in the devolved governments in Kenya. This was realized by a coefficient of R -square value of 0.399 was recorded without the moderator (39.9%) indicating that for every unit of supplier relationship management the value of implementation level of public procurement regulatory framework in devolved governments in Kenya changes by 0.814 in absence of moderator, and a coefficient of R -square value of 0.687(68.7%) with the moderator, showing that the level implementation of public procurement regulatory framework in the devolved governments in Kenya as was explained by supplier relationship management. The findings were found to be positively significant as the p-values 0.00000 which were less than 0.05. The findings indicated that for every unit of supplier relationship management the value of implementation level of public procurement regulatory framework in the devolved governments in Kenya changes with a positive significance increase of 1.105 in the presence of a moderator. From the findings, the study therefore, rejects the null hypotheses and affirms the alternative hypotheses that; H<sub>2</sub>: There is a positive significant relationship between supplier relationship management and implementation level of public procurement regulatory framework in the devolved governments in Kenya.

##### Conclusion

The study concluded that for every unit of supplier relationship management the value of implementation level of public procurement regulatory framework positively improves. The study concluded that there is a clear indication that County governments should pay close attention on communication, trust, commitment, mutual goals and cooperation which was found to be important in effective Supplier relationship management in the organization productivity. It's also concluded that the County government's investment on Supplier relationship management will achieve a better performance through minimization of costs in procurement and improve on quality of product deliveries.

##### Recommendations

The study recommended that the devolved governments functions should embrace supplier's commitment level on quality of goods and services in their operations such as information sharing between the buyer, improve on their commitment on suppliers' payment, increase commitment level in supplier partnership and development to improve the supplier's commitment level and value addition or creation in service delivery. Supplier involvement have positively improved public procurement regulatory implementation in the devolved governments. However, the study established that procurement officers in devolved governments had challenges rejecting deliveries of goods due to non-conformity to specifications and Supplier failure to honor the orders issued by the buyer. The study recommended adoption of Buyer/supplier collaboration in new product development and supplier development through trainings.

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## Understanding Pursuing as an Entrepreneurial Competence and the Relationship with Performance of Value-system Actors in Kenya's Leather Industry

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### Abstract

Entrepreneurship and associated behavioural competencies continue to be important but insufficiently studied phenomena, especially in African factor-based industries such as leather, and from an ecosystem perspective. Further, entrepreneurial orientations and competencies have not been adequately distinguished nor understood in past studies. By adapting an empirically validated construct of pursuing as an entrepreneurial competence measure, this study investigated the behaviour in determining firm-level performance of industry actors. A sample of players from Kenya's leather industry were studied representative of an entrepreneurial ecosystem. SPSS was used for exploratory and inferential analysis to establish the validity of the constructs and their hypothesized relationship. Pursuing competences of managers as key-informants of Kenya's leather industry business organizations were measured and tested for determination of expected performance outcomes. Mixed sampling of sixty-eight Leather Articles Entrepreneurs Association (LAEA) members and the associated value-system actors were studied, with a response rate of 76%. Factor analysis showed pursuing and performance were uni-dimensional entrepreneurship constructs comprising three and nine indicators respectively. Inferential analysis showed that pursuing determined performance of industry value-system actors. This study affirmed earlier research the validity of pursuing as an entrepreneurial competence construct and its determination of firm-level performance. The study therefore contributes to a new perspective of the dimensions of entrepreneurial competence and growing scholarship in industry ecosystems. Development of pursuing as an entrepreneurial competence of key decision makers in industry ecosystems can positively impact business performance. The study recommends that scholarship, policies and individual development programs in entrepreneurship should adopt pursuing as a valid dimension of entrepreneurship behaviour.

**Key words:** *pursuing, entrepreneurial competence, performance, value-system actors, leather industry, entrepreneurial ecosystems*

### 1.0 Introduction

Entrepreneurship has been studied from a cognitive and behavioural perspective as an important characteristic in determination of firm performance. However, the inadequate understanding and poor distinction between entrepreneurial orientation and competence variables, plus their erroneous attribution to firms, has led to a misunderstanding of the entrepreneurship phenomenon. Entrepreneurship scholars have therefore posited that the phenomenon needs further research. Pursuing has been little studied as an entrepreneurial competence variable, with pro-activeness being the closest attribute that is studied as a cognitive disposition rather than a behavioural competence. Further, entrepreneurship only recently attracted research as an ecosystem phenomenon. Even so there is a dearth of scholarly literature on the phenomenon from factor-based industries especially in Africa. This paper presents pursuing as an entrepreneurial behaviour as studied from an industry ecosystem perspective and using an empirically validated construct.

### 2.0 Research Objective

This study aimed to establish the validity of pursuing as an entrepreneurial behaviour construct and its relationship with industry-actor performance.

### 3.0 Theoretical Perspectives on Study Variables

#### 3.1 Pursuing

Pursuing is a less studied concept in entrepreneurship but one that is acknowledged in describing an entrepreneur's initiative, pro-activity, determination or goal- and opportunity-oriented behaviours. Jain (2011) summarized research to describe pro-activeness as the entrepreneur's behaviour of aggressively pursuing favourable business opportunities to enhance competitive position. Gartner and Baker (2010) assert that opportunity and its pursuit are central concepts in the entrepreneurship process. Shir, Hedberg and Wiklund (2014) inadvertently raise the concept of pursuit as crucial to expressing entrepreneurial motivation.

Kuratko (2014) asserts the entrepreneur's purposeful searching. Lans, Vestergren and Mulder (2011) identified pursuing as one of a three-factor entrepreneurial competence that can be learnt and developed in study of small agro-based firms. This study adapted the validated pursuing 'competence' and its measures from Lans *et al.* (2011). According to Lans *et al.* (2011) the pursuing dimension, is described as an opportunity-related entrepreneurial competence characterized by taking initiative and proactive searching. Pursuing becomes relevant to the system when the entrepreneur takes steps to improve performance in areas relevant to industry goals and competitiveness.

Because of the identification of pursuing with proactive behaviour, one needs to explore studies in psychology to find the relationship between the proactivity concept as a behaviour and in relation to its outcomes. In their meta-analytic research on proactivity, Tornau and Frese (2013) described proactivity as a personality-based concept associated with initiative. Tornau and Frese (2013) showed proactivity had positive correlations with work-related performance. Proactivity was found to be important for business-related individual performance and innovation, even when acknowledging impinging environmental conditions. The concept of pursuing is related to recognition of opportunities because the latter have to be acted upon for results of entrepreneurship to be seen. Entrepreneurial loss, the converse of entrepreneurial rent, is due to failure to recognize and act on opportunities (Wasdani & Mathew, 2014). Entrepreneurship fueled by opportunity (as opposed to necessity) makes up seventy-eight percent of successful innovation-driven economies and 69 percent of factor and efficiency-driven economies (GEM, 2015).

Empirical studies have used pro-activeness rather than pursuing as a characteristic of entrepreneurs. Lumpkin and Dess (2001) found that pro-activeness – a response to opportunities – is positively related to firm performance in dynamic environments or growth stage industries where conditions are rapidly changing and there are numerous opportunities for advancement. Kraus *et al.* (2012) found a direct and significant positive contribution of pro-activeness (taking initiative to shape the environment) to performance of Dutch SMEs even in turbulent environments. Madhoushi, Sadati, Delavari, Mehdivand and Mihandost (2011) studied the role of knowledge management in mediating entrepreneurial orientation-innovation performance link in 164 Iranian industrial-zone SMEs found that entrepreneurial orientation measured by five dimensions affected firms innovation performance directly (and indirectly through knowledge management). As a dimension of the entrepreneurial orientation construct in the Madhoushi *et al.* (2011) study, pro-activeness had the highest path coefficient compared to the others.

Pursuit has been equated to activities for development of opportunities (Lans *et al.*, 2011) towards creation of new value. This study examined the empirical evidence of a relationship between firm-level performance and the construct components of 'taking initiative' and 'pro-activeness' (or being proactive) as characterized by Lans *et al.* (2011). In this study, pursuing is defined as "searching and taking innovation action (entrepreneurial creation/venturing) to take advantage of (venture formation or strategic improvement) opportunities especially ahead of similar competing endeavours (pursuing can be introduction of an innovation for starting a business or improving business performance)"

### 3.2 Performance

Various scholars posit that performance is multi-dimensional and have identified financial and non-financial performance measures as outcomes of entrepreneurship (Zahra, 1991; Zahra and Covin, 1995; Wiklund, 1999, Wiklund and Shepherd, 2003 and 2005; Wang, 2008; Arbaugh, Cox and Camp, 2009; Rauch *et al.*, 2009; Jain, 2011; Sanchez, 2012; Al-Ansari, 2014). Foundations of firm performance measures in entrepreneurship studies were laid by Lumpkin and Dess (1996) as: sales growth, market share, profitability, overall performance and shareholder satisfaction. Lumpkin and Dess (1996) advocate for use of multiple and broad performance dimensions as growth-induced resource demand may lead to a favourable outcome on one measure and an unfavourable outcome the other (for example, investment increasing market share while reducing profitability). Jain (2011) adds overall firm growth and behavioral outcomes to the list of performance dimensions. In discussing performance of firms, including their importance to aggregate industry and country effects in the face of globalization, De Loecker and Goldberg (2014) argue that there is need to distinguish between profitability and efficiency as performance measures. De Loecker and Goldberg (2014) caution common reliance on profitability measures for failing to reveal mechanisms (distinction between price mark-ups and physical efficiencies) involved in performance improvements resulting from globalization. Performance can be defined as "the desirable or planned outcomes of firms and industries, such as production quantity, production quality,

productivity, sales, market share, profit, stakeholder satisfaction and growth expressed in either qualitative or quantitative measures”

Sanchez (2012) studied 450 young Spanish SMEs using qualitative data from key informants and found empirical evidence that enterprising characteristics, in particular entrepreneurial competence at individual level of entrepreneurs, directly and indirectly determine firm performance. Dinh and Clarke (2012) concluded that entrepreneurship may influence performance of manufacturing firms in Africa. Kraus *et al.* (2012) used qualitative data on three financial measures of performance: gross margin, profitability and cash flow and found they were influenced by entrepreneurial orientation traits individual CEO’s. Kraus *et al.* (2012) justified the use of perceived performance data reported by Dutch SME CEOs as respondents in place of archival performance.

Mwinyihija (2014) measured performance of leather footwear manufacturing SMEs in COMESA region using labour productivity. His study quantitatively analyzed number of footwears produced per worker and found average labour productivity per day of 3.4 pairs of men shoes, 5 pairs of ladies shoes, 4.8 pairs of school shoes and 4.6 pairs of sandals. This compared poorly with productivity above ten pairs per person observed in India and China.

#### 4.0 Research Method

Mixed methods design was adopted in this study to obtain data, explore the study variables and diagnose their relationships. Kothari and Gaurav (2014) exploratory research develops a hypothesis for testing, while diagnostic research concerns itself with whether certain variables are associated. A questionnaire was used for guided interviews with key-informants to collect quantitative data from 5-point Likert scale items in a cross-sectional survey of Kenya’s leather industry players. Face and content validity of the research instrument was established from opinions of nine scholars in entrepreneurship, four with Doctorate degrees and five PhD candidates. A pilot study on a representative sample of the study population showed the constructs met the 0.7 Chronbach’s alpha threshold with values of 0.701 and 0.717 for pursuing and performance respectively (Hair, Black, Babin & Anderson, 2014). The study population was fifty-eight members of the Nairobi-based Leather Articles Entrepreneurs Association (LAEA) and ten associated industry players. The population encompassed the entire leather industry value-chain roles from tanners as primary processors, finished leather traders as secondary delivery agents, manufacturers of leather goods as secondary processors, to retailers of these leather goods as tertiary delivery agents, industry networking associations, research support institutions and a policy and regulatory support institution. Sampling involved a census of the LAEA members was conducted followed by snowballing of associated industry actors. Fifty-two valid responses were obtained giving a response rate of 76%. Fifty-six percent of respondents’ businesses were micro-enterprises with 1 – 9 workers, and 29% having a turn-over of below KES. 500,000/= (KNBS, 2016). Statistical Package for Social Sciences (SPSS) version 27 was used in the analysis of data. Similar studies by Lans *et al.* (2011), Kraus *et al.* (2012) tested the relationship between entrepreneurial characteristics and business performance.

#### 5.0 Results

The pursuing variable was measured using eight items. Responses on a five point Likert type scale ranging from 1 for “Strongly Disagree” to 5 denoting “Strongly agree” gave ratings for items on pursuing ranging between 3.67 and 4.38. This indicated that the respondents believed that their firms did exhibit high levels of pursuing. The average scale total was 3.95 (SD =0.489) which was a high rating indicating that on average, the respondent firms had high levels of pursuing.

The dependent variable performance was measured using nine items. Items sought to measure broad industry-related performance goals. Annual changes industry-actor’s venture performance was measured using +, 0 and – signs to denote increase, no change and decrease respectively on the item measured. Average scale ratings for performance ranged from 2.19 to 4.00. The average scale total was 3.47 (SD =0.647) which was a high rating indicating that on average, the respondents reported that their firms had high levels of performance. Table 1 shows results of the respondents’ ratings on the study variables.

Table 1: Descriptive Statistics for Pursuing and Performance Variables

	Mean	Std. Deviation
Pursuing	3.95	.489
Performance	3.47	.647

### 5.1 Factor Analysis of the Study Variables

The Principal Component Analysis (PCA) method with Promax rotation was used for determining convergent and discriminant validity of the study variables. Indicator items that passed the acceptable level (Kaiser criterion / Eigen value >1) were identified for further analysis. Items that showed inter-item loadings above 0.5 were highlighted and retained to form the study constructs. Items whose cross-loadings were inconsistent with theoretical expectations were removed from further analysis (Hair, Black, Babin & Anderson, 2014). The Kaiser-Olkin Measure of Sampling Adequacy (KMO) threshold of 0.6 (Kaiser, 1974) and communalities of 0.4 – 0.7 were used to show appropriateness for factor analysis using the sample (Costello & Osborne, 2005).

### 5.2 Factor Analysis for Pursuing

The pursuing variable was found to be unidimensional with with eigenvalues >1 as (KMO=0.604,  $p=0.00$ ; Communalities > 0.4). Pursuing had three items whose loadings ranged from 0.651 to 0.873 as shown in Table 2. Meta-analytic study by Rauch *et al.* (2009) showed pro-activeness, which had similar measures to pursuing, as a commonly studied and empirically valid construct. The components were in agreement with empirical evidence from Lans *et al.* (2011), from where this construct was adapted, that identified pursuing as a behavioural factor of entrepreneurial competence.

**Table 2: Component Matrix for Pursuing**

Component Matrix <sup>a</sup>	
	Component 1
POpportunities	.873
PCompetiveness	.846
PFocus	.651

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### 5.3 Factor Analysis for Performance of Value-system Actors

The performance construct discriminated into two dimensions with eigenvalues >1 (KMO=0.76,  $p=0.00$ ; Communalities > 0.4) as shown in Table 3. Dimensionality of the performance variable depended on use of direct (first component) or indirect measures (second component) (Kamuri, 2021). Previous studies advised use of financial and non-financial measures of SME performance. Diverse measures were applied from theoretical and empirical literature, and for appropriateness to an industry-wide study Rauch *et al.*, 2009; Jain, 2011; Sanchez, 2012; Al-Ansari, 2014; Kraus *et al.*, 2012; Rashid, Ismail, Rahman & Afthanorhan, 2018). Defects, customer complaints and expenses were used as a proxy measures for business performance in product quality, customer satisfaction and business efficiencies respectively.

**Table 3: Pattern Matrix for Performance of Value-system Actors**

	Component	
	1	2
BusPerformSales	.949	
BusPerformQuantity	.937	
BusPerformProfit	.885	
BusPerformProductivity	.816	
BusPerformShare	.812	
BuPerformVariety	.632	
BusPerformDefects		.911
BusPerformComplaints		.881
BusPerformExpenses		.613

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

## 6.0 Test for Hypotheses

### 6.1 Relationship between Pursuing and Performance of Value-system Actors

From the theoretical foundations of pursuing as an entrepreneurial competence and its relationship with performance of a venture as an outcome, the following research hypotheses formulated:

**H<sub>0</sub>:** Pursuing as an entrepreneurial competence *does not* determine performance of value-system actors in Kenya's leather industry.

**H<sub>a</sub>:** Pursuing as an entrepreneurial competence determines performance of value-system actors in Kenya's leather industry.

Hypothesis testing applied linear regression analysis showed that the R-squared was 0.286 meaning that the pursuing was able to explain 28.6% variations in the performance of value-system actors in leather industry in Kenya while the rest are explained by the error term. The F-statistic is 21.434 with a *p*-value of 0.000 which implies that the regression model is significant at 0.05. Therefore, the t-statistics and *p*-values can reliably be used to test the significance of coefficients in the model

The regression equation obtained from this output is:

$$\text{Performance} = 2.125 + 0.548 \text{ Pursuing.}$$

The beta coefficient for pursuing was 0.548. This indicates that a unit increase in pursuing would result in 54.8 % increase in performance of value system actors in the leather industry in Kenya. The t-statistic and corresponding *p*-value were 4.630 and 0.000 respectively. Therefore, at *p* < 0.05 level of significance the null hypothesis is rejected implying that pursuing was a significant determinant of performance of value-system actors in the leather industry in Kenya. The study concludes that there is a statistically significant positive relationship between pursuing and performance of value-system actors in the leather industry in Kenya.

Studying Swiss software firms, Urwyler (2006) established that despite limited prior knowledge of markets, how to serve customers and customer problems, the entrepreneurial process involved identification, evaluation and exploitation of opportunities through “search activities, deep customer interaction and reciprocal learning”. These externally-oriented concepts are related to the pursuit indicators used in this study of searching for information, opportunities and proactive competing.

According to Urwyler (2006) actively reducing or creating horizontal and vertical knowledge asymmetries, can open up opportunities for exploitation through “search activities, deep customer interaction and reciprocal learning”. These externally-oriented actions are related to the pursuit indicators used in this study of searching for information, opportunities and proactive competing. The emphasis on active, effort, searching, as descriptors of what entrepreneurs do cannot be gainsaid. Lui, Ko, Ngugi and Takeda (2017) empirically affirmed the upward curvilinear relationship between pursuing entrepreneurial behaviour (PEB), of which pro-activeness is a central element, and the ultimate innovation outcome of new product development as a performance outcome, (moderated by innovative capability and market orientation.

**Table 4: Relationship between Pursuing and Performance of Value-system Actors**

#### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548 <sup>a</sup>	.300	.286	.73177

a. Predictors: (Constant), Pursuing

b. Dependent Variable: Performance\_index

#### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.478	1	11.478	21.434	.000 <sup>b</sup>

Residual	26.775	50	.535
Total	38.252	51	

a. Dependent Variable: Performance\_index  
b. Predictors: (Constant), Pursuing

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	2.125	.418		5.086	.000
	Pursuing	.516	.111	.548	4.630	.000

a. Dependent Variable: Performance\_index

### 7.0 Conclusion

Pursuing was a valid entrepreneurial competence variable. The depiction of active searching behaviour in studies addressing proactivity supports the concept of pursuing as an entrepreneurial competence which can be developed. Empirical evidence from this study showed that pursuing as an entrepreneurial competence of value-system actors in Kenya's leather industry was a significant determinant of their ventures' performance. Pursuing had an increasing effect on venture performance in the sample studied of value-system actors in Kenya's leather industry. Ability to pursue entrepreneurial opportunities was a significant entrepreneurial trait that decreased venture performance in Kenya's leather industry. The study affirms observations scholarly assertions on the significance of taking action on perceived opportunities for entrepreneurship outcomes to be realized.

The relationship between pursuing and performance is represented in Figure 1.

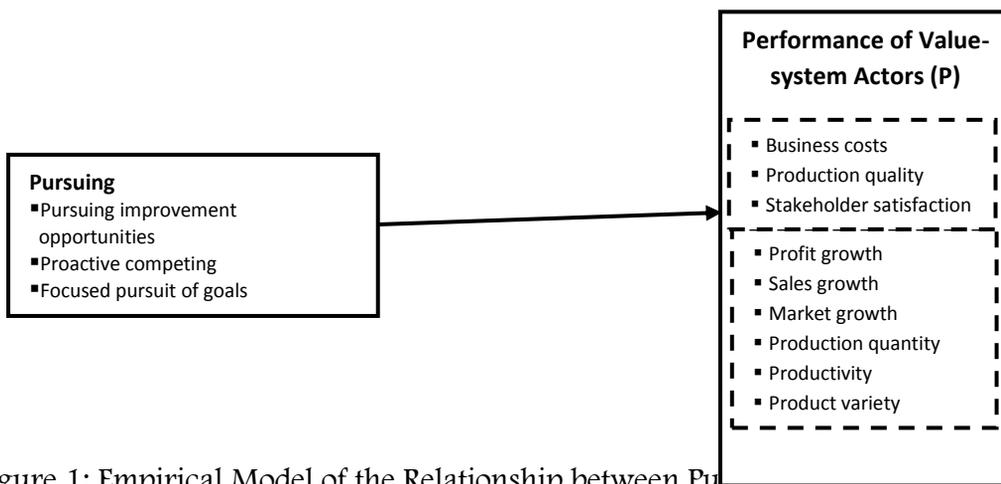


Figure 1: Empirical Model of the Relationship between Pursuing and Performance of Value-system Actors (P)

The establishment of pursuing as factor determining entrepreneurial outcomes has implications on development and practice of entrepreneurship. The pursuing construct provides a conceptual model of learnable behaviour for developing the searching, initiative and competitive abilities of prospective and practicing entrepreneurs. Policies that prescribe entrepreneurship development should therefore apply the concept in their programs. This is especially applicable to Kenya's leather industry whose performance is declining in the face of global competition from cheaper and substitute products despite abundance of opportunity. This study contributes to an understanding of pursuing as a competence factor in entrepreneurship. It provides valuable research information on entrepreneurship in a less-studied industry ecosystem of an African country. The study recommends further studies exploratory and diagnostic studies on pursuing as a factor of entrepreneurial competence in diverse industry contexts.

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## A Critical Review of Literature on Product Differentiation Strategy and Brand Loyalty

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### Abstract

The concept of product differentiation goes back to the early 20<sup>th</sup> century when there were hardly any models of differentiated products. Incremental differentiation of products and services is the main variable that helps define the key aspect of value that marketing adds to a product. Extant literature has no consensus on the relationship between differentiation of products and consumer loyalty to brands. This paper aimed at critically reviewing studies available on product differentiation. The study methodology used involved literature review where empirical studies in the field of product differentiation and brand loyalty were examined. The methodology also involved a critical review of relevant theories. A number of theories were discussed in search of a clear relationship between the two concepts. The measures of product differentiation that were used included the product quality, product innovativeness, product design and costs of products. Brand loyalty measures were product repurchase, top of mind product, advocacy metrics, business referral frequencies, extent of behavioral change, and the willingness to pay premium price. The grounding of the study was on the assumption that various measures of product differentiation would have a substantial effect on the brand loyalty. A conceptual framework for measuring product differentiation and to give more insight into what product differentiation really is was developed. The empirical review indicated that differentiated products are key to an organization's competitive advantage and to customers' satisfaction leading to customer loyalty. Theoretical review led to a conclusion that there is a strong relationship between product differentiation and brand loyalty. This critical review of empirical literature highlighted some gray areas hence future scholars should review critical issues like product differentiation and customer satisfaction, brand awareness and performance; and perceived service quality and reputation.

**Keywords:** *Product differentiation, Brand loyalty, Switching behavior, Brand equity*

### Introduction

Product differentiation concept dates back to Shaw's (1912) school of thought that commodities are increasingly being differentiated in modern markets, even though much confusion still exists pertaining to what product differentiation actually is (Shelby, 2011). According to Alderson (1957), the main variable that helps define the attribute of value that marketing contributes to commercial products is the process of their differentiation. Product differentiation is the specific way that one organization's products can be identified from another organization's products or services in a marketplace. Any distinguishing criteria, such as label or place of production, sale, or consumption, can be used to convey to the buyer the differences of one firm's product from products of other firms that operate in the same environment. Wooliscroft, Tamilia, and Shapiro (2006) argue that product differentiation can be of many varieties or come in many shapes and forms. The differentiation can be based on observable and unobservable characteristics of a product itself, e.g., the features regarding taste, patents, trade-marks, and trade names, or product containers sizes, colours and designs, among many others. Product differentiation could further be defined by the situations surrounding a product's sale or conditions thereof. For example, proximity to the seller's location, reputation and stability, all of which can serve to first attract and then attach the customer to a specific firm. Despite competition, a seller who offers a differentiated product – that is, a product that is viewed by buyers as different from others, does actually occupy a monopoly position in among other products. Every firm would like to occupy a monopoly position in the market place. However, a monopoly position is not sufficient for a strong sales base, without which a firm cannot grow.

Brand loyalty is an essential variable in any organization's success because without brand loyalty, a steady, adequate or reliable inflow of revenue is at risk, especially in the modern business environment where rivalry is a fierce one. Brand loyalty is formed when customers' expectations are satisfied by the purchases they make so that a re-purchase from same brand occurs frequently or at least regularly. According to Aaker (1991), brand loyalty can reduce

marketing costs and thus enhance the financial base of a company. In this sense brand loyalty is key in contributing to brand equity, that is, a financial worth associated with a particular brand of a product over and above the market value of that product. Thus, brand loyalty is an important contributor to the financial stability and sustainability of a company. The purpose of this review is to critically assess differentiation of products and services and their relationships with consumers' loyalty to product brands. The main idea is that product differentiation is the source of brand loyalty and brand equity. Thus, a company's marketing division needs product and service differentiation strategies that will give the company a market edge over its competitors.

### **1. Product Differentiation**

The term 'product differentiation' is increasingly being used to refer to a practical objective that a marketing strategy should be designed to achieve (McDonald, 1996). It is a deliberate effort to make a product from a staple commodity in order to increase demand for it and sell it at the highest possible price. A marketing strategy changes a familiar product and makes it to look different to consumers. There are numerous ways of making products which are essentially the same good in terms of content look distinctly different in the eyes of the consumer (Shaw, 1912). Despite this observation, it should be acknowledged that even the slight product modifications induced by a marketing strategy render a product better adapted to the use to which it is put. To achieve that end, niceties of packaging and trimming are employed.

Moreover, a product distributor occasionally builds up a pleasant atmosphere around a good as to taste or quality that assures the consumer of satisfaction upon consumption. A good or service for example might be shown by an advertisement as having superior qualities of good health or strength even when it is not different from similar goods and products on offer in the market place. At times, the distributor might differentiate the product by appealing on to service or special conveniences of the consumer and provide them as a collateral to the commodity at the point of sale or after sale. It is for this reason that many clothing stores offer private fitting rooms to customers to assure them they will be satisfied by the purchase. A distributor can also offer repair services before the product leaves the store because he knows that it is of good quality and repairs would not be needed under normal circumstances.

Always, however, the aim of product differentiation is to distinguish a commodity from well-known commodities of considerably similar nature. Nearly always, the distributor achieves this purpose through the use of trademarks, brands, or trade names. Through a marketing strategy a distributor is in a position to convey to consumers the message that they are better off paying a higher price for his differentiated product than for the stock commodity. By calling attention to the unique qualities of his differentiated product, the distributor transfers to it a portion of the demand that was previously reserved for the stock commodity.

Product differentiation occurs if there exists a substantial basis for differentiating one marketer's products from another marketer's products. In addition to attributes specific to a product that marketing can help bring out, a marketing strategy can achieve product differentiation by highlighting the general tone or character of a seller's establishment, his way of doing business, his reputation for fair dealing, courtesy, efficiency, and all the personal links which attach his customers either to himself or to those employed by him (George, 2011). Porter (1985) views a differentiation strategy as a situation where buyers have willingness to pay for a firm's product whose value is unique in an industry. Consumers must first express their needs which enables a firm selects one or more product attributes which majority of the buyers perceive them to be important, and positions itself in order to meet the needs. This makes a firm's marketing strategy to be an effective one. As long as the firm meets these needs, loyal customers reward it by paying premium prices for its products. Porter (1985) argues that product differentiation strategies vary across industries so that a uniform differentiation approach would not work in all industries. Other attributes on which product differentiation is pegged on include the product, the product delivery system, the marketing strategy, to mention just a few.

### **2. Brand Loyalty**

Brand loyalty as a concept in marketing came to light in the 1920s (Bennett, 2001). The concept has been defined by several authors whose schools of thought tend to agree. Jacoby (1971) views brand loyalty as a function of consumers' mental processes in which consumers show biased or deliberate reaction within a given period of time by centralizing their decision with regard to optional products found in a group of products. Brand loyalty mirrors the likelihood of a consumer to change brands when there is a change either in price or product

features. Therefore, it measures the bond that exists between a consumer and the brand (Aaker, 1991). According to Oliver (1999), brand loyalty is a strong commitment that a customer shows in rebuying or patronizing a product, good or service of his/her preference regularly in the future that leads to a repeat buying of the same brand regardless of situational factors and marketing efforts that can prompt switching behavior. Ishak and Ghani (2013) define brand loyalty as the inclination/biasness that the consumer shows in choosing a particular brand for purchase from a product category due to the view that the customer will get the best features of the product, tastes, images or level of quality at the best price. Loyalty is developed as a result of repeat buying which emanates from the perception. Thus, cultivated attachment to the brand by the customer and his/her likings about the brand are related to brand loyalty over a period of time.

### **3. Switching Behavior**

Although companies are striving to create common associations with clients by offering higher value and achieving their obligations, the competition in the marketplace is making it difficult for these organizations to do so (Zikiene & Bakanauskas, 2006). According to Solomon et al. (2006), customers' behaviors relate to a situation where they, alone or with others, including their peers and non-peers identify, search, select and consume products so as to fulfill their human needs and wants. This behavior is the determinant of how consumers make a decision to buy products and the various forces behind this inclination (Bhasin, 2010). It is basically the study of the maximizing behavior concerning the when, how and the why of consumers in marketplaces. Consumer switching behavior is found between firms and consumers since, because of the influences of marketing strategies it limits both groups from having a long or lasting relationship and it can even stop permanently the pre-developed long-term relationships at the expense or advantage of companies that operate within the same industry. It is the process by which consumers terminate their relationships with a current retailer or firm and replaces it with a competitor completely or partially (Nimako, 2012a).

### **4. Brand equity**

This concept made its appearance in the writings of marketing in the 1980s. Since then business strategists have expressed interest in the concept because there is a strong bond between brand loyalty and brand preferences depicted by the consumers (Thiripurasundari & Natarajan, 2011). Successful firms boast of having market competitive advantages as a result of producing successful brands. This means that companies need to have the right brand equity for their products so as to remain successful for as long as they exist. Brand Equity describes the link/connection between the brand and the bundle of its strengths and weaknesses; brand name and its symbol have been known for some time now to increase or decrease the benefits drawn from a product by an organization and /or by the organization's target market (Aaker, 1991). In another view, Yoo and Donthu (2001) state that brand equity is the monetary value of the difference in the ordinary goods chosen by the consumer and the branded goods given the same level of product features. This means that brand loyalty represents the utility difference enjoyed by the consumer in terms of positive consumption outcome which is created by branded products compared to that of the generic version of the same products. Brand equity is both financial and customer-based. (Thiripurasundari & Natarajan, 2011).

Financial brand equity is the additional cash received as a result of selling branded products compared to the additional cash received after selling unbranded products. It is not useful for the marketing purposes because it has a monetary measure hence it does not explain the value of the brand from the consumer's perspective. Customer-based brand equity is the assessment of the buyer's reaction to the name of a brand (Keller 1993; Shocker et al. 1994). It is the unique influence that a brand knowledge has on a consumer or the reaction that a consumer gives to a brand due to its marketing. A brand is viewed as having a positive (negative) customer-based brand equity when the response of the buyers towards the brand is more (less) favorable and the way it is marketed after the identification of the brand than when it is not, for instance when the brand is attributed to a fictitiously named or unnamed version of a good (Keller, 1993).

Brand equity has five dimensions namely brand awareness, brand associations, perceived quality, brand loyalty, and other proprietary brand assets. The first four relate to buyer's behavior towards the brand whereas, in contrast, proprietary brand assets are not typically consumer behavior based (Aaker, 1991). The main aspect of brand equity is brand loyalty. Product differentiation is therefore very important for competitiveness of a firm in modern markets. Brand loyalty increases a company's long-term value because it creates a large pool of customers that stakeholders expect to remain loyal to the company's products or services for a long time.

## **5. Theoretical Foundations of the Study**

### **5.1 Disaggregate Discrete Choice Theory**

The analyses in this theory are done using aggregate models that assume that all consumers have the same preferences. The outcome of the analyses gives a model of choice behavior of a representative or average consumer (Renken, 1997). In most cases, consumers' preferences on brands differ greatly in terms of the features they look for, packages they prefer, response to price changes, promotions, etc. These differences lead consumers to fall into small homogeneous groups (segments) which can lead the marketing manager to know the behavior of each of the segments hence helping the manager decide on which segments to target and the marketing strategy that can appeal to the targeted segments. Disaggregate discrete choice model takes into consideration of various market segments that emerge because of the great differences that consumers portray in choosing the brands to buy. It provides a more accurate representation of consumers while at the same time allowing marketers to cluster consumers into segments with similar choice behavior. This paper will therefore be based on disaggregate discrete choice theory since it focuses more on how consumers make their choices given the variety of differentiated products that they are exposed to in the market and how companies target these consumers differently.

### **5.2 Brand Loyalty Theory**

Brand loyalty is a positive biasness that an individual shows in responding to a branded, labelled or graded product as the consumer, the selector or the purchasing agent. The biasness can be as a result of affection, evaluation or reaction that the individual portrays towards a product (Sheth and Park, 1974). This definition tends to differ from several other definitions of brand loyalty which focus more on repeated buying behavior. Sheth and Park (1974) summarized the differences as follows: The limitation of brand loyalty is not only in situations whereby consumers reactions in terms of product purchase is the only focus when measuring brand loyalty. This is because loyalty toward a product can occur in situations where consumers have never bought the brand or product. For instance, children may be loyal to a brand because of their consumption experiences as opposed to buying experiences. Hence, brand loyalty may arise by learning from information, imitative behavior, generalization and consumption behavior and not from buying behavior experiences.

Brand loyalty is anchored on repeat purchase buying behavior even though the consumer or the buyer may have no evaluative (cognitive or attitudinal) structure underlying his brand loyalty. However, one can observe emotive tendencies (affect, fear, respect, compliance, and so forth) associated with this type of loyalty. The loyalty can occur at the non-behavioral level (emotive or evaluative level) for the products which are never bought by some consumers. It is possible for instance, for urban residents to be positively attracted emotionally towards high-end residential houses although they may not purchase them. On the other hand, some customers may have positively biased non-behavioral tendencies towards certain vehicles, mobile phones, electronics etc. even though they may never buy them.

There are three different dimensions contained in the definition of brand loyalty namely emotive tendency, evaluative tendency and behavioral tendency. Emotive tendency is the affective (like-dislike), fear, respect or compliance tendency which is systematically exhibited more in favor of a brand than other competing brands. Evaluative tendency towards the brand is the positively biased evaluation of the brand on a set of criteria relevant to define the brand's utility to the consumer. This therefore means that the evaluation criteria focus on the features of the product that are relevant to the consumer. Behavioral tendency, is the biased positive reaction that a customer has towards the brand with regard to searching, buying and consuming it.

The theory holds that it is not every circumstance where there is brand loyalty that all the three dimensions may necessarily be found. Brand loyalty dimensionality can be a simple one made up of any of the three scopes, one or a complicated one including the three scopes but this is dependent on the product class and the consumer.

## **6. Empirical Literature**

### **6.1 Product differentiation strategy**

Dirisu, Iyiola and Ibidunni (2013) studied the association concerning product differentiation and ideal organizational performance of Unilever Nigeria PLC. Their objective was to establish whether product differentiation strategy can lead to achievement of competitive advantage while influencing organizational performance within the manufacturing industry. A significant positive relationship was found to be existing between product differentiation and

organizational performance. However, it is worth noting that brands are built by customers and not companies hence it is important to consider what would make consumers to continue using a company's product or referring other people into use it. On the other hand, Valipour, Birjandi and Honarbakhsh (2012) examined the relationship between cost leadership strategy, product differentiation and firms' performance accepted at Tehran Stock Exchange. Its purpose was to investigate the business strategies effects on the financial leverage and company's performance relationship. Analysis of the findings led the researchers to conclude that a positive relationship exists between product differentiation and firm's performance. Whereas the study considers product differentiation as a critical component of the firm's performance, it fails to bring the customer into perspective, hence leaving a gap as to how the firm's performance is achieved.

Nolega, Oloko, Sakataka, and Oteki (2015) investigated product differentiation strategies' effects on firm product performance. This was a case study of Kenya Seed Company (KSC) in Kitale. The study findings indicated that a positive relationship exists between product differentiation and a firm's performance and its sales growth. This study was focused more product differentiation and firm's performance relationship. The findings are not clear on whether the firm's positive performance is as a result of the loyalty that agents and staff have on the various brands of seeds that the Kenya Seed company distributes to farmers. This therefore gives a gap as to whether differentiated products can lead to brand loyalty by consumers. Shafiwu and Mohammed (2013) studied on product differentiation effects on profitability in Ghana's petroleum industry. The findings indicated that product differentiation and profitability in Ghana's petroleum industry have a positive relationship. Therefore, it implies that firms that differentiate their products are likely to better their profits.

Arasa and Gathinji (2014) sought to examine the relationship between competitive strategies and firm performance. The study aimed at examining whether competitive strategies and organizational performance among firms in the mobile telecommunication industry in Kenya have an existing relationship. The findings of the study indicated that there was high competition in the industry and that the most commonly used strategies are product differentiation and low-cost leadership. The recommendation of the study is that when using product differentiation strategy, a company should be consistent in providing unique product or service to improve customer loyalty. The main focus of this study was to find out how competitive strategies and firm performance relate therefore product differentiation and brand loyalty were not highly factored in. This begs the question: is there a relationship between product differentiation and brand loyalty.

Rahma (2011) studied on service differentiation to achieve competitive advantage. The focus of the study was on how airlines differentiated their services to fulfill the physically challenged persons' needs. The study aimed at enriching understanding of how airlines can distinguish their services and achieve competitive advantage by satisfying the needs of physically challenged individuals and to develop the model of the same. According to the findings of the study, differentiation of the airline services to suit the physically challenged persons' needs was found to be a source of competitive advantage to these firms since this niche market is growing. Kimando, Njogu and Sakwa (2012) studied the analysis of the competitive strategies employed by private universities in Kenya. Their objectives were to determine how technology has been employed as a competitive strategy by private universities and also to determine how these universities attain competitive advantage by use of a differentiation strategy. The findings of the study indicate that use of a differentiation strategy has enables these universities to gain a competitive advantage which has made them to stand out from the public universities. This study has not addressed the issue of brand loyalty and product differentiation which is the key focus of this paper.

## **6.2 Brand Loyalty**

Kinuthia, Mburugu, Muthomi and Mwiwaki (2012) carried out a study that focused on the factors influencing brand loyalty of swimwear among Kenyan University students. Price and variety, attractiveness and size and brand reputation were the factors that showed a significant relationship with brand loyalty. This implies that when a firm differentiates its product on one or more of these factors, customers can develop some level of loyalty can be developed by the customers to the brand. Mise, Nair, Odera and Ogutu (2013) explored brand loyalty determinants in global FMCG soft drinks markets in Kenya and India. The study aimed at investigating and doing a comparison of the soft drinks market in both African and Asia. This study has not focused on differentiation hence giving a gap that this paper seeks to bridge.

Auka (2012) focused on service quality, satisfaction, perceived value and loyalty among customers in commercial banking in Nakuru Municipality in Kenya. He aimed at examining the extent to which brand loyalty in commercial banks can be influenced by service quality, perceived value and satisfaction. A positive significant relationship was found to exist between the independent variables and the dependent variable. Hence, service quality, customer value and satisfaction were found to be the critical success factors that influence the competitiveness of an organization. Nawaz and Usman (2011) studied the Telecommunication sector of Pakistan in order to unearth what makes customers brand loyal. Service quality was found to be the most essential factor of brand loyalty in mobile phone network market. It was however confirmed that an indirect positive relationship existed between service quality and satisfaction; and brand loyalty.

This section has shown that product differentiation matters for a firm’s survival. In particular, companies that did not have well differentiated products like Arthur Andersen Limited went bankrupt. The section has reviewed empirical approaches that other researchers can use to conduct new studies. The gaps identified in this section demonstrated that little research has been done on product differentiation and brand loyalty relationship. Most of the studies for instance, Nolega, Oloko, Sakataka, & Oteki (2015); Dirisu, Iyiola & Ibidunni (2013); and Valipour, Birjandi & Honarbakhsh (2012) focused on product differentiation and the firm performance relationship. The findings of these studies indicated that firms whose products were differentiated had better performance compared to the firms whose products were not differentiated. Among the studies that were done on brand loyalty, there is none that showed its relationship with product differentiation, for example Mise, Nair, Odera and Ogutu (2013); Kinuthia, Mburugu, Muthomi & Mwhiki (2012); Auka (2012); and Nawaz & Usman (2011). There is a clear indication that there is need to delve into the research on product differentiation and brand loyalty relationship.

**6.3 Conceptual Framework**

Wooliscroft, Tamilia, and Shapiro (2006), argued that product differentiation is the main determinant of power that a firm has at the marketplace. Despite competition, a seller who offers a differentiated product – that is, a product that is seen by buyers as distinctly different from others, does actually occupy a position of monopoly power in the market.

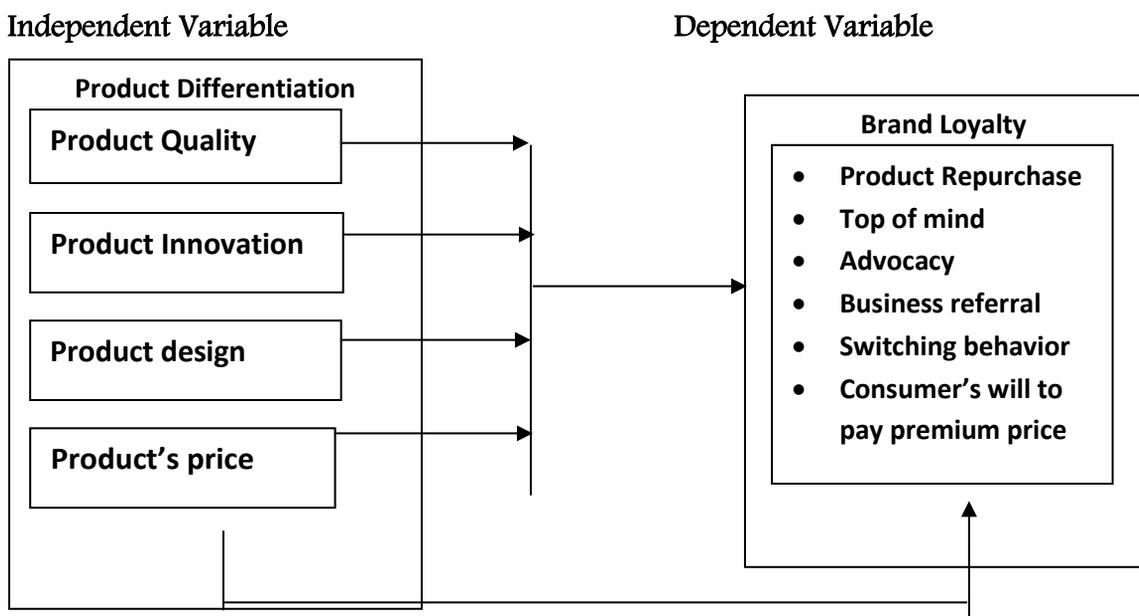


Figure 1: Conceptual Model  
Source: Author (2018)

Brand loyalty is a key variable in any company’s success because without it, a constant and steady inflow of cash for a firm is at risk, especially in situations where firms face stiff competition from their rivals. Brand loyalty is created when customers’ expectations as to the quality of the products being offered are satisfied by the purchases the customers make so that a re-purchase from same brand becomes a norm (Chamberlin, 1933). This paper looked at the relationship between a firm’s product differentiation, and the brand loyalty it experiences. Product differentiation is examined from the perspectives or aspects of product quality, innovation, design, and cost. Brand loyalty arises from product repurchase, business referral, advocacy, willingness to pay premium price and from customers’ reluctance to switch from accustomed products. The relationship between the two variables is as shown in figure 1 above.

## 7. Summary, Conclusion and Way forward

### 7.1 Summary

This paper aimed at bringing to light the relationship that exists between product differentiation and brand loyalty for various brands. It is believed that companies that differentiate their products add value to these products making them attractive to the existing customers as well as potential customers. These sentiments are supported by Alderson (1957) and Chamberlin (1933) in their views as to what product differentiation is.

### 7.2 Conclusion

The paper outlined the key measurements of product differentiation which give a clear understanding of relationship between product differentiation and brand loyalty. Measurements of brand loyalty have also been highlighted in the paper. The conceptual model developed has its usefulness in examining the contribution of product quality, branding, innovation, design, customer service and cost to brand loyalty. It is important to note that differentiated products are key to an organization's competitive advantage and to customers' satisfaction. This is according to Rahma (2011) and Nawaz and Usman (2011) respectively. In most cases, a satisfied customer will most likely make a repeat purchase, refer other customers, patronage the brand, be willing to pay a premium price or will be unwilling to switching from a product. Consumer behavior exhibited in this manner is a reflection of brand loyalty. More empirical studies need to be done on the measures and dimensions of product differentiation.

### 7.3 Way Forward

Analysis of the literature shows that product differentiation is important in every company's undertaking because it enables an organization to set its products apart from the competitors' products in a way that it wins the attention and acquisition of most of the customers. Among the key areas that the company should concentrate on when differentiating its products include product quality, branding, innovation, design, quality customer service and cost. Customers go for products that will give them value for their money. In the course of offering value to customers, organizations undertake various activities to ensure that the value is delivered in a unique and appealing way to the customers. If the customer's perceived value is met by the differentiated product, the customer will be happy with the firm's product; otherwise customer dissatisfaction will set in. A satisfied customer will in the future consider buying the product from the same organization. Other likely behavior that the customer will exhibit include speaking well about the product, giving business referrals, patronizing the brand, paying a premium price, etc. If the customer consistently exhibits all or some of these behavior, it will lead to brand loyalty. This justifies why firms should consistently aim at differentiating their products to ensure that they attract customers and while offering them value that they expect.

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**Preferences and Reservations Groups and Performance  
of State Corporations in Kenya**

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**Abstract**

This paper seeks to assess the effect of preferences and reservations groups on performance of state corporations in Kenya. State corporations have been characterized by declined performance which mainly has been tied to inappropriate adherence to the reservations and preferences groups as set in the PPAD Act. However, this is yet to be proved in a local context, hence the subject of the study. The paper also seeks to assess the moderating effect of enforcement of the public procurement act on the relationship between preferences and reservations and performance of state corporations in Kenya. The paper was informed by the theory of public value. A descriptive research design was used which was anchored on positivist philosophy. The target population of this study included all 187 registered state corporations in Kenya. The sampling frame comprised of heads of finance and heads of procurement function in all 187 state Corporations in Kenya. The study used a census where all the 187 state corporations were surveyed. To identify the unit of observation, the study purposively picked the head of finance and the head of procurement function in all 187 state corporations in Kenya. This formed 374 respondents. Primary data was the main data for the study which was collected using questionnaires. The questionnaire involved both semi structured and structured questions. The collected data was prepared and analyzed with the aid of the Statistical Package for Social Sciences (SPSS) Version 26. Descriptive and inferential statistics were used to analyse. The analyzed data was presented in form of tables, graphs, histograms and Pie charts. The study established that preferences and reservations groups through pre-qualification of firms, reporting on contracts awarded and capacity building significantly and positively influenced the performance of the state corporations. The findings further revealed that the enforcement of the public procurement act had a significant positive moderating effect on the relationship between preferences and reservations and the performance of state corporations in Kenya. The study concluded that through well-embraced pre-qualification of firms under the reservations and preferences groups and reporting the awarded tenders to these firms, the state corporations enhance effective operation and save the costs and time thus enhancing performance. It is therefore recommended that the state corporations should adopt effective and well-articulated strategies of ensuring the special groups under the preferences and reservations are catered for during the tendering processes. This serves to enhance performance and effectiveness of the state corporations.

**Keywords:** *Public procurement act, Preferences and Reservations Groups, State corporations, Firm Performance*

**1.0 INTRODUCTION**

**1.1 Background of the Study**

Procurement is a critical component in the functioning of any state as it is used for acquiring of assets and services in such a way to meet a specific need (Munyao & Moronge, 2017). Public Procurement has certainly become gradually more significant factor in economic and business circles worldwide as it has a key responsibility in triumphant management of public resources and most countries have made an attempt to incorporate it into a more strategic view of government hard work (Grandia & Meehan, 2017). The procurement of supplies, works and services in public entities is valued to account for 15-20% of GDP in developing countries, and up to 50% or more of aggregate state expenditure and it is therefore an area that needs attention in the face of increasing noncompliance (Chekol & Tehulu, 2017). Ensuring effective management of this integral aspect of government mandate is therefore, equally critical to the government. This led to the introduction of the Public Procurement and Assets Disposal Act (PPDA), which was meant to set the required procedures to be followed by government agencies when procuring or disposing off their assets.

Among the major aspects of the PPDA act is the preferences and reservations groups. These are special group that the government recognize as the less-opportune who are likely to be left of participating government projects, if specific measures for the consideration are not put in place. Preferences and reservation activities in public procurement involves ensuring that contracts or portions of a contract are set aside for bidders who satisfy certain prescribed

criteria in the public procurement Act (Mwangi et al., 2017). This is done to ensure that special groups are not disadvantaged in the procurement process by giving them an opportunity to develop themselves economically (Gitari, & Kabare, 2017). The focus of this scheme is to ensure small businesses, local bidders, youth, women and persons with disabilities are not discriminated when obtaining works, goods and services in public procurement procedures. This obligation focus on groups in the society alleged to be deprived of, equal access to resources, services and tools which are suitable for their survival (Marendi & Awino, 2016). The Kenyan government has recognized the importance of these groups thus it has put across rules establishing public procurement law for promotion of these special groups (Nyongesa & Osoro, 2019). Further, the government has specified the legal quotas for PP suppliers for small businesses and the proportion is capped at 30% of all the contracts awarded. However, the main challenges in implementing these regulations include conflict of interest, availability of resources, nature of products and services, resistance of buyers and qualification and ability of the small enterprises to deliver on the requirements (Kimote & Kinoti, 2018).

On the other hand, state corporations play a critical role in dispensing the government mandates and steering the success of the government agenda. These are the state-owned company formed by a government to embark on profit-making activities with a view to build up its economy. In Kenya, the prerequisite of its establishment, management and rules are set out under the State Corporations Act chapter 446 laws of Kenya (RoK, 2013). Public procurement in these corporations is essential in promoting the success of the corporation's mandates by enabling them live up to the service delivery as well as saving on the cost of operations and accountable use of public funds. The State Corporations Act (1987) amended in 2013 provides way through which an organization can be regarded to be a state corporation. A state corporation is a unit which the public has major control over and spends state funds in the acquiring of goods and services for use by the public (RoK, 2013). They are guided by state set of laws and selected bodies such as the State Corporations Advisory Committee (SCAC), and the Efficiency Monitoring Unit. Kenya has one hundred and Sixty (160) state corporations (State Corporations Advisory Committee (2020), grouped into Eight (8) functional categories in regards to their responsibility and purpose. These state corporations are observed to have immense forthcoming to facilitate growth (Mogikoyo *et al.*, 2017). The creation of state corporations was determined by state yearning to speed up socio-economic progress, a call to restore regional economic inequity, citizen's involvement in economy and supporting native entrepreneurship (Kariuki & Aduda, 2017). There is need to oversee and manage state corporations to help them carry out their mandate in a more efficient, effective and sustainable manner. To improve their performance, there is need to ensure that all state corporations comply with Public procurement Act through appropriate enforcement measures (Mugo & Odari, 2018).

### **1.2 Statement of the Problem**

Public procurement stands to be one of the key aspects that enhances economic growth and development through promoting government spending and dispensation of government services to the public. However, despite the merit surrounding public procurement, it has become one of the pathways for loss of public funds at the expense of the taxpayers. As noted by King'oo and Muli (2019) the government of Kenya losses about Kshs.121 billion which is equivalent to 17% of the state budget annually. This is as a result of inappropriate uphold of the PPDA including the adherence of the set preferences and reservations groups (PPRA, 2019). According to Mutangili, (2019) in 2017/2018 financial year, 32% of states corporations in Kenya experienced material shortages and 46% of these entities were still applying traditional methods of inventory records keeping. This has incapacitated the ability of the state corporations to meet the intended purpose. Empirically, it remains unclear how adherence to the set policies on preferences and reservations groups have affected the performance of the state corporations. This study therefore sought to fill the existing gaps by assessing the influence of preferences and reservations groups on the performance of state corporations in Kenya.

### **1.3 Objectives of the Study**

1. To assess the effect of preferences and reservations groups on performance of state corporations in Kenya
2. To analyze the moderating effect of enforcement on the relationship between preferences and reservations groups and performance of state corporations in Kenya.

### **1.4 Research Hypothesis**

1. H<sub>0</sub>: Preferences and reservations groups do not significantly affect performance of state corporations in Kenya.

2. H<sub>0</sub>: There is no significant moderating effect of enforcement on the relationship between preferences and reservations groups and performance of state corporations in Kenya

## 2.0 LITERATURE REVIEW

### 2.1 Theoretical Review

The paper has been anchored on the Public Value Theory. The theory was extensively proposed by Moore (1995), as an effort to expound on the use of public resources through procurement for the better benefit of the members of the public. The theory provides public sector procurement managers with a better understanding of the limitations and opportunities within which they work, and the challenge to create publically valuable outcomes. The theory visualizes a manager's role as going past implementation of law and observance to institutional standards (Bryson, Crosby & Bloomberg, 2014). It includes looking out for opportunities to achieve considerable improvements to living standards of the public. Moore (1995) also notes that public value theory communicate a more proactive and strategic responsibility for public procurement sector managers who seek to find out, classify and produce public value, instead of just coming up with means for realizing mandated purposes. The theory upholds that the need for any government spending is to serve the public. This implies that any government spending should cover every group of persons, including women, youth and people living with disabilities and those with minimal access to government opportunities. This is the essence of preferences and reservations groups. The PPDA act aimed at ensuring that all the minority groups are considered in government projects and contracts, unlike in scenarios where only large organizations are considered. This justifies the choice of this theory to expound on the preferences and reservations groups in the public procurement.

### 2.2 Conceptual Framework

Conceptual framework for this paper is as shown in Figure 1 below.

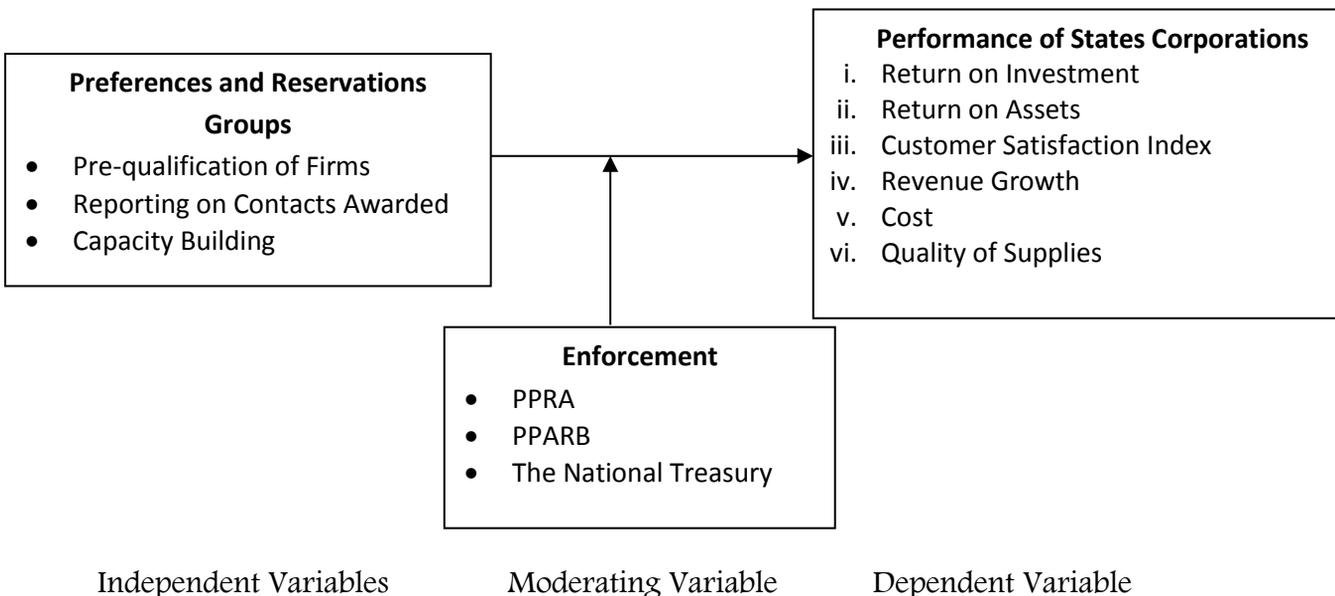


Figure 1: Conceptual Framework

### 2.3 Empirical Literature Review

Etse and Asenso, (2017) carried out a study on the challenges facing public procurement process in public sector in Ghana. A sample size of two hundred (200) participants was carefully chosen from Health and Educational institutions in Ashanti Region. The primary data was collected using questionnaires and interviews. The research indicated that the Public Procurement Act, needed to be amended to improve fiscal transparency, effectiveness, efficiency, and enhance competition between the local industries. The study indicated that there is need to deal with the challenges of non-compliance with public procurement Act by coming up with strict enforcement procedures.

A study by Muraguri, (2017) analyzed the implementation of the Youth Preference and Reservations Policy in Public Procurement in Kenya. The findings of the study indicate that that public procurement preference and reservations policy among the youth, women and people women, youth, persons living with disabilities still not been fully implemented. On average the public procuring entities have not fully prioritized the special groups in their procurement opportunities. To achieve requirements of preferences and reservations in public procurement there is need for adopting strict measures that include strict procedures and compliance to achieve the goal of preferences and reservations in public procurement. Compliance with

procurement reservation practices can also be enhanced through enforcement by regulatory bodies (Muraguri, 2017).

Gitari and Kabare, (2017) carried out a study on the factors affecting access to procurement opportunities by small and medium enterprises in Kenya. The study found out that on the number of contracts awarded to the preference and reservation groups, indicated that out of all preference and reservations contracts awarded by procuring entities, persons living with disabilities were awarded the least number of contracts across all the categories of procuring entities. The findings also indicated that some entities were awarding nil contracts to this target group. The study further noted that a number of state organizations had failed to reserve at least the 30% required minimum of their procurement expenditures to the disadvantaged groups. The study recommended the need to train employees on preferential procurement directives and ways in which the procuring entities can ensure compliance to these directives. The study also recommended the need to ensure that all special groups are well trained on preferential procurement opportunities and the documentation required to winning a tender.

Rono and Moronge, (2019) analyzed the determinants of implementation of procurement management practices in county governments of Kenya. The research used descriptive as the research design and a sample size was selected using stratified random sampling. The research results found public procurement enforcement had a positive effect on effective implementation of procurement management practices, then regulatory framework, elements related to clients and professionalism of auditors in that order. The research concluded that public procurement laws and regulations effective implementation have had a considerable effect on pricing of goods acquired and the time taken between placing an order and when the delivery is done. The study recommended that there is need to enforce all public procurement activities so as to improve performance of an organization.

### **3.0 METHODOLOGY**

This paper used a descriptive research design. The design helped realize the objectives of the study given that it explains the distinctiveness of a particular individual, or of a group and at the same time makes adequate provision for protection against bias and maximizes reliability (Kothari, 2019). It also describes data and characteristics about the population or phenomenon under study.

The target population for this study included all registered state corporations in Kenya. These are the companies owned by the Kenyan Government. The attention to this population of the analysis was determined by the reality that state organizations are representative of the state in executing the public procurement Act. There are 187 States Corporations in Kenya.

The study used a census which comprised of each head of finance and the head of procurement function in all 187 states corporations in Kenya which formed 374 respondents. The choice of these respondents was because the head of finance of a public entity with the help of the head of procurement function is primarily responsible for ensuring that the public entity complies with the Public Procurement and Assets Disposal Act, 2015.

This study used a questionnaire as the main research tool to collect primary data. Quantitative data collected in this research was analyzed using descriptive and inferential statistics. The questionnaires filled by respondents were edited to ensure they are complete for analysis. Descriptive statistics using the mean, median and standard deviation and, inferential statistics that involved correlation and regression analysis were applied to analyze quantitative data.

### **4.0 FINDINGS**

#### **4.1 Response Rate of the Study**

The study had a sample of 374 respondents who were surveyed using a structured questionnaire. A response rate of 81.3% (304 respondents) was achieved and the data used for analysis. This therefore makes the study appropriate to make conclusions and recommendations.

#### **4.2 Reliability Test Results**

A test for reliability was carried out. Cronbach's coefficient alpha which determines the internal consistency of items in a questionnaire was used. Alpha values range from zero (0) (meaning: no internal consistency) to one (1) (meaning: complete internal consistency). The acceptable values for test variables are those that are above 0.70 (Cooper & Schindler, 2017) and this was the threshold used in this study. Table 1 shows the results of the reliability of the research instrument.

**Table 1: Reliability Results**

Variable	Cronbach's Alpha	Number of Items
Preferences and Reservations Groups	0.930	9
Enforcement of the Act	0.956	11
Performance of State Corporations	0.955	18

The findings revealed that all the variables had Cronbach's coefficient alpha higher than 0.70 hence the instrument was ruled to be reliable.

#### 4.3 Demographic Analysis

The demographic results revealed that most of the state corporations surveyed were under commercial and manufacturing categories while the rest were under the tertiary, educational and training. Other categories of state corporations that took part in the study included that service, regional development authorities, training and research, public universities, and regulatory. Most of the respondents surveyed had a bachelor's degree as their highest educational qualification while majority had served in their respective organizations for a period of less than 10 years. The demographic results implied that the respondents had diverse characteristics hence they would give diverse responses which is essential for a dynamic study.

#### 4.4 Preferences and Reservation Groups

The study sought to assess the influence of preferences and reservations groups on the performance of state corporations in Kenya. The respondents were asked to indicate their levels of agreement or disagreement on specific statement drawn from the sub-constructs of preferences and reservations which were: Firms' pre-qualification, reporting on contracts awarded and capacity building. Table 2 summarizes the findings. The findings revealed that the provisions by the act that special groups should be upheld under the preferences and a reservation were not effectively adhered to in most of the surveyed state agencies. Lack of training as one of the aspects of enhancing adherence to the preferences and reservations is evident in most of the surveyed state corporations as far as special groups and preferences and reservation are concerned. This leads to minimal adherence to the PPDA requirements and guidelines as far as preferences and reservations are concerned. According to Mwangi *et al.*, (2017) it is essential for state corporations to adhere to the PPDA guidelines on preferences and reservations especially as far as youths are concerned if equitable and effective procurement procedures are to be achieved in the state agencies.

**Table 2: Descriptive Statistics on Preferences and Reservation Groups**

Statement	N	Mean	Std. Dev.
To qualify for a specific preference or reservation, all candidates provide evidence of eligibility	304	3.66	1.22
All procurement opportunities available for special groups such as the youth are advertised in the state's portal and website	304	3.35	1.23
All submissions from special groups are evaluated as required by Act	304	3.86	1.02
There is 30% set aside of all procurement value in every financial year that is fully allocated special groups	304	3.31	1.23
There are measures taken to ensure that money paid out to special groups' enterprises is paid to the appropriate accounts	304	3.19	1.17
Compliance reports with preferences / reservations in procurement are submitted to PPRA	304	3.18	1.09
There are regular capacity building programs on preferential procurement opportunities to empower special groups	304	3.13	1.17
There are regular trainings for staff on the preferences and reservations	304	3.21	1.19
There are regular trainings on the documentation required for preferential public tendering process	304	4.33	0.69

The results further revealed that that majority of the respondents indicated that preferences and reservations had no effective influence on the performance of the state corporations. The respondents were asked to comment on their answer and one statement that was recorded by majority of the respondents was that their preference groups were not aware of their reserved tenders and this gave a room for the procurement officials to overturn and give such opportunities to other unqualified groups as far as preferences and reservation were concerned.

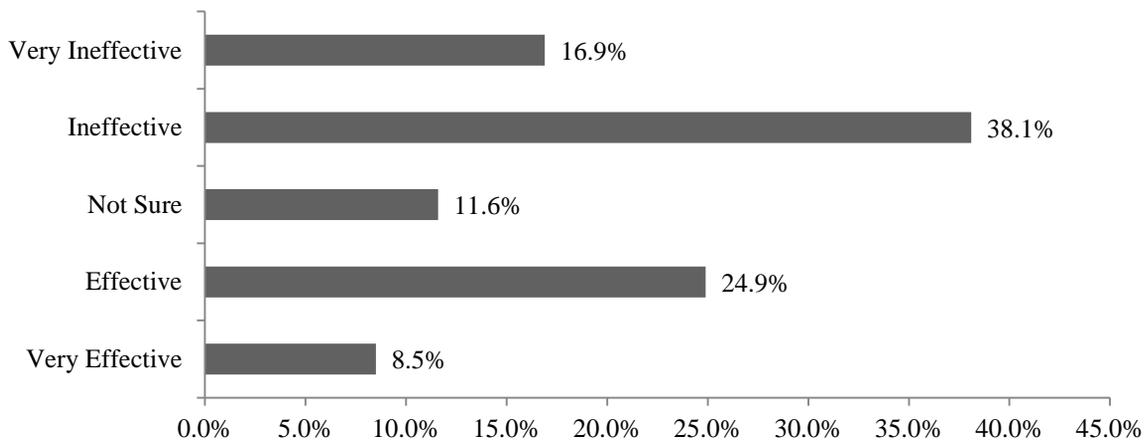


Figure 2: Rating the Effectiveness of Preferences and Reservation Groups

#### 4.5 PPDA Enforcement

The study assessed the moderating effect of the enforcement of the PPDA act on the relationship between procurement methods and the performance of state corporations in Kenya. The main aspects used to assess the enforcement were: the public procurement regulatory author, the public procurement administrative review board and the national treasury. The respondents were asked to indicate the effectiveness to which in their opinion, the enforcement of the PPDA was instrumental to the compliance with the act and performance of their respective state corporations. The findings revealed that majority of the respondents (57.6%) were of the opinion that the enforcement of the PPDA was effective in enhancing the compliance and performance of the state corporations. While asked to comment on their opinions, the respondents stated that the enforcement by the relevant authorities was needed as a way of ensuring that every state corporation complies with the act. One statement that was frequent among most of the respondents was that the enforcing agencies were not effectively doing their mandate and this led to reluctance among most of the state corporations.

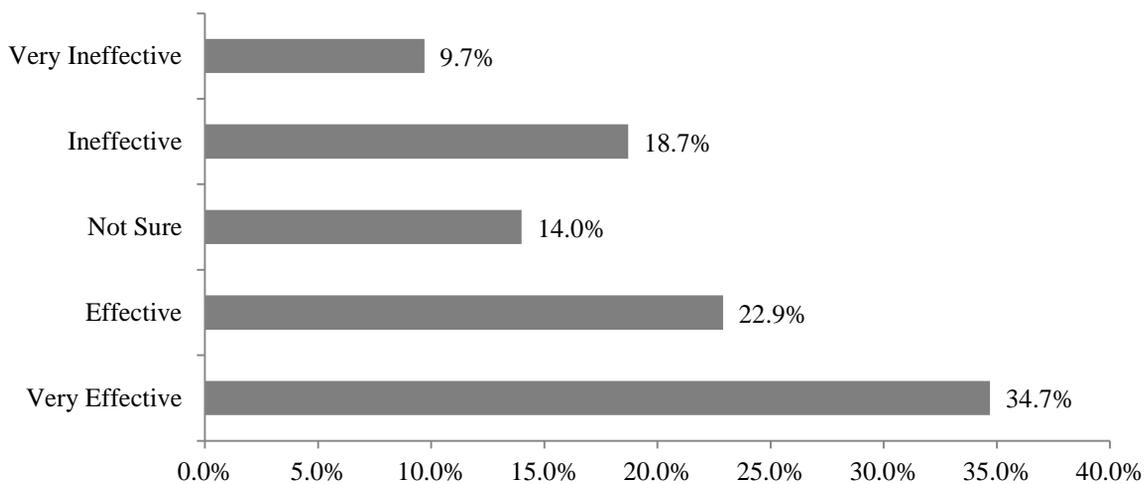


Figure 2: Rating the Effectiveness of PPDA Enforcement

#### 4.6 Performance of State Corporations in Kenya

The study sought to assess the performance of state corporation in relation to the compliance with the public procurement act. The performance in this case was assessed in terms of cost reduction, quality of supplies, Return on Investments and profit margins. The findings were obtained from both secondary sources and the primary data. For the primary data, the respondents were asked to indicate the percentage increase/decrease on specific aspects of performance for the period between 2015 and 2019. These percentages were averaged and the findings are as shown in Figure 3.

As the results portray, the reduction in cost of assets disposal had an average score of 17.5% while the average percent reduction in cost of procurement was 10.5%. The highest score was on the average percentage of goods and services delivered conforming to the specifications which was at 28.6% while the least was the average customer satisfaction index which was at 2.3%. The increase in return on assets had a score of 23.4% while the number of customer complaints was at 21.1%. The findings imply that the performance of most of the state corporations as far as the compliance with the PPDA act is concerned was below the average with customer satisfaction being the least scored aspect.

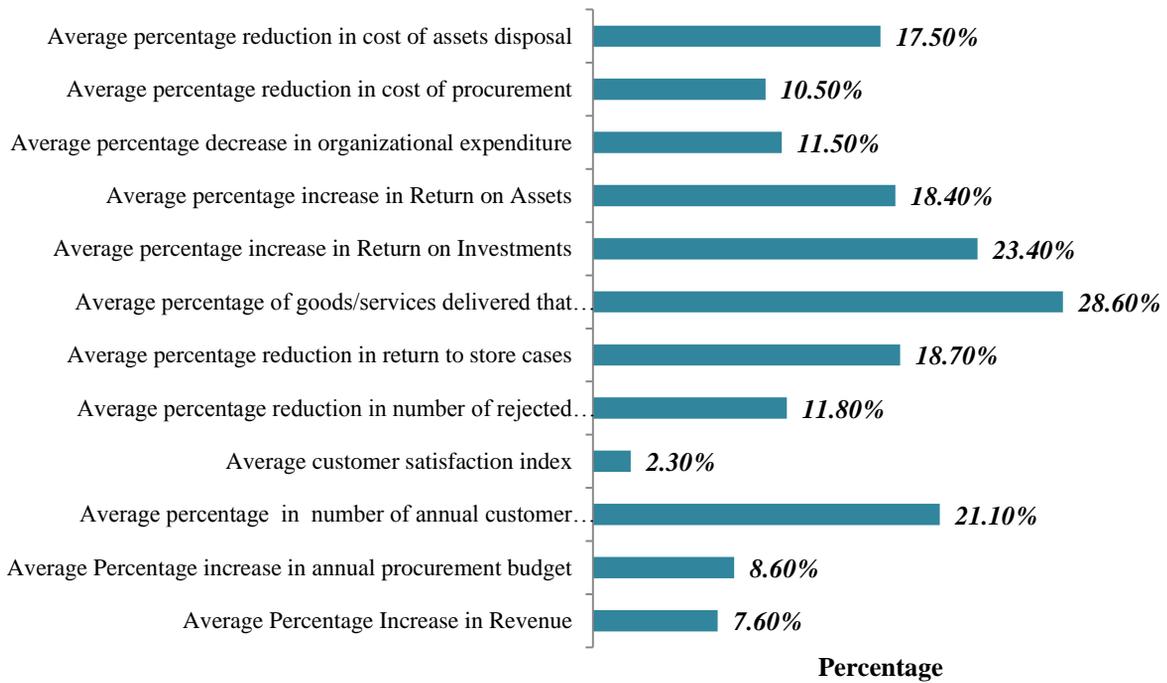


Figure 31: Descriptive Statistics on the Performance of State Corporations

#### 4.7 Inferential Analysis Results

##### 4.7.1 Correlation Results

Pearson correlation was used to establish the correlation between variables. The findings are as shown in Table 4. The results indicated that preferences and reservations had a significant correlation with performance of state corporations as evidenced by the Pearson Correlation Coefficient of 0.687 at significance level of 0.000.

Table 4: Correlation Analysis

	Performance of State Corporations	Preferences and Reservations
Performance of State Corporations	Pearson Correlation 1 Sig. (2-tailed) N 304	
Preferences and Reservations	Pearson Correlation .687** Sig. (2-tailed) .000 N 304	1 304

\*\* . Correlation is significant at the 0.01 level (2-tailed).

##### 4.7.2 Hypothesis Testing

*H<sub>0</sub>: Preferences and reservations groups do not significantly affect performance of state corporations in Kenya*

The statistical relationship between preferences and reservations (independent) and the performance of state corporations in Kenya (dependent) was sought in the study. This was done through ANOVA, regression coefficients and the Scatter plot diagram. This was an attempt to establish whether to reject the null hypothesis or not.

The model for the variable was  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$  where Y was the dependent variable and X the independent variable while  $\beta$  was the coefficient/constant. The model summary shown on Table 5 revealed that the R value was 0.687 while the R<sup>2</sup> value was 0.471. This indicated that the variability of the preferences and reservations and the performance of state corporations in Kenya could be explained by up to 47.1% of the model. This implies that the model was fit to establish the relationship between the two variables and make conclusions on the same.

Table 5: Model Summary (Preferences and Reservations)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.687 <sup>a</sup>	.471	.470	.53168

a. Predictors: (Constant), Preferences and Reservations

b. Dependent Variable: Performance of State Corporations

ANOVA test was also done and the results were as indicated on Table 6. The findings revealed that the F-calculated was 269.287 and the mean for the regression model was 76.122 at a significant level of 0.000. This indicates that the P-value for the variable was  $0.000 < 0.05$ , an implication that the model was predictive. This also shows the ability of preferences and reservations to significantly influence the performance of state corporations in Kenya.

Table 6: ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.122	1	76.122	269.287	.000 <sup>b</sup>
	Residual	85.369	302	.283		
	Total	161.492	303			

a. Dependent Variable: Performance of State Corporations

b. Predictors: (Constant), Preferences and Reservations

The coefficient of the variable was as shown in Table 7. The results revealed that the  $\beta$  value for variable preferences and reservations was 0.626 and the model equation now becomes  $Y = 1.151 + 0.626X_3$ . This implies that a unit change in the preferences and reservations, could lead to up to 62.6% increase in the performance of the state corporations in Kenya. The P-value for the variable was  $0.000 < 0.05$  again implying that the preferences and reservations significantly influenced the performance of the state corporations in Kenya.

Table 7: Regression Coefficients

Model		Unstandardized Coefficients		Standardized t	Sig.
		B	Std. Error		
1	(Constant)	1.151	.145	7.963	.000
	Preferences and Reservations	.626	.038	16.410	.000

a. Dependent Variable: Performance of State Corporations

The scatter plot was used to further bring out the relationship between the preferences and reservations and performance of state corporations in Kenya. The findings as shown in Figure 4 revealed that the plots had a positive gradient. This implied that preferences and reservations had a positive influence on the performance of state corporations in Kenya. This justified the decision to reject the null hypothesis that preferences and reservations has no significant influence on performance of state corporations in Kenya.

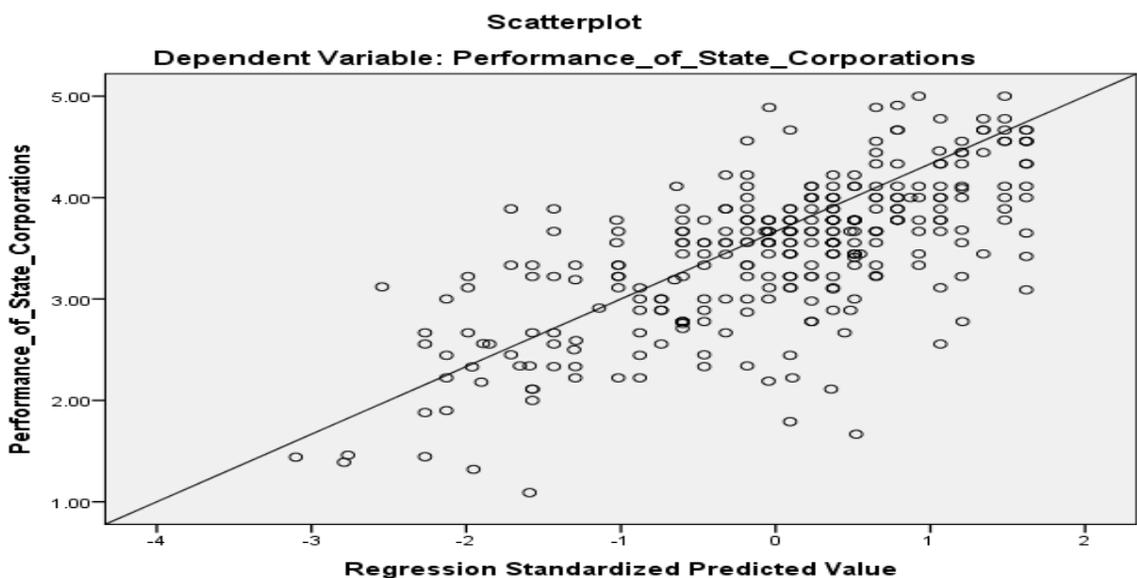


Figure 4: Scatter Plot on Preferences and Reservations

A histogram was used to further explain the viability of preferences and reservations on performance of state corporations in Kenya. The results as shown in Figure 5 revealed that the bell-shape curve was attained which is an indication of normal distribution of the standardized residuals. The bars on the histogram were also symmetric an indication that the data is normally distributed.

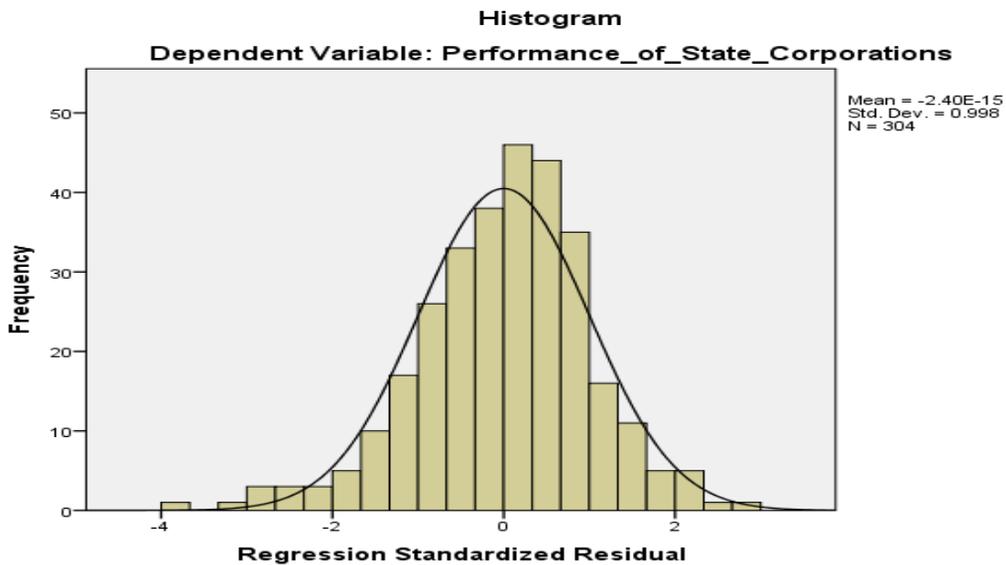


Figure 5: Histogram on Preferences and Reservations

*H<sub>0</sub>: There is no significant moderating effect of enforcement on the relationship between preferences and reservations groups and performance of state corporations in Kenya.*

The study sought to test the hypothesis on the moderating effect of PPDA enforcement on the relationship between preferences and reservations and performance of the state corporations in Kenya. Table 8 shows the findings. As the results portray, only the interaction between preferences and reservations and PPDA enforcement was significant ( $P=0.000 < 0.05$ ). The null hypothesis that PPDA enforcement has no significant moderating effect on the relationship between preferences and reservations and performance of the state corporations in Kenya was therefore rejected

**Table 8: Regression Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.509	.118		12.783	.000
Preferences and Reservations*PPDA Enforcement	.058	.014	.338	4.239	.000

a. Dependent Variable: Performance of State Corporations

## 5.0 CONCLUSIONS

The inferential analysis of the regression model revealed that preferences and reservations had a significant influence on the performance of state corporations in Kenya. The results further revealed that the enforcement of the PPDA had a significant moderating effect on the relationship between preferences and reservations and the performance of state corporations in Kenya. The study concluded that the preferences and reservations under the PPAD act were significant in influencing the performance of the state corporations. Through appropriate pre-qualification of firms during the tendering process in the social groups and making the required reports to the contracts awarded to the special groups, the state corporations could be concluded to be on the right path towards steering performance. While the findings revealed that capacity building programmes were not upheld in most of the state corporations to sensitize the social groups on the preferences and reservations, it can be concluded that the sensitization is crucial for the state corporations to meet the mandates of the special groups.

## 6.0 RECOMMENDATIONS

Preferences and reservations is an essential way of ensuring equality and fairness in government opportunities especially as far as the tendering and procurement process is concerned. The study recommends that the management of the state corporations should be at the forefront of ensuring that the appropriate members of the targets groups are awarded the reserved and preferred tenders as a way of not only implementing the PPAD Act but also putting on board every member of the society for equitable share of resources and opportunities. The enforcement agencies should also be at the forefront of ensuring that the preferences and reservations are upheld among the state corporations. The management needs to ensure that they create awareness of all procurement opportunities available for special groups and organize regular capacity building programs on preferential procurement opportunities to empower special groups. There is also need to organize regular trainings for staff on the preferences and reservations requirements so as to improve compliance.

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## Influence of Customer Relationship Management on Performance of Manufacturing Firms in Kenya

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### Abstract

**Purpose:** The study sought to determine the influence of customer relationship management on performance of manufacturing firms in Kenya.

**Methodology:** This study employed descriptive research design. The targeted population of this study is comprised of 499 manufacturing companies which are all located in Nairobi and its environs. In order to come up with a representative sample, stratified random sampling method was used since the population is heterogeneous. The stratified technique ensured that each sector in the target population has an equal chance of being selected. There were 217 respondents sampled from the 499 manufacturing firms out of 217,180 respondents returned the questionnaires for analysis. The study adopted a descriptive survey design. Data was collected using self-administered questionnaires which were tested for validity and reliability using 10% of the total sample respondents. Quantitative data was analyzed using both descriptive and inferential statistics and with the help of SPSS version 23 while qualitative data was analyzed descriptively. Linear and multiple regression models were used to show the relationship between the dependent variable and the independent variables. The information was presented using tables, charts, frequencies, percentages and graphs.

**Findings:** The study established that there exists a positive influence of customer relations management on performance management of manufacturing firms in Kenya at 5% level of significant ( $\beta=0.595$ ,  $P<0.05$ ). This indicates that as customer relationship management increases to certain level then performance of manufacturing firms in Kenya also increases significantly and vice-versa

**Unique contribution to theory, practice and policy:** The study has proved that indeed customer relationship management as a strategic alliance influences performance in these organizations. In addition, the study is of benefit to the government of Kenya who should create awareness of their policies through training of the key stakeholders for this organizations since the majority of the respondents indicated that the government policies and strategies are ineffective. Customer relationship management had significant effect on organization performance and this requires that to improve on quality production and lead time, manufacturing firms must also improve their customer relationship management. Since the quality of the products has not significantly improved for the last 5 years, more strategies must be put in place to incorporate technology which will aid to improve the quality and also maintain required lead time in these organizations. Other researches and scholars may want to build on this study and explore other areas of interest that were not covered in this work

**Keywords:** *customer relationship management, performance and manufacturing firms.*

### 1. INTRODUCTION

The manufacturing sector in Kenya is believed to be the third largest industrial sector after transport, communication and agriculture (KPMG, 2014). It is the third top sector contributing to gross domestic product in Kenya. The manufacturing sector is made up of only 10% of the industrial sector benefaction even though Kenya is said to be the most highly industrially developed country in East Africa (RoK, 2014). According to the US Department of State, this exposes a gap in the country's ability to achieve a fully industrialized economy by 2020. It argues that there is still a lot of room for development in countries manufacturing sector, but for this to happen, reforms to the business environment need to be made to factor in the influence of strategic alliances in supply chain in the sector (KPMG, 2014). The manufacturing sector has a great potential on promoting economic growth and competitiveness in the country like Kenya.

Business environment has become complex and requires flexible operations, firms have become more susceptible to supply chain disruptions and (Wieland & Wallenburg, 2013). Jüttner and Maklan, (2011) argue that supply chain resilience, which decreases the impact of supply chain risks by actively pointing out on strategies that enable supply chains to respond and recover to their original state or an even better condition is very vital to many firms' survival. Firms are now actively involved in forming supply chain strategies so as to develop new and improved processes, practices and strategies according Peter *et al.*, (2017). Literature

shows that there are many benefits of forming strategic alliances but despite those benefits, many organizations have not entered into formal alliances because they lack adequate knowledge of what strategic alliance entails and its impact on the performance of their (Ramanathan *et al.*, 2011).

According to NAM (2015), USA's 12% GDP is accounted for by its manufacturing sector, while it employs about 9% of countries workforce, every dollar spent in manufacturing adds \$1.37 to the US economy, and every 100 jobs in a manufacturing facility creates an additional 250 jobs in other sectors. USA's manufacturing output growth has over the years outperformed that of most European countries and Japan, however, it has continued to lag behind that of China, Korea and other Asian countries (Levinson, 2015).

In most of Africa, performance of manufacturing has been particularly poor over the decades compared to that of developing countries (WB, 2014). According to a report by ODI (2016), Kenyan manufacturing sector is growing slower at the rate of 7% than those in Ethiopia at 24%, Rwanda 35% Tanzania 25% and Uganda 22%. Governments in East African Countries seem to be putting more pronounced effort into building manufacturing through creation of industrial parks like Ethiopia and making land available for manufacturing and particularly labor-intensive manufacturing (ODI, 2016). Ethiopia's manufacturing sector responsibility in the nation's economic development has been increasing year after year according to the Ethiopia Economic Association (EEA) (EEA, 2011). At present, the government seems to have given increased attention to the industrial sector, especially to manufacturing, as it is expected to take the lead in the economy as of the year 2014/15 (EEA, 2011).

In Kenya, competitive pressures are forcing manufacturing companies to continuously seek new ways to manage their production capabilities more effectively in order to meet the demands of the market. The manufacturing industry in Kenya contributes 14% to the country's gross domestic product and employs over two million people (Republic of Kenya (RoK), 2013). However, this sphere has seen a decline in its contribution to GDP from 13.6 percent in the early 1990's to 9.2 percent in 2012. According to KNBS, (2016), the manufacturing sector in Kenya has been growing at 3.5% and 3.2% in 2014 and giving about 10.3% of the GDP. The third largest economic sector after agriculture, transport and communication was found to be manufacturing sector (KPMG, 2014), with building and construction, mining and quarrying cumulatively contributing the remaining 30% (KAM, 2016). The decline trend calls for better ways of doing business within the sector. The adoption and implementation of Strategic Alliances on the supply chain is seen as a way of reducing manufacturing costs and also distributions cost. This in turn enhances the performance of the manufacturing sector.

This study focusses on manufacturing sector; reason being it has been performing minimally at 10% in the last decade.

### **1.1 Strategic Alliances in Supply chain**

Strategic alliance is viewed as an open relationship which is based on reciprocal need between autonomous organization so as to achieve mutually determine and individual objectives, where decisions are made together and risks and benefits, knowledge and resources are shared (Cao & Zhang, 2011). These alliances also entail sharing of information, dedicating investment, making joint decisions, and aligning incentives (Nyaga *et al.*, 2010). The perspective of collaborative advantage enables supply chain partners to view strategic alliances as a positive venture rather than a risky one, and therefore partners endeavour to gain favourably and gain competitive advantages (Evelyne *et al.*, 2017). According to Latour (2001), in 2000, a fire destroyed the entire production capacity of a plant of Phillips Electronics in Albuquerque, which was a sub supplier of the Scandinavian cell phone maker of Nokia and Ericsson. Zhu *et al.*, (2016) added that Nokia decided to enter an alliance with Phillips to chip its chip orders to other Phillip plants so as to use their extra capacity whereas Ericsson who did nothing incurred a loss of \$400 million.

This shows that the changes of the focal firm strategy can be attributed to formation of strategic alliances. This formation of strategic alliances encourages information sharing, joint decision making and resource sharing (Lavie, 2006). These actions in return will benefit the firms to acquire and retain customers faster (Wei *et al.*, 2012) as well as focal firm's financial performance (Cao & Zhang, 2011). BAT Kenya strives for the development of people capabilities through continuous training. In 2016, BAT formed an alliance with its distribution partners ran training programs named POSITIVE to equip its distribution partners with skills to operate in challenging environment (BAT Kenya, 2016). This paper focuses on the strategic

alliance practices specifically customer relationship management and its role of as a driver for firm performance

### 1.2 Statement of the Problem

Economic Review 2014 indicated that the manufacturing sector in Kenya contributes 10 percent of the Gross Domestic Product (GDP). The Government of Kenya views the manufacturing firms as the key pillar of its growth strategy. The sector is expected to play a key part in the advancement of the Kenyan economy by contributing 20 percent of Gross Domestic Product (GDP). The manufacturing sector has however not yet achieved 20 percent of the GDP as stipulated in the Kenya Vision 2030 (Waiganjo, 2013). The manufacturing sector's contribution to GDP has remained at an average of 10 percent for more than ten years (KNBS, 2015). For example, KAM, (2012); KNBS, (2013) revealed that the manufacturing sector contribution to GDP worsened from 9.6 per cent in 2011 to 9.2 per cent in 2012, while the success rate deteriorated from 3.1 per cent in 2012 to 3.4 per cent in 2011.

According to the report from World Bank the manufacturing sector is the third largest contributor to GDP at 10.3% after transport and communication which stands at 11.3%, followed by agriculture and forestry at 23.4% (KNBS, 2016). Statistics point out that manufacturing firms in Kenya function at a technical efficiency of approximately 59% in relation to their counterparts in Malaysia that average approximately 74% (Odhiambo, 2015). This makes it hard to believe that the sector is capable of achieving the goals of Vision 2030 (Guyo, 2015). The manufacturing sphere contribution to GDP has lagged at 10% for more than a decade with a growth of 3.1%, significantly lower than the overall economic growth of 5% (World Bank, 2016). Kenyan exports to the EAC have been declining, Manufacturers through KAM can partner with institutions such as Trade Mark East Africa, which works to increase access to EAC markets (Achuka, 2016).

Further statistics from the Kenya Association of Manufacturers have shown that certain manufactures implied that they were to close shop and move their businesses to other low-cost countries like Egypt because of low profits (KAM, 2014). Manufacturing firm achievements in Africa has been particularly poor over the last decade (WB, 2014). Kenya's share of manufacturing exports to global market is about 0.02%, and whereas this compares favourably with neighbouring countries like Uganda and Tanzania, the performance is very low compared to countries like South Africa, Singapore, China and Malaysia (WB, 2015). Creation of strategic alliances along the supply chain can be the way in which firms in Kenya improve on performance.

### 1.3 Objective of the Study

The main objective of this study was to determine the influence of customer relationship management on performance of manufacturing firms in Kenya.

## 2. LITERATURE REVIEW

### 2.1 Theoretical Review

#### 2.1.1 The Social Exchange Theory

Social exchange theory is used to reproduce the results of procedural and distributive justice in supply chain relationships. This study used Social Exchange Theory to determine the influence of customer relationship on the performance of manufacturing firms in Kenya. Social exchange theory is based on the concept of individuals or groups interacting due to the expectation of rewards and the avoidance of penalties or punishment (Emerson, 1987; Bandura, 1986). Increased competition has focused attention on the development of policies to build effective on-going relationships with customers and managing those alliances (Hult, 1998). A basic tenet of supply chain management is that on-going relationships among supply chain members and especially with customers increases efficiency and effectiveness (Choi and Hartley, 1996; Shin *et al.*, 2000).

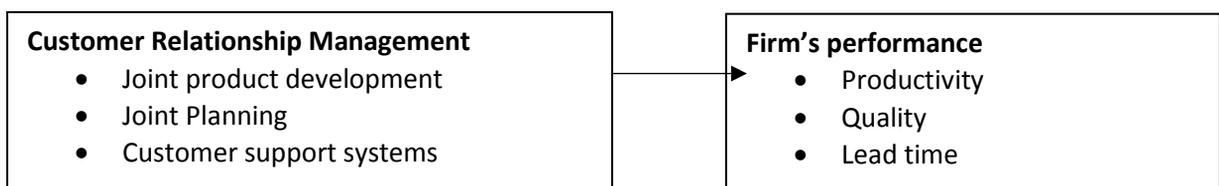
The advantage of taking a social exchange perspective is due to the fact that customer relationship management has a strong impact on supply chain processes, alliances and firm performance (Srinivasan *et al.*, 2011). Social Exchange Theory is composed of a series of propositions outlining the system of social exchange. A fundamental proposition of this theory is that for all actions taken, if an action is rewarded, more likely a member to an exchange is to perform that action again (Wu *et al.*, 2014). Social exchange theory argues that individuals or groups adepts to form contact with others for the expectation of a reward (Yang *et al.*, 2008). Based on the social exchange theory a business network may be seen as a type of exchange network (Blakenburg & Johanson, 1992), and can be defined as a set of interconnected exchange relationships (Prekert & Hallen, 2006).

SET assumes that attitudes and behaviors can be assessed by the rewards of interaction minus the cost of that interaction. Empirical studies argue that high procurement performance can be obtained if there is close understanding and trustworthy collaboration between the supply chain partners such as suppliers, customers and manufacturers (Narasimhan *et al.*, 2009; Wu *et al.*, 2014). Chetty and Eriksson, (2001) argue that the main focus of such a system is on the transformation and exchanges of resources, and less on the social exchange component. It is from this perspective that buyer-supplier networks sometimes referred to as supply networks are most frequently analyzed. Claro (2004) also emphasizes how business networks; supply chains networks and buyer-supplier relationships are all types of business relationships ranging from a web of connections to a dyadic relationship with often blurred boundaries.

Hausman, (2010) in his study argues that committed customer relationship and commitment to core concepts in various transactions between the company and its partners are considered to improve the supply chain performance of a firm. Social Exchange Theory can be well used for explaining supply chain management practices and especially formation of alliances with customers and the influence it has on the performance of an organization. Adopting a social exchange perspective, a consumer makes a contribution to its manufacturer through their partnerships and helps in reaping the benefits of quality and affordable products (Eriksson, 2001). Therefore, Social Exchange Theory was beneficial in explaining the influence of customer relationship management and performance of manufacturing firms.

## 2.2 Conceptual Framework

Orodho (2012) defines a conceptual framework as a road map that the study intends to follow with the aim of looking for answers to the problems raised by the research questions. According to Kothari (2011), a variable is a measurable characteristic that assumes different quantitative values among the subjects. Linked to the statement of the problem, conceptual framework creates the base for presentation of the specific research question that steer the analysis being reported (Shields & Rangarjan, 2013). The conceptual framework below shows the diagrammatic representation of the relationship between customer relationship management and firm's performance.



## 2.3 Empirical Review

### 2.3.1 Customer Relationship Management and performance of manufacturing firms

Mohammad and Nicolette, (2016) in their study on knowledge integration with customers in collaborative product development projects found that the customer's knowledge contribution is aligned with the specific requirements of each phase of the product development. Three specific customer roles are identified and connected to the customer's knowledge contribution. The capability of customers and the degree of initiative of the product development project are affecting the prerequisites for knowledge integration with customers. Michael and Jürgen (2012) found that customer integration was important in-service provision process so as to enhance the operations of the firm and to meet the customer's needs adequately. They argued that customer integration should be included in the operations of a firm by first identifying the type of customer integration need and how much integration. The firm also has to identify the impact of integration and the mechanism that will be used to measure the integration.

Roya and Metin (2017) in their study on customer relationship management, they discovered that managing customers can bring many benefits to the hotel business, though there are some associated challenges. Such challenges often bring a significant risk of failure, and these risks become more significant in budget hotels. The study considered the changes that have emerged in the last decade as regards customer expectations when staying in budget hotels. The study used qualitative approaches to investigate the overlaps between customer expectations and managers' perceptions of CRM applications. The findings revealed that regardless of all changes, value for money and core products continue to play a critical role in customers' overall satisfaction with budget hotels.

Gharakhani et al. (2012) argued that good customer relation has a positive impact in the entire supply chain. Customer relationship management implies that all the customer needs are met by having all right goods, in the right condition and at the right time for customers (Sundram et al., 2011). This will enable a firm to gain new customers and retain them, the firm will also

be able to respond quickly to customer demands and meet customer expectations (Gawankar et al., 2013). Customer relationship management considers customer opinions and involves them in the production process through methods that facilitate the relationship between the customer and the manufacturer or provider (Lotfi et al., 2013).

## 2.4 Research Gaps

There is limited literature on the position of strategic alliance, not much has been researched on the strategic alliances in the past. There is neither adequate literature on future of strategic alliances as it pertains to the performance of organizations. This calls for research so as to provide direction and insight and fill the literature gap in strategic alliances in supply chains and their effect on organizational performance, whether real or simply perceived. This will provide guidance on what form and degree of alliance to make (Ralston et al. 2017). Hassan et al. (2015) investigated measurement for strategic alliance and organizational performance of manufacturing firms. The study concluded that strategic alliance has a positive impact on organizational performance. However, this study was conducted in Malaysia manufacturing firms and not the Kenyan manufacturing firms. Likewise, this study discussed only three strategic alliances practices not including channel alignment and supply chain partnering. As reflected by the presented theoretical and empirical literature there is an inadequacy of research done on strategic alliance and performance of manufacturing firms. This proposed study was unique in that it adopted an integrative approach that captured not only manufacturing firms in Kenya but also the core four factors in successful implementation of customer relationship management through customer support systems. It is therefore a more comprehensive and integrative study that has not been the focus of researchers.

## 3. METHODOLOGY

This study, based on the Positivism research philosophy, employed descriptive research design. The targeted population of this study is comprised of 499 manufacturing companies which are all located in Nairobi and its environs. In order to come up with a representative sample, stratified random sampling method was used since the population is heterogeneous. The stratified technique ensured that each sector in the target population has an equal chance of being selected. There were 217 respondents sampled from the 499 manufacturing firms out of 217,180 respondents returned the questionnaires for analysis. The study adopted a descriptive survey design. Data was collected using self-administered questionnaires which were tested for validity and reliability using 10% of the total sample respondents. Quantitative data was analyzed using both descriptive and inferential statistics and with the help of SPSS version 23 while qualitative data was analyzed descriptively. Linear and multiple regression models were used to show the relationship between the dependent variable and the independent variables. The information was presented using tables, charts, frequencies, percentages and graphs.

## 4. DATA ANALYSIS AND PRESENTATION

### 4.1 Introduction

This chapter presents results arising from the analysis of data collected using questionnaires.

### 4.2 Pilot results

The cronbach's alpha was computed in terms of the average inter-correlations among the items measuring The respondents that were piloted were not included in the main study. The pilot results for 18 participants were distributed as per the organization in the table 1 and 2 below.

#### 4.3.1 Reliability study tool

Reliability analysis was done to evaluate survey construct using Cronbach's alpha. The table 1 shows the reliability results for the pilot study.

Table 1: Reliability

Variables		Cronbach's Alpha	Number of Items	Conclusion
Customer	Relationship			
Management		0.768	9	Reliable
Performance		0.788	3	Reliable

From table 1, the pilot results proved that the variable statements were highly reliable with Cronbach's Alpha for the results being 0.768 and 0.788 for Customer Relationship Management and organization performance respectively. Sekaran and Bougie (2013) stated that coefficient greater than or equal to 0.7 is acceptable for basic research. Bagozzi (1991) explains that reliability can be seen from two sides: reliability (the extent of accuracy) and unreliability (the extent of inaccuracy). The most common reliability coefficient is Cronbach's alpha which estimates internal consistency by determining how all items on a test relate to all

other items and to the total test- internal coherence of data. The reliability is expressed as a coefficient between 0 and 1.00. The higher the coefficient, the more reliable is the test.

#### 4.3.2 Test for Construct Validity

The test for construct validity for the study is the Kaiser-Meyer-Olkin (KMO) test for construct validity which according to Field (2005), KMO Value/Degree of Common Variance of between 0.90 to 1.00 is “Marvelous”, 0.80 to 0.89 is “Meritorious”, 0.70 to 0.79 is “Middling” 0.60 to 0.69 is “Mediocre”, 0.50 to 0.59 is “Miserable”, 0.00 to 0.49 is “Don't Factor”. Thus, a KMO coefficient of above 0.800 is “Marvelous” for the study and were evaluated as per Table 2 which indicate the KMO and Bartlett’s test of construct validity for each of the dependent and independent variables.

Table 2: Factorial Test Results for Construct Validity

	KMO	Bartlett's Test of Sphericity		Validity
		Approx. Chi-Square	df Sig.	
Customer Relationship Management	0.594	39.625	36 0.011	Valid
Performance	0.666	16.403	3 0.001	Valid

From table 2 the values of the KMO Measure of Sampling Adequacy for all the variables were above 0.500. The significance of the KMO coefficient was evaluated using a Chi-Square test and a critical probability value (p-value) of 0.05. A Chi-Square coefficient of 16.403 and 39.625 and a p-value of < 0.05 imply that the coefficients were significant. The result further implies that there was a significant correlation between Customer Relationship Management and organization performance of the firms.

### 4.3 Customer relation Management and Performance

#### 4.3.1 Descriptive Statistics for Customer relation Management

Respondents were required to rank the customer relationship management indicators in order of preference by ranking the performance of the indicator as Least Preferred =1, Moderately Preferred =2, Neutral =3, Preferred =4 and strongly Preferred =5. The results were analyzed and displayed in table 3.

Table 3: Descriptive Statistics

Indicators	N	Mean	Std. Deviation
Joint Product Development	180	3.64	1.240
Joint Planning	180	3.52	1.235
Customer Support Systems	180	3.89	1.133

From table 3, respondents ranked joint product development for customer relation management with (mean=3.64≈4, SD=1.240), this indicates that majority of the respondents rated the indicator as preferred for customer relation management. It had a small standard deviation which indicates that majority had a common rating on joint product development as preferred for customer relation management. On joint planning had (mean=3.52≈4, SD=1.235), this indicates that majority of the respondents rated the indicator as preferred for customer relation management. It had a small standard deviation which indicates that majority had a common rating on joint planning as preferred performance for customer relation management. On customer support systems had (mean=3.89≈4, SD=1.133), this indicates that majority of the respondents rated the indicator as preferred for customer relation management. It had a small standard deviation which indicates that majority had a common rating customer support systems as preferred performance for customer relation management. Both of the indicators for customer relationship management were rated preferred indicators in these organizations, this is in line with the study by (Tarafdar & Qrunfleh (2017). which fund out that interaction with customers and involving them product development, planning, processing customer feedback and managing customers’ complaints improves customer relationship management in an organization. It also enables organizations to develop customized products (Li *et al.* 2005), thus addressing the attribute of flexibility and enables tracking of and addressing changes in customer demand preferences and trends, thus addressing the attribute of responsiveness (Vickery *et al.* 2010).

#### 4.3.2 Implementation of Customer relationship management system in your organization

Respondents were asked to state how effective customer relationship management system is implemented in their organization and they respondent as shown in figure 1.

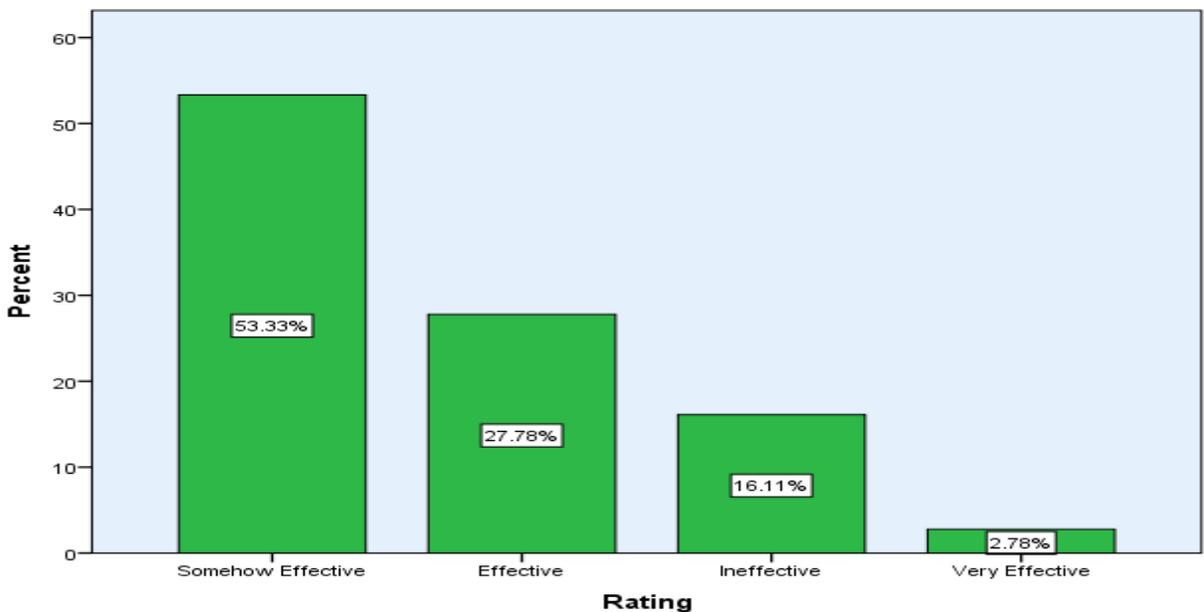


Figure 1: Implementation of Customer relationship management system

From figure 1, majority of the respondents about 53.33% indicated that the implementation of customer relationship management system is somehow effective, 27.78% indicated that implementation was effectively done, 16.11% indicates that it was ineffective and only 2.78% indicated that the Implementation of Customer relationship management system was very effective in their organizations.

#### 4.3.3 Customer Relationship Management process

Respondents were required to rank the customer relationship management process in order of preference by their performance as Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4 and Strongly Agree =5. The results were analyzed and displayed in table 4.

Table 4: Descriptive Statistics of Customer Relationship Management process

	N	Mean	Std. Deviation
Joint Planning is very key in improving Productivity	180	4.16	.783
Joint Planning is very crucial in improving quality	180	4.13	1.085
Joint Product Development is very paramount in improving quality	180	4.11	1.128
Customer support systems are vital for maintaining quality	180	3.96	1.207
Customer Support systems play a significant role in improving productivity	180	3.93	1.153
Joint Product Development is very crucial in increasing Productivity	180	3.59	1.302

From table 4, respondents rated joint planning is very key in improving productivity with (mean=4.16 $\approx$ 4, SD=0.783), this indicates that majority of the respondents agreed that joint planning is very key in improving productivity. It had a very small standard deviation which indicates that majority had a common rating on joint planning is very key in improving Productivity. Joint planning is very crucial in improving quality had (mean=4.13 $\approx$ 4, SD=1.085), this indicates that majority of the respondents agreed that. Joint planning is very crucial in improving quality. It had a small standard deviation which indicates that majority had a common agreement joint planning is very crucial in improving quality. On joint product development is very paramount in improving quality had (mean=4.11 $\approx$ 4, SD=1.128), this indicates that majority of the respondents agreed that joint product development is very paramount in improving quality. It had a small standard deviation which indicates that majority had a common agreement that joint product development is very paramount in improving quality. On customer support systems are vital for maintaining quality had (mean=3.96 $\approx$ 4, SD=1.207), this indicates that majority of the respondents agreed that customer support systems are vital for maintaining quality. It had a small standard deviation which indicates that majority had a common agreement that customer support systems are vital for maintaining quality. On customer support systems play a significant role in improving productivity had (mean=3.93 $\approx$ 4, SD=1.153), this indicates that majority of the respondents agreed that customer support systems play a significant role in improving productivity. It had a small standard deviation which indicates that majority had a common agreement that customer support systems play a significant role in improving productivity. This is inline with

the study by Miguel and Brito (2011) who argued that the main advantage of building long-term relationships with suppliers is to reduce the costs of transactions through trust and this increases supply of the manufactured products. Thus, for a firm to remain competitive then extensive understanding of the buyer-supplier relation is indispensable (Berkowitz, 2004). On joint product development is very crucial in increasing productivity had (mean=3.59≈4, SD=1.302), this indicates that majority of the respondents agreed that joint product development is very crucial in increasing Productivity. It had a small standard deviation which indicates that majority had a common agreement that joint product development is very crucial in increasing productivity.

#### 4.4 Inferential Statistics

##### 4.4.1 Influence of customer relationship management on performance of manufacturing firms in Kenya

The analysis started by testing the equivalent researchable hypothesis on the customer relationship management on performance of manufacturing.

**H<sub>a</sub>:** Customer relationship management improves performance of manufacturing firms in Kenya.

Using Anova table the regression model with selection and recruitment as a predictor was not significant (F=99.19, p- value =0.512) which shows that there is a significant influence of Customer relationship management on performance in of manufacturing firms in Kenya. This leads in failing to reject the researchable hypothesis as predicted that: Customer relationship management improves performance of manufacturing firms in Kenya. Thus, the customer relationship management improves performance in manufacturing firms. The objective is to boost the alliance between the organizations and their clients by controlling all activities related to customers including sales, service delivery, and support and after sales so as to discover and preserve the most valuable customers and revamp the less loyal or less profitable clients (Wang, 2012). This implies that the client's value is not only weighed from the transactions they make but from how they add to the overall survival of the organization (Ekinici et al., 2014).

Table 5: ANOVA of Customer relationship management

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.978	1	14.978	99.19	0.512 <sup>b</sup>
	Residual	26.928	178	.151		
	Total	41.906	179			

a. Dependent Variable: Organization Performance

b. Predictors: (Constant), Customer Relations management

Based on the regression model and table 6 below, the coefficient of determination (R squared) of 0.357 shows that 35.7 % of the variation in performance management in manufacturing firms in Kenya can be explained by Customer Relations management. The adjusted R square of 0.353 depicts that all the Customer Relations management in exclusion of the constant variable explained the variation in performance management by 35.3% the remaining percentage can be explained by other factors excluded from the model. The R shows the correlation coefficient of the combined effects of mapping skills, an R =0. 598 shows that there is a strong positive relationship between performance management and Customer Relations management. The standard error of estimate (0. 413) shows the average deviation of the independent variables from the line of best fit is very small and thus a model to predict with less errors are achieved. This finding concurs with the study by Valmohammadi and Yousefpour (2014) who points out that CRM enables organizations to provide value added products and services through identifying most valuable customers, working on retaining them by providing quality services since they exist a strong relationship between CRM and performance management. The Anova results were displayed in table 5.

Table 6: Model Summary Customer relationship management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.598 <sup>a</sup>	.357	.353	.413

a. Predictors: (Constant), Customer Relations management

The study objective was to determine the influence of customer relationship management on performance of manufacturing firms in Kenya. Based on regression analysis, the model

indicated a positive significant effect (coefficient) of ( $\beta = 0.595$  and  $p \text{ value} < 0.05$ ). This was shown in the equation below:

$$\text{Organization Performance} = 1.556 + 0.595 * \text{Customer Relations management}$$

This indicates that as level of Customer Relations management increases also level of performance management increases in manufacturing firms. This finding was in line with the study by Zhao et al. (2008) that found out that as customer relationship management increases market information, operational effectiveness, product quality and feedback also increases (Danese & Romano, 2013). Thus, the benefits of increased loyalty are becoming better understood, customer satisfaction is increasingly becoming a more important corporate goal (Das *et al.*, 2010). The results were shown in the table 7 below.

Table 7: Coefficient of Customer Relations management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	1.556	.256		6.080	.014
1 Customer Relations management	.595	.064	.598	9.375	.002

a. Dependent Variable: Performance Management

## 5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

### 5.1 Summary of the Findings

The objective of the study was to influence of customer relationship management on performance of manufacturing firms in Kenya. Based on regression analysis, the model indicated a positive significant effect (coefficient) of ( $\beta = 0.595$  and  $p \text{ value} < 0.05$ ). This indicates that as customer relationship management increases to certain level then performance of manufacturing firms in Kenya also increases significantly and vice-versa.

### 5.2 Conclusion

From the analysis of data, the study concluded based on the hypothesized relationship that:  
H<sub>1</sub>: There is significant influence of customer relationship management that improves performance of manufacturing firms in Kenya.

### 5.3 Recommendations

The study has proved that indeed customer relationship management as a strategic alliance influences performance in these organizations. In addition, the study is of benefit to the government of Kenya who should create awareness of their policies through training of the key stakeholders for this organizations since the majority of the respondents 53.17% indicated that the government policies and strategies are ineffective. Customer relationship management had significant effect on organization performance and this requires that to improve on quality production and lead time, manufacturing firms must also improve their customer relationship management. Since the quality of the products has not significantly improved for the last 5 years, more strategies must be put in place to incorporate technology which will aid to improve the quality and also maintain required lead time in these organizations. Other researches and scholars may want to build on this study and explore other areas of interest that were not covered in this work.

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## Liquidity and Adoption of Public Private Partnerships in Kenyan Public Universities

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### Abstract

Traditionally the role of infrastructure provision was solely undertaken by the government. However, over time most governments especially in the developing world have continued to experience increasing budget deficits in meeting their infrastructure needs. Such increasing budget deficits lead to reduced allocation to public entities such as public universities. In order to bridge this funding gap, private sector players are brought on board through public private partnerships. Kenyan public universities have in the recent past experienced difficulties in meeting their short-term obligations as they fall due. This is partly attributable to reduced capitation in comparison to the increasing costs of running the university. The study aimed at assessing how the need for liquidity influences adoption of public private partnerships in Kenyan public universities. The specific objectives of this study were to evaluate the extent to which need for timely payment of short term external and internal liabilities influence the adoption of public private partnerships in Kenyan public universities. The study employed a descriptive research design with a target population of 223 comprising of purposively selected management representatives from nine public universities. The sample size was 143. Data was collected using a structured questionnaire. The response rate attained was 86%. Statistical Package for Social Sciences (SPSS) was employed in data analysis. The findings indicated that need for timely payment of short term internal and external liabilities had a statistically significant influence on adoption of public private partnerships. Based on the study findings it was concluded that need for timely payment of short-term obligations had a significant positive influence on the level of adoption of public private partnerships in Kenyan public universities. It is therefore recommended that Kenyan public universities should make use of public private partnerships in order to maintain a sound liquidity level since it ensures regular small periodic cash out flows as opposed to heavy lump sum cash outflow that is characteristic of traditional funding. Since liquidity is just one of the financial drivers of public private partnerships, it is suggested that other studies could be done on the other drivers.

**Keywords:** *Liquidity, Adoption, Equity, Debt and Capital*

### Introduction

In the past the role of infrastructure provision was traditionally undertaken by the government. However, over time most governments especially in the developing world have continued to experience increasing budget deficits in meeting their infrastructure needs. Such increasing budget deficits lead to reduced allocation to public entities such as public universities. In order to bridge this funding gap, private sector players are brought on board through public private partnerships (Turley & Semple, 2013). Kenyan public universities have in the recent past experienced difficulties in meeting their short-term obligations as they fall due. This is partly attributable to reduced capitation in comparison to the increasing costs of running the university. Increased uptake of private funds greatly assists governments to maintain their budget deficits at minimum, even if it is only for a short period (Mouraviev & Kakabadse, 2016). Many countries across the world have employed PPPs as a means of deferring upfront payment hence being able to control their budget deficits without reducing investments in infrastructural development and public services.

### Objective of the Study

The study aimed at assessing how the need for liquidity influences adoption of public private partnerships in Kenyan public universities.

### Literature Review

Given the continued increase in budget deficits, many governments especially in the developing world have shown an increasing desire in involving the private sector entities in delivering their infrastructure needs (Turley & Semple, 2013). Employment of private funds in financing of infrastructure needs greatly assists governments to maintain their budget deficits at minimum, even if it is only for a short period (Mouraviev & Kakabadse, 2016). A number of countries all over the world have employed PPPs as a means of deferring upfront payment

hence being able to control their budget deficits without reducing investments in infrastructural development and public services. Public private partnerships are seen by financially constrained governments as being the solution for the provision of the much needed infrastructure services to its citizens (Engel, Fischer & Alexander, 2014). The use of public private partnerships enables governments with otherwise limited capital to be able to invest in additional socially profitable projects that may not have been undertaken were the government to rely solely on its own funds. In general, inadequate funding on the part of government majorly contributes to the need for public sector entities to undertake PPP as a way of delivering certain public goods. It has been determined that the level of development in capital markets in a given country is crucial in determining the availability of sources of financing public infrastructure projects (Pedo et al. 2018). Well-developed capital markets enable the government to easily get finances from the private sector thereby lessening the pressure on its budget. PPP arrangements are known for improving cash flow in addition to freeing up the government's fiscal funds which are then invested in other areas of public service. For public universities, use of PPP in funding of projects frees available funds which can be applied in other areas like research and extension. This is attributed to the fact that instead of high initial capital outlay as is the case in traditional funding, PPP arrangements allow for regular periodic payments. Such an arrangement ensures that cost remains within predicted limits as opposed to situations where there are unpredictable demands for asset maintenance and replacement (Balcioglu, 2017).

Over the past years, enrolment in public universities has been on the rise thereby putting pressure on existing physical facilities. Investment in physical facilities calls for huge financial investments which may not be readily available. Channeling of the available cash towards acquisition of these facilities may lead to liquidity problems for the public entity. Such an entity is likely to face financial difficulties in meeting its current liabilities as and when they fall due. In addition, other areas of university functions like research and extension would greatly benefit when the liquidity improves. Besides freeing up funds, engagement of a private partner in delivery of a public good or service can help in generating additional revenue. This is achieved through levying of some user fees for services delivered. In most cases this can be attained more efficiently by the private entity as compared to the public sector (World Bank, 2012). Such additional revenue generated from the project improves the cash flow of the public sector entity thereby enhancing its liquidity.

Uptake of PPP is therefore crucial in aiding governments to ensure steady cash flow, which can easily be upset by major investments due to temporary modifications in the budget of a public entity. The desire to have a constant cash flow devoid of massive capital outlays is a driving factor in adopting PPP. Availability of the appropriate financing ensures both timely and efficient delivery of services (Balcioglu, 2017). These goals are best attained if the public entity engages in a PPP.

Liquidity of an entity can be measured by considering how timely the current liabilities are met. Current liabilities may further be classified into internal liabilities and external liabilities. The external liabilities relate to the amounts payable to those outside the institution while the internal liabilities relate to the amounts payable to those within the institution. For public universities, external short-term liabilities include sums payable to suppliers, statutory deductions like NSSF and NHIF, income tax deductions, rent payable for rented premises as well union deductions. If remittance of these external liabilities is done on time, then that would signify increased liquidity. Internal liabilities for public universities on the other hand would include staff salaries as well as part-time lecturer payments. When payment for such short-term liabilities is prompt, then that would signify improved liquidity. In general, it is expected that since PPP employs external funds from the private sector, then internal sources of funds would remain available to cater for the short-term liabilities of the institution. Osei-Kyei et al. (2014) in their study in Ghana agreed that public private arrangements help to reduce the problem of budget constraints for the public sector entities. The overall effect of use of PPP is improved liquidity position of the public entity as evidenced by timely payment of due liabilities.

## **METHODS**

The research adopted a descriptive survey research design. The target population was 223 respondents from nine (9) public universities. A sample size of 143 respondents was used to collect data. A structured questionnaire was employed in data collection. The data collected was presented using descriptive statistics. The collected data was analysed using Statistical package for social sciences (SPSS) where a regression model was generated indicating the influence of the financial value drivers on adoption of PPP. Analysis of variance (ANOVA) was

conducted to establish the significance of each independent variable at 95 percent level of confidence.

## RESULTS

The objective of the study was to determine the influence of liquidity on adoption of public private partnership in Kenyan public universities.

### Descriptive Statistics for Liquidity on adoption of PPP in Kenyan public universities

Descriptive analysis was conducted. The findings from the study were presented in Table 1. The mean and standard deviation for each opinion statement was obtained. The responses were ranked on a scale of 1 to 5 where 1-1.80 represents strongly disagree while 4.20- 5.00 represents strongly agree. From the results it was seen that the need to free up internal sources of funds encourages adoption of public private partnerships in Kenyan public universities as shown by a mean of 4.03 which corresponds to agree on the ranking scale.

Table 1: Descriptive Statistics for Liquidity on Adoption of PPP in Kenyan public Universities

Statement	N	Min	Max	Mean	SD
1. Need to free up internal sources of funds encourages adoption of PPP	121	1	5	4.03	.766
2. Need for timely payment of short-term internal liabilities leads to increase in the number of PPP proposals made.	123	1	5	3.76	.888
3. Need for timely payment of short-term internal liabilities leads to increase in the number of PPP projects initiated.	123	1	5	3.80	.826
4. Need for timely payment of short-term external liabilities leads to increase in the number of PPP proposals made.	122	2	5	3.87	.778
5. Need for timely payment of short-term external liabilities leads to increase in the number of PPP projects initiated made	123	1	5	3.89	.822

**Key:** N= Sample size, Ranking scale for the mean: 1.00-1.80 (Strongly Disagree), 1.80-2.60 (Disagree), 2.60-3.40 (Neutral), 3.40-4.20 (Agree), 4.20-5.00 (Strongly Agree), Min = Minimum, Max = Maximum, SD = Standard Deviation.

This means that the need by public entities to have operating cash to meet daily operation expenses is a driving force for adoption of PPP. This is further illustrated by agreement of the respondents that need for timely payment of short-term internal liabilities contributes to increase in both the PPP proposals and projects initiated as shown by mean of 3.76 and 3.80 respectively, which correspond to agree on the ranking scale. In addition, it was seen that the desire for timely payment of short-term external liabilities led to increase in number of PPP proposals made as well increase in the number of PPP projects initiated as indicated by mean of 3.87 and 3.89 respectively. The means correspond to agree on the ranking scale. This suggests that the need by public entities to defray external liabilities as and when they fall due drives them to adopt PPP as a way of infrastructure provision. By using PPP, they are able to remain liquid enough to meet their operational expenses as opposed to a scenario where the project was funded the traditional way. The use of PPP ensures that there is no immediate heavy cash outlay, hence reducing budget deficits. This finding concurs with the that of Mouraviev and Kakabadse (2016) who found that use of public private partnerships greatly enables the public entities to keep their budget deficits at minimum even if it is in the short run.

### Testing Adequacy of Sample for Factor Analysis on Liquidity

Kaiser-Meyer-Olkin (K.M.O) as well as Bartlett's test of Sphericity was conducted to test for sample adequacy for factor analysis for liquidity items. The findings were presented in Table 2. The findings indicate that KMO was 0.849, which is greater than the minimum recommended of 0.5. Similarly at 95% level of confidence the Bartlett's Test of Sphericity was found to be significant with p-value of 0.000 which is less than 0.05. On the basis of these results, it was concluded that the items on liquidity were adequate to perform factor analysis.

Table 2: Kaiser-Meyer-Olkin and Bartlett's Test on Liquidity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.849
Bartlett's Test of Sphericity	Approx. Chi-Square
	Df
	Sig.
	30.177
	4
	.000

### Factor Analysis for Liquidity

Factor analysis on liquidity was conducted so as to explain the variability among the observations as well as to check if the variables were correlated with a view to eliminating data which was deemed to be redundant. Five (5) items constituting measures of liquidity were subjected to a variance test. All the five (5) items of the measure of liquidity were deemed valid because they had factor loadings above 0.5, which is considered to be the minimum acceptable. As a result, all the five construct items were reserved for further analysis. Outcome of the factor analysis is shown in Table 3. The results indicated that there were two major factors that had greatest influence on liquidity, cumulatively explaining 48.4 percent of the total variation. This meant that, 48.4 percent of the common variance shared by the five constructs could be explained by just two factors. Component 1 explained 26.6 while component 2 explained 21.8 percent. Each of these two major factors (component 1 and 2) had Eigen values greater than 1 implying they had the greatest influence on liquidity, explaining 48.4 percent of the variability.

Table 3: Total Variance explained for Liquidity  
(Extraction Method: Principal Component Analysis.)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.329	26.583	26.583	1.328	26.554	26.554
2	1.089	21.786	48.369	1.091	21.815	48.369
3	0.978	19.551	67.92			
4	0.855	17.09	85.01			
5	0.749	14.99	100			

To help in interpretation of the two components a rotation component matrix was generated. The results were shown in Table 4. From the rotation matrix coefficients, the major loadings in component 1 refer to items on need for timely payment of short-term internal liabilities. These are liabilities such as salaries and other personal claims. Prompt payment of such indicates sound liquidity. The desire for such enhanced liquidity drives a public entity to enter into PPP since less capital outlays are made. Component two has major loadings on items relating to the need for timely payment of short-term external liabilities. Such liabilities include dues owed to outsiders such as suppliers. Prompt payment of such liabilities indicates sound liquidity of the public entity.

Table 4: *Rotated Component matrix for Liquidity*

Statement	Component	
	Timely Payment of short-term Internal Liabilities	Timely Payment of short-term External Liabilities
1. Need for timely payment of short-term internal liabilities leads to increase in the number of PPP projects initiated	<b>.842</b>	.063
2. Need to free up internal sources of funds encourages adoption of PPP	<b>.833</b>	.281
3. Need for timely payment of short-term internal liabilities leads to increase in the number of PPP proposals made	<b>.730</b>	.029
4. Need for timely payment of short-term external liabilities leads to increase in the number of PPP proposals made.	.294	<b>.736</b>
5. Need for timely payment of short-term external liabilities leads to increase in the number of PPP proposals made.	.048	<b>.595</b>

*Extraction Method: Principal Component Analysis.*

*Rotation Method: Varimax with Kaiser Normalization.*

*a. Rotation converged in 3 iterations.*

Further, descriptive analysis of the two extracted factors of liquidity (timely payment of short-term internal liabilities and timely payment of short-term external liabilities) was done. The two factors were identified in the rotation matrix. The analysis indicates the mean, standard deviation and the Cronbach's alpha for two factors. The results are indicated in Table 5. From the results it can be seen that prompt payment of short-term internal liabilities achieved a Cronbach's alpha of 0.899 whereas the prompt payment of short-term external liabilities had

a Cronbach's alpha of 0.817. The results of the study were deemed to be reliable based on the Cronbach's alpha values obtained, which were greater than the recommended minimum of 0.7

Table 5: *Analysis of Mean and Reliability of two factors of Liquidity*

Component	Mean	Standard deviation	Cronbach's Alpha
Timely payment of short-term internal liabilities	4.241	.687	.899
Timely payment of short-term external liabilities	4.132	.634	.817

Key: 1.00-1.80=Strongly Disagree, 1.80-2.60=Disagree, 2.60-3.40=Neutral, 3.40-4.20 = Agree, 4.20-5.00 =Strongly Agree

Based on the constructed scales for the two factors, it was observed that the need to meet prompt payment of short-term internal liabilities is a driving factor for public entities to enter into public private partnerships as indicated by a mean of 4.241, corresponding to strongly agree on the ranking scale. Prompt payment of short-term internal liabilities enables the public entity to continue its operations uninterrupted.

In addition, it was seen that the desire for prompt payment of short-term external liabilities motivates public entities to adopt PPP. This was shown by a mean of 4.132 which coincides with agree on the ranking scale. This means that the need by public entities to meet external liabilities as and when they fall due drives them to adopt alternative funding methods that don't drain the current funds available. Prompt payment of external liabilities is critical to a firm in order to ensure continued provision of goods and services by the suppliers. This outcome agrees with that of Mouraviev and Kakabadse (2016) who posit that the use of public private partnerships highly contributes to reduction in government budget deficits even if it is in the short run. This is attributed to the fact that engagement of the private sector helps the public entity to substitute immediate heavy cash outflow in the short run with small periodic payments albeit for a long time. This helps in reduction of budget deficit which would have been worse were there to be heavy immediate cash out flow.

**Regression Analysis between Liquidity and Adoption of PPP in Kenyan Public Universities**

A multiple linear regression analysis was performed. The result of the analysis was shown in Table 6. The table shows an R<sup>2</sup> result of .245 or 24.5%, which implies that the independent variable liquidity, accounted for a total of 24.5% of the entire change in the dependent variable, adoption of public private partnerships in Kenyan Public Universities. The remaining 75.5% of the variability in the dependent variable, adoption of public private partnerships in Kenyan public universities, can be explained by other factors that are not included in the model.

Table 6: Model Summary of Liquidity and Adoption of PPP in Kenyan Public Universities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.495 <sup>a</sup>	.245	.234	1.109

a. Predictors: (Constant), Payment of short-term internal liabilities and payment of short-term external liabilities

**ANOVA for Liquidity and Adoption of PPP in Kenyan Public Universities.**

An ANOVA test was conducted and the outcome obtained was shown in Table 7. A model was fitted based on the collected data. From the outcome it can be observed that the model fitted on the data was statistically significant as supported by F value of (5.226, 2, 120) with a p-value of 0.007 which is lower than 0.05, the level of significance. The hypothesis of the study under this objective was that liquidity has no statistically significant influence on adoption of public private partnerships in Kenyan public universities. From the results of the study, the null hypothesis that "Liquidity has no statistically significant influence on adoption of public private partnerships in Kenyan Public Universities" is rejected. Therefore, the alternative hypothesis that Liquidity has a statistically significant influence on Adoption of public private partnership in Kenyan Public Universities is accepted. This is based on the fact that the p-value of 0.007 obtained is less than the threshold of 0.05 required to accept the null hypothesis.

Table 7: ANOVA for Liquidity and Adoption of PPP in Kenyan Public Universities

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	27.025	2	13.512	5.226	.007
Residual	310.244	12	2.549		
		0			
Total	337.268	122			

To support the ANOVA findings on Liquidity and Adoption of public private partnership in Kenyan Public Universities, regression coefficients were obtained and presented in Table 8. These findings show that Liquidity as indicated by prompt payment of short-term internal liabilities and timely payment of short-term external liabilities was positively related with adoption of public private partnership in Kenyan Public Universities. These results imply that prompt payment of short-term internal liabilities had a positive influence on the level of adoption of public private partnership in Kenyan public universities ( $\beta=0.279$ ;  $t=5.403$ ;  $p=0.000$ ). The p value is lower than 0.05, the level of significance. This finding means that the desire for prompt settlement of short-term internal liabilities motivates public entities to engage in PPP arrangements. Such an arrangement makes use of private sector funds to finance the project hence leaving the public entity with sufficient cash to pay for its internal liabilities as and when they fall due. This result is in agreement with the finding of Mouraviev and Kakabadse (2016) who content that use of public private partnerships greatly enables the government to keep their budget deficits at minimum even if it is in the short run. This is enabled by the fact that by engaging in PPP the public entity avoids immediate heavy cash outflow in the short run and instead incurs small periodic payments albeit for a long time. This greatly helps in solving the problem of budget deficit which would have been worsened by heavy immediate cash out flow.

In addition, the findings indicate that the need for prompt payment of short-term external liabilities was positively related with adoption of public private partnerships in Kenyan public universities ( $\beta=0.168$ ;  $t=3.722$ ;  $p=0.000$ ). The p value was less than 0.05, the significance level required. This means that the need for prompt payment of external liabilities drives the public entity to invite the private sector to fund its projects. Use of private sector funds improves the liquidity of the public entity thereby enabling it to pay its external liabilities in good time. This finding is supported by Turley & Semple (2013) who found out that due to the continued tightening of budgets and pulling of the public purse in various directions several governments have increasingly embraced the need to engage the private sector in delivering their infrastructural needs.

Table 8: Coefficients of Liquidity and Adoption of PPP in Kenyan Public Universities

	Unstandardized coefficients		Standardized Coefficients		
	B	Std. Error	$\beta$	t	Sig.
Constant	0.718	0.050	–	14.360	0.000
short-term Internal Liabilities	0.281	0.052	0.279	5.403	0.000
short-term External Liabilities	0.175	0.047	0.168	3.722	0.001

On the basis of the summary presented in Table 50 a linear regression model of the nature,  $Y = \alpha + \beta_1X_1 + \beta_2X_2 + e$  was fitted as follows:

$$Y = 0.718 + 0.279X_1 + 0.168X_2 + e$$

Where

Y – Adoption of PPP

$X_1$  – Timely payment of internal liabilities

$X_2$  – Timely payment of external liabilities

e – Error term.

This means that holding other factors constant, a unit increase in the need for timely payment of short-term internal liabilities of the public entity leads to 27.9 percent increase in adoption of PPP in Kenyan public universities. On the other hand, other factors remaining constant, a unit change in the need to pay short-term external liabilities on time would lead to 16.8 percent change in adoption of PPP in Kenyan public universities. Of the two indicators of liquidity, it can be seen that the need to pay internal short-term liabilities on time has greater influence on adoption of public private partnership in Kenyan public universities.

### Discussions

The aim of the study was to assess the influence of liquidity on adoption of public private partnership in Kenyan public universities. To find out whether adoption of public private partnership in Kenyan public universities was significantly influenced by liquidity, a regression analysis was conducted with two liquidity indicators (payment of short-term internal liabilities and payment of short-term external liabilities) as independent variables against PPP adoption as dependent variable. The regression results indicated the presence of a positive influence of liquidity on adoption of PPP in Kenyan public universities. In addition, the analysis of variance

(ANOVA) indicated that the relationship that existed between liquidity and adoption of public private partnerships was significant.

The results of the study agree with those of Engel et al. (2014) who found out that employment of public private partnerships is instrumental in deferring upfront payments thereby helping public entities to control their budget deficits. This guarantees that they are able to pay for their short-term liabilities as and when they fall due. The results in Mouraviev and Kakabadse (2016) are also in concurrence with the study findings that use of public private partnerships greatly enables the government to keep their budget deficits at minimum even if it is in the short run. The ability of public private partnerships to employ funds from the private entities helps the public entity to remain with enough cash to pay for its short-term financial needs. The overall effect of employment of funds from the private sector is to ensure there is no immediate lump sum cash outflow from the public entity. This finding is further supported by Turley & Semple (2013) who assert that due to the continued tightening of budgets and pulling of the public purse in various directions, several governments the world over have continued to show the desire to involve the private sector in delivering their infrastructure needs. Involvement of private sector funds helps to free up internal funds thereby increasing the liquidity of the entity leading to timely payment of liabilities.

The results of this study are supported by the stakeholders' theory which requires that the interests of each party should be considered (Kumaraswamy, 2015). In forming a PPP arrangement, the public entity brings on board a private partner to bring in cash to alleviate its budget constraints. This ensures that the public entity remains with sufficient funds to meet its day to day operations as well as meeting its short-term liabilities when they fall due. This ability to meet its short-term liabilities is attributed to improved liquidity due to bringing on board of a private partner. These findings are in agreement with Balcioglu (2017) who carried out a study in Turkey in which it was found that public private partnerships possess the ability of ensuring that funds are availed at appropriate time thereby guaranteeing efficient delivery of services. Funds availed by the private sector allows the public entity to utilize its other funds to meet recurrent expenditure needs on time. Such expenditure or liabilities arise from either internal or external creditors. The study findings are also supported by those of Turley and Semple (2013) who reported increased use of public private partnerships as a result of increasing budget deficits and pulling of public purse in various directions. This has had the effect of straining the government's ability to meet its short-term liabilities on time. Resorting to public private partnerships is therefore meant to reduce this strain since the public entity will exchange upfront lump sum capital outlay with periodic payments thereby remaining with adequate funds to meet its recurrent expenditure.

The study findings are in agreement with the results in Pedo et al. (2018) in which it was found that countries which operate in well-developed capital markets can easily raise funds for public private partnerships, thereby being able to pay for their financial needs as they fall due. The study findings are also supported by the arguments of Osei-Kyei et al. (2014) in a study carried out in Ghana in which it was found that use of public private partnerships in delivery of products and or services reduces the burden of public sector budget constraint. Reduced budget constraint enables the public entity to adequately service its short-term financial obligations when they fall due. When a public entity is less constrained financially, its ability to defray short-term liabilities is enhanced. Such short-term liabilities in the case of public universities could be salaries for staff, statutory deductions, union dues as well as remittance of Sacco deductions. Externally such obligations could include payment of creditors as well as external part timers. In the recent past, public universities have experienced cuts in capitation from the exchequer leading to financial constrains as evidenced by accumulation of debts. Employment of public private partnerships would therefore defer heavy upfront capital outlay in preference for periodic payments. This would greatly enhance the ability of such a public entity to meet its short-term financial liabilities.

### **Conclusion**

From the findings of the study liquidity showed a positive correlation with adoption of public private partnerships in Kenyan public universities. Its influence on the level of adoption was statistically significant. From the regression model it can be concluded that liquidity as indicated by timely payment of internal liabilities positively influenced adoption of public private partnerships in Kenyan public universities. This means that need for liquidity is a major factor that drives adoption of public private partnerships. Public universities therefore adopt PPP in order to remain liquid so that the routine operations are not disrupted by huge cash outflows associated with infrastructure projects.

### Recommendations

It is recommended that a public entity should always conduct thorough analysis of the benefits to be derived from a public private partnership before opting for one. This can be attained by evaluating the specific drivers that would motivate the individual public entity to engage a private sector player to fund the delivery of a public good or service. To avoid illiquidity in the future, it is recommended that public sector entities should only accept PPPs in situations where future cash inflows will be adequate to meet the financial demands of the private sector players with regard to repayment of principal and the corresponding interest charges. This will ensure that short-term gains in terms of enhanced liquidity do not affect future cash flows of the public entity.

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## Strategic Marketing, a Technical Approach for Company Performance in The Telecommunications Industry in Rwanda

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### Abstract

Marketing strategies are one of the most essential tools for business growth and competitive advantage in the telecommunications industry. It is a key strategic factor contributing to market leadership and under all ways, has a greater contribution on building the market value. The main objective of this study was designed to examine the role of Strategic Marketing as a significant tool for performance of Telecommunication industry in Rwanda and to assess the moderating influence of legal and regulatory framework on the performance of Telecommunication industry in Rwanda. This study report applied descriptive survey design and utilized both qualitative and quantitative data. Hence the distribution of questionnaires and interview was subjected to the top and middle level management teams of both MTN and Airtel as an efficient mechanism of collecting data that helped the researcher to arrive at reliable findings. The study population included the 133 Top and middle level, managers of mobile phone operator companies in Rwanda which comprised of MTN and Airtel company Headquarter and different branches within Kigali City from which a sample size of 100 respondents were calculated using the slovens formula which is commonly used for calculating sample size in research. The data collection instruments were pre-tested using the Cronbach's alpha and factor analysis of dimensions reductions to determine the validity and reliability of the tests. The data collected was analyzed and presented using tables, by help of the SPSS statistical Package for Social Science. The results on, reliability test, descriptive statistics, demographic information of respondents, correlation analysis, normality test, heteroskedasticity test, factor analysis and regression results were established on the variable of strategic marketing plus the intervening variable of the legal and regulatory framework. Notably, the correlation results revealed that Strategic Marketing is positively and significantly correlated with Performance of Telecommunication industry ( $r = 0.846^{**}$ ,  $\rho < .05$ ). Moderating variables showed a positive and significant correlation with Performance of Telecommunication industry. As revealed, Legal & regulatory framework ( $r = 0.905^{**}$ ,  $\rho < .05$ ) is positively associated with Performance of Telecommunication industry. The conclusion here was that the companies benefits tremendously when the strategic marketing practice was taken into account for the efficient performance of the telecommunication industry in Rwanda. Th research managerial recommendations emphasized the need for telecom policy makers Rwanda Utility and Regulatory Authority (RURA) to ensure a successful evolution towards competing markets, regulate and properly supervise the relations between the incumbent telecom companies and the new comers, who are known to depend on the incumbent's services.

**Key Words:** *Strategic Marketing, Technical Approach, Company Performance, Telecommunication Industry, Rwanda*

### Introduction

Strategic marketing is a market driven process of strategic development that takes into account constantly changing environment and the need to achieve high level of customer satisfaction, Cravens, [2000]. It focuses on organizational performance, rather than no increasing sales. It links the organization with the environment and view marketing as the responsibility of the entire organization rather than as specialized function. However, a strategy is an intentional process. Oyedijo, [2013], stated that organizations must be consistent with serving the needs of the target market within the framework of a long-term plan which is the key to achieving organizational goals and objectives. He stated further that the major proposition of strategic marketing management is to align marketing activities with organizational objectives, while marketing opportunities must be found by systematically analyzing the competitive and industry situational environment. However, organizations that take cognizance of strategic marketing management as a sustainable competitive advantage through the development of long-range marketing plans has the opportunity to outperform firms that has not strategically identify the needs and wants of customers in order to tailor those needs within the framework of long-term plan [Oyedijo, 2013].

Odongo [2008], also stated that organizations can use environment scanning to determine whether or not to enter new market and also to know the present situation or condition of its

environment. Environmental scanning is the monitoring, evaluating, and disseminating of information from the external and internal environment to key people within the corporation or organization. Oyedijo, [2013], confirms the positive effect of strategic marketing management of organization performance in terms of competitive advantage, profitability, survival and market share. Their study also reveals that strategic marketing management has some effects on performance measures, such as process efficiency, service quality, cost saving, organization and process flexibility and customer satisfaction.

### Objectives of the Study

1. To evaluate the influence of strategic marketing on the performance of Telecommunication industry in Rwanda.
2. To assess the moderating influence of legal and regulatory framework on the performance of Telecommunication industry in Rwanda

### Research Hypothesis

**H<sub>1</sub>:** There is no significant relationship between strategic planning and performance of telecommunication industry in Rwanda

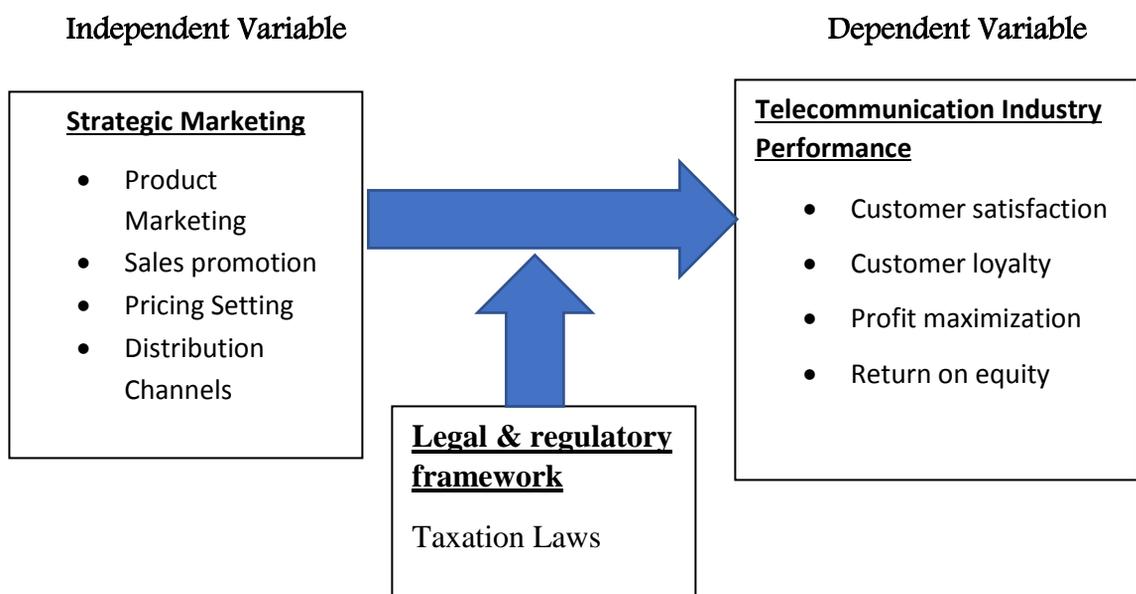
**H<sub>2</sub>:** There is No significant correlation between legal and regulatory framework and the performance of Telecommunication industry in Rwanda

### Literature Review

#### Market-based Theory

Market-based view of the firm postulates that the industrial factors plus the external market orientations are the most fundamental determinants of the firm's performance. The source of value for the firm are embedded in the competitive situation which distinguishing its end-product strategic position. The strategic position is the firm's unique set of activities that are distinctive from those of its rivals. In this context, the firm's performance or probability are determined exclusively by the structure and competition dynamics of the industry within which it carries out its operations. Researchers observed that; the firm's performance considerably dependent on the on the industrial environment within which it operates. In the context of industry, they viewed strategy as a whole and the position of the firm in market comparative to its competitors. Market-based theory of the firm is founded on the premise that; innovative firms endeavor to manipulate changing market conditions. Such market conditions are set to offer the original conditions, which govern the direction and quality of an organization's groundbreaking activities. The ability of any organization to customize its strategies with branded enablers and restraints in their environment are extremely influential to its competitive advantage [Askarany & Yazdifar, 2012]

Organizations need to develop strategies in response to the structure of the industry in which the organization is set to compete in order to gain a strategic competitive advantage. The market-based view strategy designs the company's policies and strategies based on the trends and the nature of the industry's environment. It helps in the selecting the market combination for the product in which the company utilizes its strategy. The strategy helps in designing the approach and the structure of the company based on the market analysis of the industry. During this phase, the focus was on the organization's internal environment plus the external factors. The firm's performance was extremely significant and dependent on the environment of the firm. In this sense, strategy was viewed in the industrial context as a whole and the position of the firm in the market relative to its competitors. Organizations need to develop strategies that respond to the industrial structure in which within which organizations compete so as to acquire a competitive advantage. Firms normally make a general evaluation of their own competitive advantage through an assessment of the external environment [Bradley, 2008]



### Moderating Variable

Figure 1: The Conceptual framework

#### **Strategic marketing**

This conceptual framework explains four significant attributes under the marketing strategy including product marketing, sales promotion, price setting and distribution channels. On the other hand, the communication and signaling of an organization's pricing strategy affects the distribution channel, which include competitors and customers, as well as the internal sales force [Varadarajan, 2010].

Every business must research and test its pricing to determine at which price point consumers will buy or consume enough product to yield enough total profits to justify price change. Similarly, sales promotion is an initiative undertaken by Organizations to promote and increase sales, usage or trial of a product or service [Muala & Qurneh, 2012]. Sales promotion refers to the provision of incentives to customers or to distribution channel to accelerate demand for a product. It is an important component of an organization's overall marketing strategy along with advertising, public relations and personal selling. Sales promotion acts as a competitive weapon by providing an extra incentive for the target audience to buy or support one brand over the other. Its main aims are communication to create and maintain relationships by informing and persuading one or more audiences.

According to Hollensen, [2015] strategic marketing is the way a firm effectively differentiates itself from its competitors by capitalizing on its strength (both current and future potentials) to provide consistently better value to its customer than its competitors. Marketing strategies have been associated with the field of strategic management from its earliest foundations Hollensen, [2015]. The relationship between strategic marketing and the firm's performance is a key issue to the survival of the Organization. Marketing strategies can be qualified as a key to measure of Firm performance. It is a concept of identifying the reason why a company exists and how it can benefit target consumers over the long term cannot be divorced from organizational performance [Ward & Peppard, 2016].

According to Del Chiappa, [2013], Marketing strategies is a necessity to meet the demands of an increasingly complex and dynamic environment. Knowledge and evidence-informed decision-making are instrumental in marketing strategies; and entails getting focused on important goals, and involving others in achieving them. In all these cases, when the company is already aware of why it exists and has a clear marketing mix strategy on what to do when, how and where, there is absolutely no doubt such a strategy will have a direct impact into how the company will perform. Firms may utilize communication channels like newsletter, e-mails and podcasts in their new strategies marketing activities. The central objective of any company will be customer satisfaction so they may dominate the market and become leaders in their industry and thus providing substantial business.

#### **Legal and Regulatory Framework**

All regulatory outcomes including unbundling policies and mandated access prices are the effect of political and administrative processes, which can interact with the investment decisions of firms. This is crucial for the econometric modeling of the investments and known in the econometric literature as endogeneity problem. These political and institutional factors include governments' attitudes towards market regulations, electoral system, political systems (presidential vs parliamentary), accountabilities and independence of the regulatory agencies. One indication of the benefit of telecommunication investment is the strong correlation between telecommunication development and overall economic development [Bauer, 2010]. Del Chiappa, [2013], argued that Independent Regulatory Authority (IRAs) can be evaluated by looking at i) their impact on performance on the markets they regulate and capacity to strike a balance between possibly conflicting goals, ii) their capacity to produce high quality regulation and iii) the extent to which they respect the accountability standards. According to the author, the first and second aims can be measured through an econometric analysis assessing the link between IRAs and a range of indicators of market performance (defined widely to include the interests of both firms and consumers) and regulatory quality, while the third needs an assessment on a case-by-case basis

#### **Strategic Marketing and Organizational Performance**

This way, the new forms of strategic marketing and corporate administration are then better understood giving a complete outline of the strategic thinking and business planning to its implementation in the telecommunications strategies. Justification of strategic marketing practice as my independent variable was set to expose the indispensable relationship between strategic marketing, business processes and techniques of working in the telecommunications world that allows the 21<sup>st</sup> Century business managers align their organizational, financial and technological innovations to warrant maximum degree of competitiveness across the new paradigm of interconnected global market. This knowledge will allow the 21<sup>st</sup> Century business managers align their organizational, financial and technological innovations to warrant maximum degree of competitiveness across the new paradigm of interconnected global market [Wambua & Mulyungi, 2019].

Contemporary strategic marketing practice is a completely a new paradigm shift that addresses the need for managers to have comprehensive knowledge of different technological innovations, tactical global markets, standard management plans and digital marketing tools of today's and future networks. Knowledge on strategic marketing practice provide the concrete foundations for innovation in the telecommunications business which is based purely on proper management and alignment of company strategies with those of the broader industry. While strategic marketing knowledge leads to the knowledge and skills on how the company is run, telecommunications leads to knowledge of possible network potentials and capabilities. When these two are connected the new management, space is created which links business administration and telecommunication management [Namusonge, Muturi & Olaniran, 2016]. This therefore, stamps the theoretical knowledge on the telecommunications well-connected to the methods and tools that are used currently plus the international experiences which are related to strategic marketing practices [Mutindi, Namusonge & Obwongi, 2013].

### Methodology

This study applied descriptive survey design by collecting general information through administering questionnaire to the selected sample of respondents. This design was appropriate since it provided an accurate account of characteristics of a particular event or scope of real-life situation [Kothari, 2004]. Both qualitative and quantitative data was collected in order to answer the question formulated for this study

### Results and Discussion

#### Total Variance Explained for performance

Explained variance sometimes referred to as explained variation is used in research to measure the inconsistency and discrepancy between the said model and the actual data. Actually, it is part of the model's total variance that is explained by the different factors which are essentially present and are not caused by the error variance. The higher percentage of explained variance indicates a strong strength of association. In essence, the percentage of the variance Colum gives the ratio that is expressed as a percentage of the variance accounted for by each component to the total variance among all the variables. This therefore implies that better predictions were made [Rosenthal & Rosenthal, 2011].

Table 1: Total Variance Explained for performance

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.302	61.456	61.456	4.302	61.456	61.456
2	.732	10.463	71.920			
3	.533	7.612	79.532			
4	.438	6.251	85.783			
5	.413	5.906	91.689			
6	.350	4.997	96.686			
7	.232	3.314	100.000			

Extraction Method: Principal Component Analysis.

Further, the high factor loading scores showed that all the items explained Performance of Telecommunication industry. The EFA extracted 1 factor with an Eigen value of 4.302 which is above the accepted value of 1 and cumulative extracted variance of 61.456 %. Thus, none of the items was dropped [Yong & Pearce, 2013].

Table 2: Strategic Marketing Descriptive Statistics

Opinion Statement	Mean	Std. D	N
The company always identifies one or more sustainable competitive advantages and allocate resources to explain them	4.08	.750	87
Our firm effectively differentiates itself from its competitors by capitalizing on its strength to provide consistently better value to customer than its competitors	4.18	.724	87
We have an overall game plan for reaching people and turning them to customers of the product or service that the business provides	4.11	.672	87
We have a long-term forward-looking approach to planning with the fundamental goal of achieving a sustainable competitive advantage	4.14	.650	87
We have a competitive Pricing strategy compared to our competitors	4.30	.701	87
The firm has always adopted the Sales promotion strategy to expand our market base	4.02	.747	87
The firm has always adopted the Advertising strategy to expand our market base	4.18	.674	87

Strategic marketing influences the performance of the Telecommunication industry in Rwanda also was sought by the study. The company always identifies one or more sustainable competitive advantages and allocate resources to explain them 4.08, Our firm effectively differentiates itself from its competitors by capitalizing on its strength to provide consistently better value to customer than its competitors 4.18, We have an overall game plan for reaching people and turning them to customers of the product or service that the business provides 4.11, We have a long-term forward-looking approach to planning with the fundamental goal of achieving a sustainable competitive advantage 4.14, We have a competitive Pricing strategy compared to our competitors 4.30, The firm has always adopted the Sales promotion strategy to expand our market base 4.02 and The firm has always adopted the Advertising strategy to expand our market base 4.18. This symbolized that most respondents agreed to the statement marketing strategy is key in achieving telecommunication company's objectives.

#### Strategic Marketing Total Variance Explained

It is part of the model's total variance that is explained by the different factors which are essentially present and are not caused by the error variance. The higher percentage of explained variance indicates a strong strength of association. In essence, the percentage of the variance Colum gives the ratio that is expressed as a percentage of the variance accounted for by each component to the total variance among all the variables. This therefore implies that better predictions are made

Table 3: Strategic Marketing Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.630	66.136	66.136	4.630	66.136	66.136
2	.658	9.400	75.536			
3	.481	6.873	82.409			
4	.375	5.360	87.768			
5	.357	5.102	92.870			
6	.297	4.243	97.113			
7	.202	2.887	100.000			

Extraction Method: Principal Component Analysis.

Further, the high factor loading scores showed that all the items explained strategic marketing. The EFA extracted 1 factor with an Eigen value of 4.630 which is above the accepted value of 1 [Yong & Pearce, 2013] and cumulative extracted variance of 66.136 %. Thus, none of the seven items was dropped.

**Legal and Regulatory Framework factor analysis**

**Descriptive Statistics for Legal and Regulatory Framework**

The research further subjected the variable legal and regulatory framework on the factor analysis tests. To that effect, the dimension of the data was reduced into more super-variables. The research utilized measures of central tendency especially the “mean” which was used to describe the central position of the frequency distribution. Similarly, the measures of spread including the standard deviation described how spread out or dispersed the scores are.

Table 4: Legal & Regulatory Framework Descriptive Statistics

<b>Opinion statement</b>	<b>Mean</b>	<b>Std. D</b>	<b>N</b>
Our employees are aware and adheres to the laws and regulations governing the telecommunications industry in Rwanda	4.03	.723	87
The laws and regulations favour the operation of our telecommunications industry in Rwanda	4.16	.680	87
The investments regulations do favour the operation of our telecommunications industry in Rwanda	4.14	.632	87
The firm is always able to comply with the tax laws in the country	4.14	.613	87
The company always comply with labour laws in the country	4.31	.653	87

This section of the analysis shows the descriptive statistics on Legal & regulatory framework. The results are reported in the above table. As presented in the Table below, our employees are aware and adheres to the laws and regulations governing the telecommunications industry in Rwanda 4.03, The laws and regulations favors the operation of our telecommunications industry in Rwanda 4.16, The investments regulations do favors the operation of our telecommunications industry in Rwanda 4.14, The firm is always able to comply with the tax laws in the country 4.14 and The company always comply with labor laws in the country 4.31. This suggests that the respondents mostly agreed that Legal & regulatory framework is a vital trait in the success of the firm.

**Legal & Regulatory Framework Total Variance Explained**

It is part of the model’s total variance that is explained by the different factors which are essentially present and are not caused by the error variance. The higher percentage of explained variance indicates a strong strength of association. In essence, the percentage of the variance Colum gives the ratio that is expressed as a percentage of the variance accounted for by each component to the total variance among all the variables. This therefore implies that better predictions are made [Rosenthal & Rosenthal, 2015].

Table 4.6 Legal & Regulatory Framework Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.089	61.781	61.781	3.089	61.781	61.781
2	.722	14.440	76.220			
3	.486	9.716	85.936			
4	.416	8.323	94.260			
5	.287	5.740	100.000			

Extraction Method: Principal Component Analysis.

Further, the high factor loading scores showed that all the items explained strategic marketing. The EFA extracted 1 factor with an Eigen value of 3.089 which is above the accepted value of 1 and cumulative extracted variance of 61.781 % [Yong 2013]. Thus, none of the items was dropped.

**Correlation Results**

Statistically, correlation coefficient always falls between -1.0 and +1.0 such that if the correlation (*r*) is positive, there is a positive relationship whereas if correlation (*r*) is negative, then the relationship between variables is negative. Further, if the correlation (*r*) falls within 0.00 to 0.10 then it is a negligible correlation; 0.10 to 0.39 means weak correlation; 0.40 to 0.69 infers a moderate correlation; 0.70 to 0.89 implies a strong correlation and 0.90 to 1.00 signifies a very strong correlation. Accordingly, bivariate correlation analyses were performed and Pearson correlation coefficients were generated to measure the strength of the link between the study variables [Field, 2000].

**Correlation Results**

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		Performance	Strategic marketing	Legal and regulatory
Performance	Pearson Correlation	1		
	p-value			
Strategic marketing	Pearson Correlation	0.846**	1	
	p-value	.000		
Legal and regulatory	Pearson Correlation	0.905**	.752**	1
	p-value	.000	.000	

From the results shown in table above, there is a positive and significant correlation between the independent variables and Performance of Telecommunication industry. From the results, Strategic Marketing is positively and significantly correlated with Performance of Telecommunication industry ( $r = 0.846^{**}$ ,  $\rho < .05$ ).

Moderating variables showed a positive and significant correlation with Performance of Telecommunication industry. As revealed, Legal & regulatory framework ( $r = 0.905^{**}$ ,  $\rho < .05$ ) is positively associated with Performance of Telecommunication industry. Based on the above results there is an indication of the linear relationship between all predictors on performance, hence the need to perform a more sophisticated model such as multiple regression model to show a cause-effect relationship.

**Model Summary**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.846 <sup>a</sup>	.715	.712	.53656025

From table 4.61 above, the combined prediction of all the variables accounted for approximately 72% of the total variation in Performance of Telecommunication industry (R2 = .715 and Adjusted R2 = .712) as depicted in Table 4.61. Thus, the model was fit to predict Performance of Telecommunication industry using strategic marketing.

**Analysis of variance**

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.529	1	61.529	213.718	.000 <sup>b</sup>
	Residual	24.471	85	.288		
	Total	86.000	86			

The results in the table above indicates that the overall models were a good fit since the variables; Strategic Marketing, were found to have a value of F-statistic of 213.718 and the p-value was found to be 0.000 which is less than the critical value of 0.05.

**Hypothesis summary**

No	Null Hypothesis	Decision criteria	Conclusion
	<b>H<sub>1</sub>:</b> There is No significant relationship between strategic marketing and performance of Telecommunication industry in Rwanda.	Reject the null hypothesis if $p < 0.05$	The null was rejected since p-value was found to be $< 0.05$
	<b>H<sub>2</sub>:</b> There is no significant moderation effect of legal and regulatory framework on the relationship between strategic management practices and the performance of Telecommunication industry in Rwanda	Reject the null hypothesis if $p < 0.05$	The null was rejected since p-value was found to be $< 0.05$

## Conclusion

The indicators of strategic marketing include; product marketing, strategic sales promotion and strategic pricing and distribution channels. Descriptive statistics was applied as a focal starting point for data analysis thereby organizing, simplifying and summarizing data for advanced inferential statistics. The research utilized measures of central tendency especially the “mean” which was used to describe the central position of the frequency distribution and the measures of spread including the standard deviation described how spread out or dispersed the scores were. The high factor loading scores showed that all the items explained strategic marketing.

The study found out that strategic marketing measurers had strong effect on the performance of telecommunication firms in Rwanda. The company always identifies one or more sustainable competitive advantages and allocate resources to explain them, the firm effectively differentiates itself from its competitors by capitalizing on its strength to provide consistently better value to customer than its competitors, we have an overall game plan for reaching people and turning them to customers of the product or service that the business provides, we have a long-term forward-looking approach to planning with the fundamental goal of achieving a sustainable competitive advantage, we have a competitive Pricing strategy compared to our competitors, the firm has always adopted the Sales promotion strategy to expand the market base and the firm has always adopted the Advertising strategy to expand our market base. It was discovered that digital marketing played a significant role to spur growth in both the telecommunication companies. It was clear that, without strategic marketing, the company would fall far below the competition line. From the results, Strategic Marketing was positively and significantly correlated with Performance of Telecommunication industry at ( $r = 0.846^{**}$ ,  $\rho < .05$ ). It focused on organizational performance, rather than no increasing sales. Strategic marketing linked the organization with the environment and viewed marketing as the responsibility of the entire organization rather than as specialized function. The two telecommunication companies were consistent with serving the needs of the target market within the framework of a long-term plan which was the key to achieving organizational goals and objectives.

## Recommendations

This research recommends that; Policy should require that, Rwanda Utility and Regulatory Authority (RURA) ensures a successful evolution towards competing markets, regulate and properly supervise the relations between the incumbent telecom companies and the new comers, who are known to depend on the incumbent’s services. Policy-makers should ensure that the services of the regulatory authorities are periodically evaluated concerning performance of the market they regulate plus their ability to draw a balance between the possible conflicting goals and their ability to yield high quality regulations as well as the degree of adherence to the accountability standards. This is because, it is possible that some company operators hide and manipulate important information required for the evaluation process.

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**AIRTEL RWANDA LIMITED**

Airtel Building, Remera, KG 17 Ave, Kigali  
Rwanda

17/08/2020

**To: Ms Kirabo Joyce**  
**Reg No: HD433-C010-1683/2016.**

Dear Madam,

**REF: Acceptance letter to conduct academic research from Airtel premises**  
Reference is made to your letter in which you requested permission to conduct research from our premises.

In order to support you to accomplish your academic research for an award of a PhD titled; "Influence of Strategic management practices and performance of telecommunication industry in Rwanda" of Jomo Kenyatta University of Agriculture and technology,

I hereby accept your request and I will request you to provide us with a copy of your findings at the end of the study

I wish you all the best in your academic endeavor

Yours faithfully

  
**Andry Ratsimbason**  
**HR Director**

## Influence of Logistics Information System Management on Performance of Food and Beverage Manufacturing Firms in Kenya

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### Abstract

The purpose of this paper is to assess the influence of logistics information systems management on the performance of food and beverage manufacturing firms in Kenya. Manufacturing companies in Kenya have been experiencing problems in the performance of their production and operations management. In view of the foregoing, it is relevant to investigate how Kenyan organizations could outsource their logistics requirements through logistics information systems management in the most efficient manner with regard to customer service and cost. In Kenya, studies have reported mixed findings with regard to logistics information systems management and its influence on firm performance among food and beverage manufacturing firms, while published literature on logistics information systems management and firm performance lacks in the country. It is against this backdrop that the present study sets out to investigate the influence of logistics information systems management on performance of food and beverage manufacturing firms in Kenya. This research study adopted a descriptive research design approach. Data was collected using self-administered questionnaires. The data collected was analyzed by use of descriptive and inferential statistics. Multiple regression model was used to show the relationship between the dependent variable and the independent variables. The findings from the study revealed that logistics information systems management had a significant influence on the performance of food and beverage processing firms. Policy and governance framework was also found to significantly moderate the relationship between logistics information systems management and performance of food and beverage processing firms. The study concluded that logistics information system management was critical in enhancing the performance of food and beverage processing firms in Kenya. The study recommends that the management of food and beverage processing firms ought to embrace enhanced use of logistics information systems to enhance performance.

**Keywords:** *Logistics Information System Management, Fourth Party Logistics, Food and Beverage Manufacturing Firms, Firm Performance*

## 1.0 INTRODUCTION

### 1.1 Background to the Study

In the 21<sup>st</sup> century, manufacturing environment is becoming competitive day by day as the rapid globalization and technology continue to force organizations to constantly seek ongoing improvement in all areas in terms of their knowledge, flexibility and performance (SoonHu, 2010). Logistics is one of the fields that is receiving growing attention as a result of these rapid changes, owing to its ability to enhance efficiency and productivity towards improving customer service and to lower costs (Payan, 2013; Hirakubo & Kublin, 2011; Bourlakis & Bourlakis, 2015). One of the integral aspects of logistics is the logistics information systems. As the Information Technology is becoming a common and must-have pillar in every modern organization, logistics has also to be tied on technology through logistics information systems. Chang et al. (2012) define logistics information system as the flow of data in different directions with variable contents between various data base (department) within a company. Logistics information system has continually enabled supply chains to respond on real time and accurate data thus meeting and understanding the changing customer needs (Bumstead & Cannons, 2012).

Samson (2012) concurred that, the flow of accurate and real time information in logistics was considered very important to the flow of materials. This logistics information system explosion had enabled logistics to become an important weapon in the firm's arsenal to add value to the bottom line (Bowersox, Closs & Cooper, 2010). Information sharing has been a key to success of logistics performance. Abrahamsson (2008) confirmed that logistics information system had become an important element that reflected collaboration within the logistics management and firm performance. Sharing of information on transfer; exchange of information indicating the level and position of inventory; sales data and information on the forecasting; information about the status of orders, production schedules and delivery capacity, and firm performance measures had become essential to all firms (Wardaya, *et al.*, 2013).

On the other hand, manufacturing sector has been integral to the economic growth and development in both the developed and the developing countries. Among the major sub-sectors in the manufacturing sector is the food and beverage processing firms. These are the companies dealing with production, value addition and supply of food products including beverages. According to OECD (2016), the food and beverage processing industries controls over 48% of the global manufacturing industry owing to the ever-increasing demand of food products. In Kenya, the food and beverage processing firms are the majority in the manufacturing industry. This shows that focusing on these companies would be a major milestone towards answering to the concerns in the manufacturing sector. The logistics information systems management and the entire supply chain in these firms has not been adequately documented, particularly in a local context.

### 1.2 Statement of the Problem

Most food and beverage manufacturing firms in Kenya operate at a technical efficiency of about 59% compared to their counterparts in South Africa at 70% and Malaysia at about 74% (JDA, 2019). According to a report by Deloitte (2019) on food and beverage manufacturing firms in Kenya, fourth party logistics saved various firms over Kshs.82 billion in the financial year (FY) 2018/2019. According to KAM (2020), on the life span of food and beverage manufacturing firms, the firms were winding up at notable percentage indices, fluctuating between 49% and 58%; poor logistics outsourcing was cited as the main reason. According to KAM (2019), the manufacturing sector has always accounted for over 35% of the country's Gross Domestic Product (GDP), provided employment to about 600,000 people in the formal sector and 2 million persons in the informal sectors of the economy. However, the firms have been experiencing problems in the performance of their production and operations management.

The existing literature has shown mixed results with regard to fourth party logistics and its influence on firm performance. Moreover, most of the available studies have focused on different contexts from this study with scant evidence available on how logistics information systems management affect performance of manufacturing firms in a Kenyan context. This study therefore sought to bridge this gap by assessing the influence of logistics information systems management on performance of food and beverage manufacturing firms in Kenya.

### 1.3 Study Objectives

- i. To determine the influence of logistics information system management on performance of food and beverage manufacturing firms in Kenya.
- ii. To determine the moderating influence of policy and governance framework on the relationship between logistics information systems management and performance of food and beverage manufacturing firms in Kenya.

### 1.4 Research Hypotheses

The study was guided by the following null hypotheses:

- i.  $H_{01}$ : Logistics information system management does not significantly influence the performance of food and beverage manufacturing firms in Kenya.
- ii.  $H_{02}$ : Policy and governance framework does not significantly moderate the relationship between logistics information systems management and performance of food and beverage manufacturing firms in Kenya.

## 2.0 LITERATURE REVIEW

### 2.1 Theoretical Review

This paper was informed by the Principal Agency Theory. The theory was first proposed in the context of logistics and supply chain in the year 1976 in an article “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure” by Jensen and Meckling. It was established as the dominant theoretical framework of the supply chain literature, and position shareholders as the main stakeholder. The adoption of the agency logic increased during the 1980’s as companies started replacing the hitherto corporate logic of managerial capitalism with the perception of managers as agents of the shareholders (Bourlakis & Bourlakis, 2015). This theory is based on the separation of ownership and control of economic activities between the agent and the principal. Various agent and principal problems may arise including conflicting objectives; differences in risk aversion, outcome uncertainty, and behavior based on self-interest, and bounded rationality. This may for example entail an agent having a different concept of database design and inventory systems that do not concur with the principles needs.

The Principal Agency Theory suggests an “inter-firm contracting perspective” on logistics information systems in the context of fourth party logistics, focusing on the design of an efficient contract between the buyer and seller of logistics services, such as logistics information system management (Aldin, Brehmer & Johansson, 2014). The idea is to develop the most efficient combination of outcome and behavioral incentives in the contract between the shipper and the fourth party logistics provider. The extent to which the fourth party logistics provider’s performance can be measured and controlled has a great effect on whether the provider is paid by actual inventory management performance (for example; number of orders picked, packed, and shipped to the customers) or according to production management system (for example; salaries, hours, and/or miles).

## 2.2 Empirical Review of the Literature

The successful integration of information within an organization is a powerful enabler for reduced costs; increased productivity; and improved customer service, Logistics planning and operations has been an early and extensive adopter of information technology advances due to its dependency on information for efficient operations (Wisner, 2010). Systems for order entry, order processing, electronic data interchange (EDI), vehicle routing and scheduling, and inventory replenishment are examples of early applications (Tilokavichai, 2012). Effective information technology (IT) has become absolutely necessary to support logistics processes, (Samson, 2012). By automating many routine logistics activities, IT has enabled managers to focus on strategic issues and core competencies and supported the use of intermediate supply chain activities, such as distribution (Ross, *et al.*, 2012).

Atos (2012) addressed a heuristics model to solve forward-reserve allocation problems within the order picking system. This was found to have a positive significant effect on logistics management and firm performance. Alavi *et al.* (2012) introduced an efficient optimization-based heuristics model based on the real-time information to support the decision-making process of a freight transportation network which resulted in improvement of logistics management and performance of retail firms. With the perceived benefits of using LIS in the support of logistics daily operations, seven kinds of LIS are widely applied in the logistics industry: load planning system (LPS); terminal management system (TeMS); vendor selection system; warehouse management system (WMS); financial management system; electronic Customer Relationship Management; and transportation management system (TMS) (Bagchi *et al.*, 2012).

According to Zhang, Goh, and Meng (2011), LIS increases supply chain visibility through collaboration among supply chain members via real-time data sharing and enhance time-based delivery thus increasing firm performance. With sufficient information and with increased visibility and communication between various logistics operations and shareholders, different parties along the supply chain can promptly make appropriate decisions which in turn improve efficiency in logistics management. Thus Zailani *et al.* (2005) established a moderating effect of logistics information system on relationship between logistics management and firm performance. In fact, the recent advanced developed ICT such as RFID, GPRS, wireless mesh network and smart sensors are able to provide real-time tracking information on moving objects such that logistics firms can enhance their logistics management through improved accuracy in delivery and tracking ability

## 2.3 Conceptual Framework

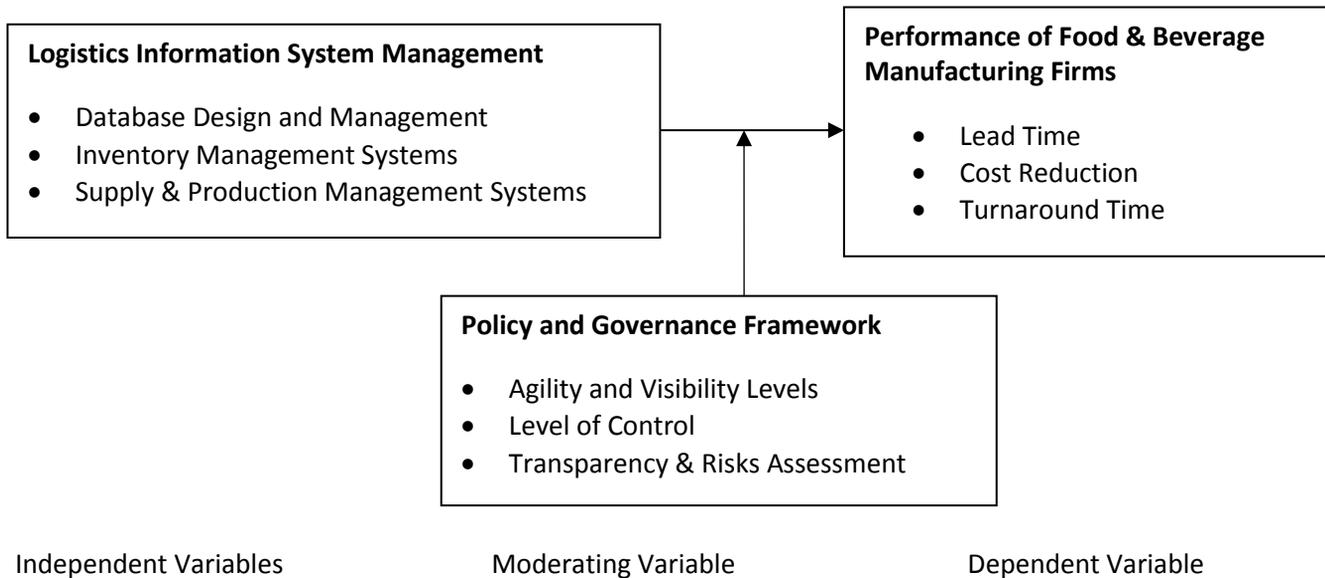


Figure 1: Conceptual Framework

## 3.0 RESEARCH METHODOLOGY

### 3.1 Research Design

This study adopted the descriptive research design using both quantitative and qualitative approaches. Descriptive research design was used to allow researcher to gather, summarize, present and interpret information for the purpose of clarification. It is mainstreamed to fact finding and may result in the formulation of important principles of knowledge and solution to significant problems.

### 3.2 Target Population

The target population of this study was 197 registered food and beverages manufacturing companies in Kenya as per KAM (2015). Food sector constitutes about 33% of the manufacturing sector in Kenya and the sector adds value to agricultural produce and therefore growth of this sector can have a direct significant impact on the whole Kenya's economy.

### 3.3 Sampling

The study used stratified random sampling technique where the subjects were selected in such a way that the existing subgroups in the population are more or less reproduced in the sample. Where  $n$  is the sample size,  $N$  is the population (197) and  $\beta$  denotes the error, set at 0.05

$$\frac{N}{\{1+N(\beta^2)\}} = n$$

$$197 / \{1+197(0.05^2)\} = 132$$

Therefore, the study sought to gather information from 132 food and beverage manufacturing firms located in across the country, where the heads of procurement were used. This sample was deemed good representation of the populations since the sample size was greater than 10% of the target population.

### 3.4 Data Collection

A semi-structured questionnaire was developed to capture the various variables under study, and for the independent variables. The questionnaire contained both closed and open ended questions. The closed ended questions were aimed at giving precise information which minimized information bias and facilitate data analysis, while the open ended questions gave respondents freedom to express themselves.

### 3.5 Data Analysis and Presentation

Descriptive statistics including frequencies, percentages, mean and standard deviations was used in data analysis. Descriptive statistics was utilized with a view to summarize, reduce data and analyze constructs and items. This form of analysis gave insights into the sample attributes. Descriptive statistics were further offer a basis for inferential statistics using multiple regressions and correlation.

Multiple regression analysis is specifically preferred as it contained a model goodness of fit to show the percent of firm performance being attributed to the conceptualized study variables

(Kothari, 2014).

#### 4.0 FINDINGS

##### 4.1 Response Rate

A response rate of 89% was obtained where 117 respondents gave back the questionnaires for analysis out of a total of 132 food and beverage manufacturing firms. This was perceived adequate for analysis.

##### 4.2 Logistics Information System Management

The study sought to establish the influence of logistics information system management on performance of manufacturing firms in Kenya. The key measures of logistics information system management used were: database design and management, inventory management systems, and supply and production management systems. The respondents were asked to indicate their level of agreement or disagreement with specific statements drawn from these sub-constructs. The findings revealed that most of the aspects of logistics information systems management were not effectively upheld in most of the firms, an aspect that could affect the effective performance. The findings are in line with those by Atos (2012) who established that logistics information systems through a well-designed database enhances the prospects of ensuring that the information and other materials regarding database management are appropriately managed for better performance. The findings imply that logistics information systems management is an essential driver to the effectiveness of supply chain in the food and beverage processing firms in Kenya. The findings compare with those by Tilokavichai, and Sophatsathit (2011) who found out that through extensive management of the logistics information systems and integration of the appropriate technology in the supply chain process, modern organizations are more likely to meet the customer needs and enhance efficiency thus gaining more performance and competitiveness.

Table 1: Descriptive Analysis for Logistics Information System Management

Statements	Mean	Std. Dev.
Our company has an active database for keeping all logistics information	3.29	1.00
The available database is designed in a secure and easily accessible manner	3.38	.82
Through a well-managed and designed database we are able to monitor the logistics of the company	4.00	1.20
Our company has an effective system for monitoring the inventory	4.28	1.23
The inventory levels and flow are appropriately controlled using the adopted system	3.82	.88
The company through the management is committed towards embracing the best systems of managing inventory	3.56	1.16
The company has an active system for engaged and sharing information with suppliers	3.49	.92
The product process in our company is monitored by effective systems	4.02	1.25
The management of the organization has been committed on embracing information technology in key supplier chain frameworks	3.59	1.01

##### 4.3 Descriptive Analysis for Policy and Governance Framework

The study sought to assess the moderating effect of policy and governance framework on the relationship between logistics information systems management and the performance of food and beverage manufacturing firms in Kenya. The findings are as summarized in Table 2.

Table 2: Descriptive Analysis for Policy and Governance Framework

Statement	Mean	Std. Dev.
Our company is always alert on changes in policies and regulations	2.99	0.97
The company through the management always ensures that it is visible in the policing process	3.98	1.33
The company has emphasized on carrying out logistics with partners who have adhered to the existing policies	3.76	1.55
The company always ensures that there is a control framework for the logistics operations	3.67	1.03
The level of our company's control in fourth party logistics has been high	3.82	1.01
The management has set out a standard for adhering to the existing logistics policies	3.49	1.25

There is a significant level of transparency between our company and its logistics partners	3.76	1.48
The company frequently carries out risks assessment on the fourth party logistics partners	3.15	0.97
Through adherence to the existing policies in logistics management our company has enhanced its effectiveness	4.01	1.18

The findings revealed that most of the respondents disagreed that their companies were always alert on changes in policies and regulations and that the companies through the management always ensures that it is visible in the policing process. The findings imply that some aspects of policy and governance framework have a hand in reducing lead time than others. This shows the need for companies to keenly analyse on how to integrate the policies in their logistics planning for effectiveness and efficiency (Mathenge & Dihel, 2011). Generally, the findings imply that policy and governance framework had a moderate extent of influencing the role of fourth party logistics on the performance of food and beverage processing firms in Kenya. In a study on the effect of partner collaboration in logistics, McNichols, and Brennan (2016) established that the policies set to govern the way logistics operations are carried out in organizations define how effective the logistics framework adopted can become hence the need for continued focus on policies before having given logistic frameworks put in place.

#### 4.4 Performance of Food and Beverage Manufacturing Firms

The study sought to find out the performance of the food and beverage manufacturing firms in Kenya. The respondents were asked to indicated their level of agreement on specific statements drawn from the key measures of performance used in the study. The findings as shown in Table 3 imply that as per the opinions of the respondents, the food and beverage manufacturing firms are fairly and unstably performing thus calling for a high need for improvement and continued focus on key logistics management frameworks that could enhance their performance.

Table 3: Descriptive Results on Firm Performance

Statement	Mean	Std. Dev.
Our company has continually met the customer needs in terms of timeliness thus enhancing their satisfaction	3.51	1.01
Our customers are always willing to do business with us and also refer others	2.77	0.76
We have embraced consistency in the production to maintain high quality of our supplies	2.51	0.98
The distribution of our products is effectively done to minimize on poor quality on transit	2.61	1.16
The costs of managing inventories have reduced in our company due to focus on lead time management	2.64	1.48

#### 4.5 Hypothesis Testing

The first hypothesis of the study was that logistics information system management does not significantly influence the performance of food and beverage manufacturing firms in Kenya. Model summary, ANOVA test, and regression coefficients were used to display the results on the regression model for the second hypothesis of the study. The model was as follows:

$$Y = \beta_0 + \beta_1 X_1 + e$$

The model summary results as shown in Table 4 revealed that the R-square (R<sup>2</sup>) for the model was 0.360. This implies that logistics information system management has 36% impact on the variation in the performance of food and beverage processing firms in Kenya.

The ANOVA results on the other hand revealed that the F-statistic was 64.617 at a significant level of 0.000. This being less than the standard P-value of 0.05, the findings imply that the model could significantly predict the relationship between logistic information system management and the performance of food and beverage processing firms in Kenya.

The regression model results revealed that the  $\beta$  for the variable (logistics information system management) was 0.597. From the findings, the following model can be deduced:

$$Y = 1.105 + 0.597 X_1 + e$$

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Machakos University, Kenya**

The results imply that when regressed alone with the dependent variable (performance of food and beverage processing firms), a unit change in logistics information systems management would influence up to 59.7% of the performance of food and beverage processing firms in Kenya. The P-value for the variable in the model was 0.000 which implies that being less than the standard p-value of 0.05, logistics information systems management has a significant and positive influence on the performance of food and beverage processing firms in Kenya.

Table 4: Regression Results on Logistics Information System Management

*Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.600 <sup>a</sup>	.360	.354	.73924

a. Predictors: (Constant), Logistics Information System Management

*ANOVA*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	35.312	1	35.312	64.617	.000 <sup>b</sup>
1 Residual	62.845	115	.546		
Total	98.156	116			

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Logistics Information System Management

*Regression Coefficients*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.105	.206		5.361	.000
	Logistics Information System Management	.597	.074	.600	8.038	.000

a. Dependent Variable: Firm Performance

The second hypothesis of the study was as follows:

H<sub>02</sub>: Policy and governance framework does not significantly moderate the relationship between logistics information systems management and performance of food and beverage manufacturing firms in Kenya.

The findings as shown in Table 6 revealed that the moderator (policy and governance framework) had a moderating effect on the relationship between logistics information systems management and the performance of food and beverage processing firms. This is as shown by Beta coefficient of 0.095 and a P-value of 0.041 < 0.05. However, the findings revealed that policy and governance framework has no direct relationship with the performance of food and beverage processing companies.

Table 4.1: Moderating effect of Policy and Governance

*Model Summary*

Model		Unstandardized Coefficients	Standardized Coefficients	T	Sig.
		B	Beta		
(Constant)		.325		1.449	.150
Logistics Information* Policy and governance framework		.095	.082	1.703	.041
Policy and governance framework		-.094	-.050	~	.150
				1.448	

a. Dependent Variable: Performance

**Conclusions and Recommendations**

The study concluded that logistics information system management has significant influence on performance of food and beverage manufacturing firms in Kenya. The sub-constructs of logistics information system management that is database design and management, inventory management system and supply and production management systems influence performance positively. It is recommended that manufacturing firms in Kenya should have an improved

logistics information system management system as it leads to high performance. The firms should have a database design and management, an inventory management system and a supply and production management systems.

The study also recommends that future scholars and researchers should aim to test the relationship between logistics information system management system and performance using different sub constructs apart from database design and management, an inventory management system and a supply and production management systems. This can bring rigour and offer platforms for comparison of findings.

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Organisational Culture and Public Service Delivery  
of Huduma Centres in Kenya

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**Abstract**

In Kenya, Huduma Centres was established as a result of inefficient public service delivery, which led to corruption and was both time consuming and costly. The aim of this study was to see if Huduma centers are effective at reducing corruption, petty bureaucracy, and inefficiency in government service delivery. The study looked at the impact of organizational culture on Huduma centers' public service delivery, as well as the mediating effect of government policies on public service delivery. The research was based on the concept of competing values framework. The study employed a descriptive research design. The target population was branch managers of the 52 Huduma centres, 1456 supervisors and 1456 public customers from the government ministries offering public services in huduma centre branches. Multi-stage probability sampling was used. Both primary and secondary data was used. Primary data used self-administered questionnaires and Secondary data from reviewing relevant literature and government statistics. Pilot study measured validity and Cronbach's alpha measured reliability. Inferential data analysis was used and it involved correlation coefficient (r) and linear regression analysis, which looked for the strength and degree of relationship between the variables. The findings revealed a positive significant low linear relationship between public service delivery and organizational culture, with government policies serving as a mediating variable. Therefore, organizational culture is significant but does not influence public service delivery in Huduma centres. Furthermore, government policies don't have any mediating effect between organizational culture and public service delivery. Based on the findings, the study recommends improvement and sustainability of organizational culture in Huduma centres as well as organizational culture being done in a way that will ensure there is accountability and the rule of law is respected. Public organisations are urged to use guidelines of human resource strategy for the public service, to avoid every ministry, from using its own regulations and standards and learn to cope with Covid 19 pandemic. More study into human resource practices in the public sector is recommended.

**Key words:** *Organizational culture, Competing values framework, Servqual model, New public management, Public service delivery*

**Introduction**

Due to globalization and the changes in the aspirations of the public customer needs, the organisational culture of being able to distinguish between public interests and organizational interests, has tremendous effect on potential effectiveness and efficiency of the public service delivery. Values on ethics conflict with the practice of professionalism in the delivery of public services. Even with ethical values embedded in the system, misconduct is evident in the public service delivery, which challenges the notion of accountability to such an extent it affects public trust. Organizational culture, according to Yirdaw (2016), is the glue that holds nonhuman resources and human resources together in an organization to foster teamwork and high efficiency. Furthermore, Schneider et al. (2014) described organizational culture as the norms that employees consider to be their work environment, and these norms affect how employees act and adjust in order to achieve organizational goals. The way that organizational participants communicate with each other and with all other stakeholders is referred to as organizational culture (Simoneaux & Stroud, 2019).

I

Increasing global choices of human resource practices don't give much attention towards the ever-changing trend of global competitiveness and modern advancements. Human resource practices are incomplete and are biased and in certain cases give wrong forecasts and understanding by assuming a general inclination to agree on certain types of human resource functions. Ignoring sustainability of human resource management practices means to ignore opportunities and benefits of productivity in sustainability and losses are made when sustainability is disregarded. (Kaufman, 2016, Bányai, 2019)

The old bureaucratic system of the public service was characterised by inefficiency, bred corruption and wasted time. There were endless queues in public offices, during which countless hours were wasted. Therefore, this inefficiency caused corruption to ensue, setting in motion a vicious cycle that has tormented countless people and cost the nation billions of dollars. The strategy for delivering public services is centred on optimising the experience of the citizen. This is accomplished through a variety of public service delivery networks. These

public services include: Huduma Centres; citizen service centres with a single point of contact to provide national government services. (Mutuku, 2015)

Organisational culture that incorporates work professionalism and meeting interest of the general public is very important. There are more than ethical values that would ensure accountability and public trust in public service delivery. Employee loyalty to his or her work and to the government helps better public service delivery. Corporate culture plays a big role in aligning the organization's potential business growth. In a good organizational culture, members of the organization have shared views about the organization and are aligned with organizational principles (Flamholtz & Randle, 2012, Chuda and Wyrwicka, 2016, Schopohl et al., 2020).

Within a healthy corporate culture, managers encourage their workers to participate in strategic decision-making processes. Furthermore, according to Cauchick Miguel (2015), employee participation in the corporate decision-making process is important for improving efficiency. Employees can develop a sense of ownership and responsibility when they participate in organizational decision-making (Bhatti et al., 2020). Employees' loyalty and dedication to the company increase significantly if they develop a culture of ownership and responsibility, even if they are not closely supervised (Nikpour, 2017).

Responsive and clear contact is used by corporate managers with a good organizational culture to empower workers and improve service quality (Kohtamäki et al., 2016). Organizational participants can quickly exchange relevant information around the company in an open communication culture (Simoneaux & Stroud, 2019). The mission, according to Handayani et al., (2018), involves a specific path and vision, strategic decisions and purpose, and organizational priorities and objectives that are used by firm managers to guide organizational activities.

**Purpose of the Study**

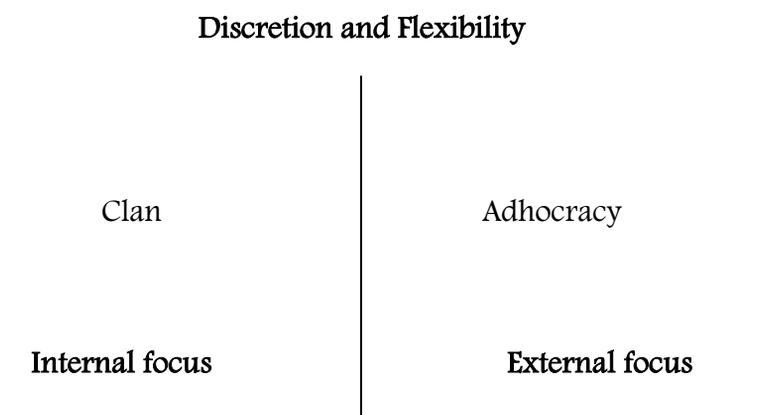
1. To determine the effect of organisational culture on public service delivery of Huduma centres in Kenya and the mediating effect of government policies on delivery of services to the public

**Literature Review**

The competing values framework (CVF) is used to evaluate the organizational culture as a strategic human resource practice in the public service delivery. Competing values framework was developed by Quinn and Rohrbaugh in 1983 who sought to find out what makes organisations effective.

The competing values framework is built on two dimensions: horizontal and vertical dimension as shown in figure 1 below. These assessments create a base for the purpose of diagnosing the culture of an organizational. There is vertical axis area which is flexibility, which means, development and spontaneity, and the control which is continuity and stability. The lateral axis area forms internal orientation, which is, improvement and maintenance, and external section, which is, interaction and adaptation. The two aspects create four different quadrants, that is, the clan culture, the adhocracy culture, the market culture, and the hierarchy culture. These quadrants characterize the main types of organizational culture. The four typologies are represented by a set of values that are distinct, defining the way organizations operates and its efficiency and effectiveness (Yu & Wu, 2009, Sandrk & Huemann, 2016).

**Figure 2.2 Competing Values Model**



Hierarchy

Market

Control and stability

Source: (Quinn and Cameron, 1999)

To start with, is the Clan culture has an internal focus and also is strengthened by a structure that is adaptable. Clan culture thrives on confidence and loyalty, as well as increased efforts to improve employee communication (Cameron et al, 2006). Moreso, there is an association, membership behavior and teamwork activities within the organization. The maximum outcomes in the clan culture enhance satisfaction, morale and commitment of the employees (Cameron & Ettington, 1988). Clan as a culture leans towards the emphasizes of human factors, mainly geared towards sharing values among people, giving emphasis to teamwork empowerment and creating an environment that emphasizes on human relationships. Clan culture shows itself on fashioned work environment, that has infrastructure and provisions which encourage proper application of values in the constitution. Its main aim is to create long-term employee development that has great morale and cohesion. (Song et al., 2016)

Secondly, Adhocracy culture on flexible, adaptive, and innovative ways of organizations. Such type of organizations easily take up risks to engage more of the inventions and the resources in order that more profits are acquired more by means of appreciating new technology, modern systems, approaches and attitudes. Organizations that are able to fit into the dynamics of the environs are usually more maintainable compared to the ones that are rigid. (Misigo et al., 2019) postulates that adhocracy culture encourages employees to focus on the satisfaction of the customer and offer support to initiatives that will help adopt the changes in the environment. Creating and adopting the right organizational culture like the adhocracy cultures is very important in enhancing and retaining workers' loyalty to the company. Reason being that adhocracy culture has significant role in an organization's overall performance and success. This is because adhocracy culture affects job contentment and performance. Adhocracy culture focuses on quality, timeliness, effectiveness and efficiency. (Njagi et al., 2020)

Market culture is focused on the outside world, and the structure of the organization is strengthened by control mechanisms. This way of doing things stresses on effectiveness so as to meet the needs and the expectations of the stakeholders. To ensure efficiency and effectiveness in organizational performance, clear aims, goals and objectives and remuneration systems are created to facilitate employee development. A characteristic of market culture is a goal-oriented attitude moving to high productivity as well as competitiveness. In the long run, the purpose of market culture has been to accomplish the laid down goals of the organization through using competitive strategies (Yu & Wu, 2009, Lee & Chang, 2020)

The hierarchy culture has an internal focus and is held by means of a corporate structure which is strengthened by means of an internal mechanism of control. Employees of the organization have a tendency of expecting predictability and conformity. Furthermore, the management value outcomes like zero-error recognition, performance, longevity, and thoroughness. Organizations with a hierarchy culture emphasize directives, laws, and regulations to regulate employees' jobs. Predictability, stability, and smooth operations are indicators of organizational effectiveness. Internally, the hierarchy-type organization is based on its activities, aiming for a high level of integration. Organizational leaders also work to create and execute strategies for positioning their company in order to improve results. Organizations must endure and improve their efficiency in order to thrive. (Ferreira, 2014, Teräväinen et al., 2018)

A balance among the four different cultures of; adhocracy, market, hierarchy and clan cultures, is very important. It is more possible for an organization to fail if one culture dominates. Hierarchy culture is mostly found in the public service compared to other culture types. In addition, public sector organisations naturally, are not very focused on the market and are moreso interested with agendas of politics. In reaction to political action and legislation, the public sector's organizational culture seems to be more reactive than constructive. Politicians make decisions, and public workers provide services that are paid for by politicians. Reactive nature of public sector organisations claims that the old methods and attitudes have developed

professional dominant culture in the public institutions. As a result, public sector organizations have become unresponsive to evolving demands and risk-averse when it comes to creativity. (Chidambaranathan & Swarooprani, 2016, Parker & Bradley 2000, Windrum, 2008, Christie report, 2011)

Public service human resources have strong social values in comparison to private sector organisations. Ethics in the Public Sector consists of a culture of the organisation's which encourages the employees in it. This supports the notion that public organizations, usually, have a cultural history and a cultural stance that is 'integrated. The integrated cultural outlook is where basic values, opinions, and beliefs are held by everyone in the company. Nonetheless, public sector organisations are complex, with a possibility of an existing number of different cultures. This means that methods, the focus on the market, procedures, as well as the results have different approaches, consumer orientation, processes, and outcomes. The hierarchy culture is usually more common in public organisations. The public service organisations are usually not very market oriented and in addition are more interested in political agendas rather than anything else. (Greasley et al., 2009, Drumm, 2019)

Quinn & Rohrbaugh, (1983) established six main aspects of organizational culture are formed by the elements in the four cultural dimensions: To begin, there are the major characteristics: teamwork and a feeling of belonging, level of innovation and dynamism, goal-orientedness and competitiveness, dependence on processes, and an emphasis on performance. The second type of leadership is organizational leadership, which refers to the leadership style and approach that encompasses the organization. Mentor, facilitator, innovator, broker, developer, operator, organizer, and monitor were among the positions listed. Thirdly, employee management demonstrates how workers are handled, as well as the degree of consultation, engagement, and agreement, as well as the working climate. The fourth one is the organizational glue. This shows cohesion and cooperation, loyalty and dedication, entrepreneurship and versatility, rules and regulations, target focus, and competition. All these bonding mechanisms keep an organization together. Fifth, there is the strategic emphasis which involve organizational strategy triggers that include long-term human capital development, innovation, sustainability and competitiveness, advancement and acquisition, goal achievement, and finally, the success criteria that show how success is defined and who is rewarded profits, market share and market penetration, sensitivity to customers and concern for people, establishment of new services and products, optimum cost. The Competing values framework is helps human resources management in the public service be able to find weaknesses, strengths, and advancement opportunities. In this course a fourth dimension, motivational trait was added in competing values framework in order to capture the conflicting principles of mind and heart that often control human resource management attitudes and decisions. Motivational trait identifies intrinsic benefits of soft human resource management besides laying too much emphasis on the hard aspects of human resources. (Grabowski et al., 2015).

Competing values framework (CVF) works to address uncertainty in organizations. The Competing values framework suggests that people who continuously come together must create internal mechanisms and processes that ensure feasibility of the internal functions. Organizations should look at environmental changes and come up with ways of renewing and adapting, like developments and innovation and being able to function flexibly. Balancing modern developments by an organization is very important. When an organization over emphasizes on one thing while ignoring others, it seems not to exist. Quinn & Rohrbaugh (1983)

According to Yu & Wu, (2009) competing values framework is very convenient for practical operations in organizations. Rukh & Qadeer, (2018) postulates that, culture diagnosis, is very important, especially in public service delivery due to the complex and dynamic social, political and economic environment. Organization development initiatives succeed through a change of culture. If culture diagnosis is ignored or misunderstood, the organization may not achieve its full potential in productivity. This goes hand in hand with creating a balanced focus between the internal processes and the external aspects of the business environment that may influence the organization in one way or the other. This balanced focus enables the organization to plan ahead and to focus more on the required needs of the organization (Zlatković, 2018).

Employee's beliefs, values, attitudes to change in the public service are very important. Readiness for change and the understanding of change factors in the environment is very important in organizational culture of an organization. Culture affects employees' understanding of time and the place, and also their understanding of authority and work behaviors and schedules. Employee motivation is also affected by the organizational culture. A

motivational approach can lose or gain its motivational influence in varying cultural environments. Therefore, desires of individuals that do not contradict with their work environment should be fulfilled. Organizations should be aware of their own unique organizational cultures and lay emphasis on the motivational methods that will motivate employees in regard to a specific type of culture adopted rather than applying the same or a general motivational tool on every employee. This contributes to the understanding of the behaviors of employees in the public service, and to directing employee behaviors towards organizational goals and objectives. (Can, 2018)

### **2.2.6 New Public Management Model**

The New public management (NPM) explains mediating variable of government policies. New public management entails techniques and practices of management derived from management of the private sector. New public management initiatives place a greater focus on public management rather than traditional government administration. New public management is characterised by decentralization of management of government services : the development of autonomous agencies as well as the devolved budgets and financial regulation, the increased use of markets and competitiveness in the public services provision , such as subcontract and other market type mechanisms, and a greater emphasis on performance, outputs, and customer focus, the advancement of technology, and the growing and use of international management consultants a In developing nations, main factors involve lending conditions and a growing focus on good leadership, as well as external influences and structural reform programs. (Islam, 2015)

Moreso Bouckaert (2018), postulates that New Public Management involves a significant change in the principles of the way public sector is managed in both developed and developing countries to varying degrees. The new public management agenda reform is based on improving public administration competencies in order to better monitor output based on outcomes. (Islam, 2015) states that external factors such as political, economic, social, cultural, and technological factors have influenced shifts in new public management

### **Empirical Literature**

Flamholtz and Randle (2012) added to a vast body of expertise in the field of organizational culture and its effect on business success by using case studies from a variety of companies in the United States, Europe, China, and other nations. Furthermore, Sharma and Good (2013) conducted an empirical study to evaluate the impact of organizational culture on efficiency. Organizational culture is an essential component of organizational success and a source of competitive advantage, according to the findings of the research. Such related books and papers, in addition to the aforementioned seminar studies, contributed to the advancement of the theory of organizational culture. (Handayani et al., 2018).

However, according to Gheta (2017), there's also no theoretical evidence to develop expertise of managers in the field of organizational culture's effectiveness in enhancing corporate business efficiency. Employees and business managers who develop mutual respect and competence will support and combine their skills and experience to improve service delivery (Cauchick Miguel, 2015).

Unger et al., (2014) reported a good relationship on corporate culture and service delivery. Additionally, the viability of organizational culture, according to Flamholtz and Randle (2012), affects 46 percent of service delivery. Nevertheless, Wilderom et al., (2012) discovered that company culture may have an impact on service delivery, with a longer time span demonstrating the role of culture on service delivery. While conducting their study, Sengottuvel and Sengottuvel, (2020) found that all aspects of organizational culture describe significant difference in service delivery service delivery, whereas Strategic focus is the most important indicator of organizational success. However, According to Nikpour (2017), organizational culture has an indirect effect on service delivery because it is mediated by employee contribution to the organization. The findings of the quantitative analysis show a positive relationship of organizational culture and service delivery (Jofreh & and Masoumi, 2013). The findings of the case studies also show that an effective organizational culture is a key factor in service delivery (Simonaux & Stroud, 2014).

The majority of research concluded that there is a good relationship between firm culture and service delivery (Gorondutse & Hilman., 2019). However, several current empirical results suggest that there is no such connection between organizational culture and organizational success (Leithy, 2017). Rashid and Shah (2016) found no evidence for the hypothesis that there is a significant link between organizational culture and success. Furthermore, according to Leithy (2017), both work-related attitudes and work behavior can be linked to

organizational success, and the structural equation model appears to have removed the connection regarding organizational performance.

**Methodology**

This study used descriptive research design. The study also used mixed method approach. The target population was all the 52 Huduma centres in Kenya with the 52 branch managers and 1456 supervisors from the Huduma centres in Kenya. A public customer was also included into the sample to rate public service delivery, leading to 1508 persons from the public. Multistage sampling was used. Multistage sampling is commonly used when there is no sampling frame, and if the population is dispersed over a large area. (Sedgwick, 2015; Chauvet, 2015). To collect data, the researcher used structured self-administered questionnaires. Cronbarch’s alpha was used to measure reliability. Data was analyzed using SPSS version 20 and presented through descriptive and inferential statistics.

**Response Rate**

A total of 360 section supervisors and branch managers were sampled as respondents. 82 respondents did not respond to the questionnaire. This led to 278 questionnaires for managers and supervisors, having been duly answered and valid for data analysis representing a valid response rate of 77.2%. An equal number of 278 public customer respondents in Huduma centres were sampled at the Huduma centre counters to respond to public service delivery.

**Table 1**

<b>Factors</b>	<b>Cronbach’s Alpha</b>	<b>Comment</b>
Organizational culture	0.961	Accepted
Public service delivery	0.880	Accepted
Government policies	0.729	Accepted

The results in table 1 reveal that employee training (ET), Public service delivery and the mediating variable of government policies (M) had coefficients above 0.70. Cronbach, (1951) indicated that 0.70 coefficient or higher indicates that the data is highly reliable. Therefore, those constructs that were used to measure the factors were accurate. This implies that the questionnaires were sufficient as a tool for data collection and that the questionnaires helped the study obtain reliable information from the respondents.

**Respondents Characteristics**

There were more female managers and supervisors (57.9%), than male (42.1%) participated in the survey. public customers that participated where male (50.4%) was more than the female (49.6%). This shows there is a fairly balanced gender from the Huduma centers from which the information was obtained. This also shows that there was no discrimination on the basis of gender. Most managers and supervisors that responded to the survey, 39.2% (n=109) were aged 30-39 years, followed by 24.8% (n=69) who were aged 20-29 years followed by 24.5% (n=68) who were aged 40-49 years followed by 11.2% (n=31) who were aged 50-59 years. The least was those aged below 20 years who represented 0.4% (n=1) of the respondents. Out of all the public sampled, majority, 45.3%, were aged 20-29 years, followed by 26.3% who were aged 30-39 years, followed by 11.5% who were aged 40-49 years, followed by 6.2% who were aged below 20 years. The least were the elderly, 5.8% aged 50-59 years and 3.6% who were aged 60 years and above. From the results, it is found out that majority of those who seek the government services in Huduma centers are the youths and the middle aged. This helps to understand opinions about the study variables since public service delivery is all about motivation. Majority of managers and supervisors were bachelor’s degree holders (36.3 %), closely and the Diploma holders (36.7%), and followed by masters degree holders (11.5%), secondary school certificate holders at 9.7%, PHD holders (0.4%) and college certificate (0.4%) who were the least. Majority of the respondents, 36.0%, showed that they had certificates in secondary school as their highest standard of education, followed by 23.4% who had attained a bachelor’s degree followed by diploma holders (22.3%), followed by primary school certificates (9.4%), followed by 3.6% who had a postgraduate diploma, followed by 2.2% who had pursued their Master’s degree, followed by 1.4% who were certificate holders and 0.7% who were PHD holders. The least, 0.4% were those without any education. From the findings, the public customers have the minimum education requirement to respond on service delivery of Huduma centers in Kenya.

On gender, majority of 66.2% (n=184) were married, 33.8% were single. This helps to understand in depth about the study variables. It helps also understand workforce diversity in Huduma centres which is a factor in employee motivation at the workplace in turn enhancing

public service delivery of Huduma centres in Kenya. The majority of the branch managers, indicates that, 32.5%, earned a net monthly salary of Kshs. 80,000 - 99,000, followed by 22.5% who earned a net salary of Kshs. 20,000 - 39,000, followed by 17.5% who earned a salary of 100,000 and above, followed by 15% who earned a salary of 60,000 - 79,000 and finally 12.5% who indicated they earn a salary of Kshs. 40,000 - 59,000. For the supervisors, most of them earned a net salary of Kshs. 20,000 – 39,000 (31.5%) followed closely by 27.7% who earned 40,000 - 59,000, followed by 14.3% who earned 60,000 to 79,000 followed by 11.3% who earned 80,000 - 99,000. Few, 5.9 %, were found to earn below 20,000 as well as 100,000 and above. Majority of the branch managers were found to earn a basic salary of Kshs. 60,000 and above on average as most have experience and higher education earning a considerable higher net salary as compared to the section supervisors. Income levels help in the understanding of what motivates employees. (Ashraf et al., 2014)

#### 4.2.2 Organizational Culture

The researcher sought to analyze organizational culture and the influence it has on provision of public services by Huduma centres in Kenya.

Table 2: The Influence of Organizational Culture on Public Service Delivery

<b>Organizational Culture</b>	<b>SA (%)</b>	<b>A (%)</b>	<b>N (%)</b>	<b>D (%)</b>	<b>SD (%)</b>	<b>Mean</b>	<b>Standard deviation</b>
There is a culture of transparency and accountability due to open communication	48.9	36.2	11.2	2.6	1.1	4.291	0.851
Culture change has improved the image of Huduma centre	49.1	38.2	9.7	3.0	0.0	4.483	2.606
Every ministry offering their services through Huduma centres have their own regulations norms and standards	38.1	40.8	9.4	9.8	1.9	4.034	1.020
There is accountability of work in Huduma centres	57.4	35.5	4.2	2.3	0.8	4.464	0.749
There is respect for the rule of law in Huduma Centres	59.2	34.0	3.8	2.3	0.8	4.487	0.744
There is observance of public service values in Huduma centres	59.9	33.3	5.2	0.0	1.5	4.502	0.733
<b>Composite mean and standard deviation</b>						<b>4.4</b>	<b>1.1</b>

From the research findings in Table 2 there is a culture of transparency and accountability due to open communication shown by 4.291, mean value and 0.851, standard deviation. Culture change has improved the image of Huduma centre as depicted by 4.483 mean values and 2.606, standard deviation. Research outcomes pointed out that every ministry offering their services through Huduma centres have their own regulations norms and standards shown by a standard deviation of 1.020, and a mean of 4.034. The research findings pointed out that there is accountability of work in Huduma centres with a mean value of 4.464 and 0.749, standard deviation.

The results indicated that the rule of law is respected in Huduma centres which are expressed by 4.487 mean and 0.744, standard deviation. Study findings established that observance of public service values is found in Huduma centres. This is clearly shown by 4.502 mean, and a value of 0.733, standard deviation.

Table 3: The Influence of Public Service Delivery in Huduma Centres in Kenya

<b>Public Service Delivery</b>	<b>SA (%)</b>	<b>A (%)</b>	<b>N (%)</b>	<b>D (%)</b>	<b>SD (%)</b>	<b>Mean</b>	<b>Standard deviation</b>
The services employees deliver in Huduma centres are of good quality	39.5	48.2	7.6	4.7	0.0	4.22	0.782
Employees are highly engaged in their work of serving clients satisfactorily	40.6	47.1	7.2	4.7	0.4	4.23	0.806
There is quick response to clients' needs	37.6	39.4	15.3	6.2	1.5	4.05	0.953
The location of Huduma Centres is accessible, reliable and convenient to customers	39.9	35.1	13.8	10.1	1.1	4.03	1.021
The services offered in Huduma centre are reliable	40.2	43.5	12.3	3.6	0.4	4.20	0.817

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Huduma centres fully conform to and fulfill the provisions of the constitution and expectations of the public.	42.5	46.2	8.0	2.9	0.4	4.29	0.762
There is responsiveness to citizens' needs in Huduma centres	37.5	52.0	6.9	2.5	1.1	4.22	0.772
There is professionalism in Huduma Centres	46.0	41.2	8.4	3.6	0.7	4.28	0.824
There is respect for the rule of law in Huduma Centres	46.0	43.1	6.9	3.6	0.4	4.31	0.784
There is observance of public service values in Huduma centres	42.5	45.1	8.4	3.3	0.7	4.25	0.803
<b>Composite mean &amp; Standard deviation</b>						<b>4.2</b>	<b>0.8</b>

According to the findings, majority of (48.2%) of the public customers did agree that the services employees deliver in Huduma centers are of good quality, 39.5% strongly agreed, 7.6% remained neutral, 4.7% disagreed and no one strongly disagreed that the services employees deliver in Huduma centers are of good quality. Research also shows that a majority 47.1% of the public customers agreed that employees are highly engaged in their work of serving clients, 40.6% strongly agreed, 7.2% remained neutral, 4.7% disagreed and 0.4% Of the public customers strongly disagreed that employees are highly engaged in their work of serving clients satisfactorily.

The research also established that a majority of 39.4% of the respondents agreed that there is quick response to clients' needs, 37.6% strongly agreed, 15.3% remained neutral, 6.2% disagreed and 1.5% strongly disagreed that there is quick response to clients' needs. More so, on whether the location of Huduma Centers is accessible, reliable and convenient to customers, majority 39.9% of the respondents strongly agreed, and 35.1% agreed, 13.8% neither agreed nor disagreed, and 10.1% disagreed and 1.1% strongly disagreed.

The research went further to find out if the services offered in Huduma center are reliable and the majority of 43.5% of the respondents agreed, 40.2% strongly agreed, 12.3% remained neutral, 3.6% disagreed and 0.4% strongly disagreed. The respondents also confirmed with the majority of 46.2% agreeing that Huduma centers fully conform to and fulfill the provisions of the constitution and expectations of the public, 42.5% strongly agreed, 8.0% remained neutral, 2.9% disagreed and 0.4% strongly disagreed. Research findings also show that there is responsiveness to citizens' needs in Huduma centers with the majority of 52% agreeing, 37.5% strongly agreeing, and 6.9% neutral, 2.5% disagreed and 1.1% strongly disagreed. On matters concerning professionalism in Huduma Centers, research findings show that a majority of the respondents strongly agreed, 41.2% agreed, 8.4% neutral, 3.6% disagreed and a minority of 0.7% of the respondents strongly disagreed.

The findings also show that a high number of respondents 46% strongly agreed that there is respect for the rule of law in Huduma Centers, 43.1% agreed, 6.9% neutral, and 3.6% disagreed and a minority of 0.4% strongly disagreed. Finally, the findings showed that 45.1% of the respondents agreed that there is observance of public service values in Huduma centres, 42.5% strongly agreed, 8.4% remained neutral, 3.3% disagreed and 0.7% strongly disagreed. According to the findings, public service delivery is effective and efficient. This is shown by an aggregate mean of 4.2 and a standard deviation of 0.8.

#### 4.2.6 Government Policies

The researcher analyzed the mediating variable of government policies on public service delivery in Huduma centres.

Table 4: The Mediating Effect of Government Policies on Public Service Delivery of Huduma Centres in Kenya

	Strongly Disagree %	Disagree %	Neutral %	Agree %	Strongly Agree %	Mean	Standard Deviation
Government policies influence public service delivery in Huduma centres	1.9	3.4	6.0	45.5	43.2	4.24	0.859
Priorities in political developments influence public service delivery in Huduma centres	5.3	17.4	20.0	35.5	21.9	3.51	1.165

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Economic resources available influence public service delivery in Huduma centres	1.1	7.9	15.7	41.9	33.3	3.99	0.953
Government budgets influence public service delivery in Huduma centres	1.5	6.8	7.2	41.1	43.4	4.18	0.940
Laws that define institutional processes influence public service delivery in Huduma centres	1.5	6.8	12.9	45.8	33.0	4.02	0.933
Composite mean and standard deviation						4.0	0.643

Table 4 shows that government policy was indicated by 5 items. On the first item, the results indicated that government policies influence public service delivery in Huduma centers (M=4.24, SD=0.859) with majority, 88.7% agreeing. The second item was on priorities in political developments and whether they influence public service delivery in Huduma centres. The respondents were found to agree (M=3.51, SD=1.165). The third item asked whether economic resources available influence public service delivery in Huduma centres from which the respondents agreed (M=3.99, SD=0.953). The respondents again agreed that the Government budgets did influence public service delivery in Huduma centres (M=4.18, SD=0.940). Lastly on Government policies, the participants were asked whether laws that define institutional processes influenced public service delivery in Huduma centres. The respondents agreed on average (M=4.02, SD = 0.933). On average, the respondents agreed that government policies had an influence on public service delivery (M=4.00, SD =0.643). This is a clear indication that government policies play a critical role in enhancing effectiveness of public service delivery.

**4.4 Hypothesis Testing Using Multi Regression Analysis Model**

Multiple regression analysis was performed to assess the influence of organizational culture on public service delivery of Huduma centres in Kenya and the mediating effect of government policies.

Table 5: Model Coefficients for Multi regression Model - Hypothesis results

Coefficients		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
Model		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.207	.470		4.697	.000		
	OC	.059	.083	.045	.716	.475	.818	1.222
2	(Constant)	2.061	.393		5.241	.000		
	OC	.007	.070	.005	.100	.920	.814	1.228
	M	.464	.043	.580	10.881	.000	.799	1.252

a. Dependent Variable: PSD

According to table 5 it shows that, in the first model, Organizational Culture (OC);  $\beta = 0.059$ ,  $p = 0.475$  was insignificant. In the second model government policies has insignificant mediating effect on the relationship between Organizational Culture (OC) and PSD ( $\beta = 0.007$ ,  $p = 0.920$ ). As indicated by p value which is less than 0.05 at 95% confidence level

Results of the study shows that in the first model, the p value on Organizational Culture was insignificant as it was greater than 0.05 ( $p = 0.475$ ). Therefore, the null hypothesis was not rejected and it was concluded that Organizational Culture do not influence on public service delivery of Huduma centres in Kenya.

Owoyemi & Ekwoaba (2014) conducted a study on organizational culture as just a tool for management to motivate, control, enhance, and improve the performance of employees. The findings revealed that organizational culture is a two-edged sword which can cut across in both workers and management, and that it should be encouraged if it leads to increased productivity and performance; otherwise, other methods of enhancing performance should be used. That organizational culture is ambiguous and can lead to mental closure, restriction of mind, and decrease in autonomy. Organisation culture also gives direction to the employees of an organisation.

Cacciattolo, (2014) posited that organisational culture is an important element of any organisation. According to Cacciattolo, there is no organisation that adopts a single type of culture and in complex organisations some cultures overlap or disagree with one another. The importance of organisational culture cannot be underestimated because of the benefit that is derived from it. According to this study, organisational structure has a positive significance to public service delivery of Huduma centres in Kenya.

Nyabuti et al (2017) examined the effect of organizational culture and employee performance of the Kenyan public service. The findings of the study were that there is a statistically significant relationship between organizational culture and employee performance in the public service in Kenya. This shows that organizational culture is a central feature of enhancing employee productivity in the public service in Kenya. Therefore, it is of paramount importance to create and implement an organizational culture that is efficient enough to encourage and increase employee performance in the public service.

Misigo & Moronge (2017) conducted a study to find out the effect of organizational culture and employee performance in the Kenyan public service. The study's goal was to determine how organizational values, communication, reward systems, and mission affected of performance employees. Employee performance in the public sector was positively influenced by organizational values, reward systems, organizational communication, and mission. Therefore, organizational culture is a vital variable in improving and enhancing employees' service delivery.

### **Summary of the Findings**

From the results, it was found that majority of those who seek the government services in Huduma centers are the youths and the middle aged. From the findings, the public who were sampled were found to have the minimum education requirement to respond to public service delivery of Huduma centers in Kenya. Therefore, it is concluded that the respondents both the supervisors, branch managers and the public customers were well placed to give adequate and reliable information. On the marital status of the Huduma centre managers and supervisors, majority of 66.2% were married, 33.8% were single.

### **Organizational culture**

In organizational culture, research findings show that there is the organization culture of transparency and accountability due to open communication. Culture change has improved the image of Huduma centre. The research findings pointed out that every ministry offering their services through Huduma centres have their own regulations norms and standards. The research findings pointed out that there is accountability of work in Huduma centres. The findings pointed out that there is respect for the rule of law in Huduma Centres. The findings established that there is observance of public service values in Huduma centres. On average the respondents agreed that organizational culture influence public service delivery of Huduma centres in Kenya with a composite mean of 4.4 and a standard deviation of 1.1

### **Government Policies**

Results indicated that government policies have a mediating effect on public service delivery in Huduma centers with a mean of 4.24 and a standard deviation of 0.859. Respondents agreed that priorities in political developments influence public service delivery in Huduma centres. The third item asked whether economic resources available influence public service delivery in Huduma centres from which the respondents agreed. The respondents again agreed that the Government budgets did influence public service delivery in Huduma centres. Lastly on government policies, the participants were asked whether laws that define institutional processes influenced public service delivery in Huduma centres. On average, the respondents agreed that government policies have a mediating effect on public service delivery with a composite mean of 4.00, and a standard deviation of 0.643. This is a clear indication that government policies play a very important role in enhancing the effectiveness of public service delivery.

Dependent variable public service delivery has a mean of 4.2 and a standard deviation of 0.8. This implies that there was a moderate response of the influence of strategic human resource practices on public service delivery of Huduma centres in Kenya. Hypothesis results in the multi regression model reveal that in the first model Organizational Culture had  $\beta = 0.059$ ,  $p = 0.475$  insignificant because it's greater than 0.05. The second model Regression analysis showed the mediating effect of government policies and the relationship between strategic human resource practices and public service delivery. Government policies had insignificant

mediating effect on the relationship between organizational culture and PSD ( $\beta = 0.007$ ,  $p = 0.920$ ).

### Conclusion and Recommendations

Organizational culture was agreed by the majority of the respondents to have an influence on public service delivery of Huduma centres in Kenya. From the research findings, there is a culture of transparency and accountability due to open communication. Culture change has also improved public service delivery of Huduma centres. The research findings pointed out that every ministry offering their services through Huduma centres have their own regulations norms and standards.

This means that there is no uniformity in strategic implementation of organization culture in the public service delivery in Huduma centres. The research findings pointed out that there is accountability of work in Huduma centres. The findings pointed out that there is respect for the rule of law and that there is observance of public service values in Huduma centres.

Organizational culture has a positive significant low linear relationship with public service delivery of Huduma centres in Kenya. There was a positive correlation coefficient of 0.170 (which is statistically significant  $p = 0.005$ ) between strategic implementation of organizational culture and public service delivery of Huduma centres in Kenya.

Study findings indicated that government policies mediated public service delivery in Huduma centers with a composite mean of 4.00 and a standard deviation of 0.643. However, it does not have any mediating effect on organizational culture. The findings also show that priorities in political developments influence public service delivery in Huduma centres. Furthermore, the economic resources available influence public service delivery in Huduma centres from which a majority of the respondents agreed. It was also agreed that the government budgets did influence public service delivery in Huduma centres. Lastly a majority of the respondents agreed that laws that define institutional processes influenced public service delivery in Huduma centres. Government policies were found to have a positive and statistically significant moderate mediating relationship with public service delivery. This was indicated by significant  $p$  - values less than 0.01 at 99% confidence level and a significant beta  $\beta = 0.594$ ,  $p = 0.000$ . This is a clear indication that government policies play a very important role in enhancing the effectiveness of public service delivery.

Organizational culture should be sustained but continually monitored to detect any other effects from the environment. However, every ministry offering services through Huduma centers still have their own regulations, norms and standards. This is against the mandate of the strategic framework for human resources in the public service. Lastly there should be a robust monitoring and evaluation of policy implementation so that performance gaps can be identified early enough in order to advise policy change and help measure performance for the future policy making process. There should also be inclusive stakeholder participation in the process of policy making and policy implementation to ensure that policies are inclusive and well crafted.

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## Employee Training and Public Service Delivery if Huduma Centres in Kenya

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### Abstract

This study set to investigate whether Huduma centres are a success in eliminating corruption, petty bureaucracy and inefficiency in public service delivery. The study focused on the influence of employee training on public service delivery of Huduma centres in Kenya and the mediating variable of government policies on public service delivery. The study was anchored on Human capital theory. Descriptive research design was used. The target population was branch managers of the 52 Huduma centres, 1456 supervisors and 1456 public customers from the government ministries offering public services in huduma centre branches. Multi-stage probability sampling was used. Both primary and secondary data was used. Primary data used self-administered questionnaires and Secondary data from reviewing relevant literature and government statistics. Pilot study measured validity and Cronbach's alpha measured reliability. Inferential data analysis was used and it involved correlation coefficient (r) and linear regression analysis, which looked for the strength and degree of relationship between the variables. Results showed a positive significant low linear relationship between public service delivery and employee training and the mediating variable of government policies. Therefore, strategic employee training has a significant influence on public service delivery in Huduma centres. Based on the findings, the study recommends proper implementation and use of employee training in Huduma centres in order to increase the efficiency of public service delivery. In addition, employee training should be done in such a way to avoid duplication and overlapping of roles. Public organisations are urged to use guidelines of human resource strategy for the public service, to avoid every ministry, from using its own regulations and standards. Further research is recommended on more human resource practices in the public service.

**Key Words:** *Employee training, Public service delivery, Human capital theory, Servqual model, New public management,*

### Introduction

Increasing global choices of human resource practices as employee training, doesn't give much attention towards the ever-changing trend of global competitiveness and modern advancements. Human resource practices are incomplete and are biased and in certain cases give wrong forecasts and understanding by assuming a general inclination to agree on certain types of human resource functions. Ignoring sustainability of human resource management practices means to ignore opportunities and benefits of productivity in sustainability and losses are made when sustainability is disregarded. (Kaufman, 2016, Bányai, 2019)

Citizens' demand for quality service delivery has risen as a result of globalization and advancements in information and communication technology (ICT). This has placed a strain on the human resource development function of employee training, which is responsible for shifting organizational cultures and employee attitudes in order to meet the demands of a rapidly changing world. In Kenya, the public service commission is responsible for improving human resource practices and ensuring public service performance quality. The Kenyan constitution allows the public service commission to delegate all of its duties and powers towards any one or more of its members, or to any officer, in the public sector, authority or body according to Article 234(5). (Public Service Commission, 2017)

According to the Kenya human resource development policy for public service (2015), the immediate supervisor of the public service employees are required to have daily meetings with their coworkers in order to determine individual training needs that affect their efficiency. Articles 10, 27, 54, 55, 56, 232, and Chapter 6 of the Constitution direct the strategy, which outlines methods for ensuring employee preparation and capacity building in the public sector. Furthermore, the policy establishes a structure through which decisions about employee training can be made and supported. Employees are encouraged to improve their talents, expertise, and mindset, as well as their full potential, in order to meet their own needs as well as the goals of the MDAs for which they work.

To provide sufficient services, the public sector requires a skilled workforce, so finding the right applicant for the right job is critical. (Maangi & Wambalaba, 2017). Organisations, in

this case Huduma centres need to be more equipped with adequate resources of skilled human capital, transformational leadership in the central government and decentralized levels and a strategic roadmap for implementation. This enhances quality and effectiveness of government services which in turn lead to improved public service delivery. (Mohamed & Xavier, 2016)

### **Purpose of the Study**

To establish the effect of employee training on public service delivery of Huduma centres in Kenya and the mediating effect of government policies on service delivery

### **Literature Review**

The theory of human capital focuses on how employee training boosts employees' productivity and production. This is accomplished by growing the intellectual stock of economically efficient human capability, which is a result of inherent skill and investments in people. Formal education is viewed as a long-term human capital investment. This is thought to be as useful as, if not more useful than, physical capital (Woodhall, 2001). The term Human capital describes the total sum in skills possessed by that of the labor force. These abilities in turn increase productivity of an organization. The more the skills, the more productive the employees become. (Goldin, 2016)

Schultz (1961) suggested the human capital theory, which was later established by Becker (1962). According to the human capital theory, education or training provides employees with valuable knowledge and skills, which increases their efficiency and income. Becker (1964) makes a distinction between particular and general human resources. Expertise gained through education and training that is unique to a particular firm is referred to as specific human resources (firm-specific or context-specific skills). On the other hand, basic human capital (general skills) is expertise acquired through education and training that is useful across the board (e.g., reading and writing). Education is an investment in employees and its output is a form of capital. Since education becomes a part of the person receiving it, then it's referred to as human capital.

This idea employee training is a type of investment with a long-term horizon demonstrational a higher return rate and the ability to help achieve significant national goals has been very well put by the Kenya strategic human resource framework for the public service. Through this, human capital idea implies that policies promoting employee training in the public service could help achieve set goals of the government service human resources. Therefore, public sector has a responsibility to provide funding for education, and a right to control employee training. Productivity, economic power, and worldwide competitiveness are all linked to human capital. (Holden & Biddle, 2017)

Human capital theory influences training strategies pursued by public service delivery in Africa. The contribution of human capital theory is not viewed in terms of economic development alone, but there is also now clear evidence of modeling investment in employee training. Human capital theory still provides a strong framework and relevance to employee training in public service delivery in Africa. However, with the now demands of the public customer that are increasing daily and the citizens knowledge and aspirations, the goal of employee learning as a factor in public administration in service delivery cannot be underestimated. (Oketch, 2014)

According to Marginson, (2019) Human capital theory however has the limitation of assuming that employee training determines the productivity of employees and hence determining remuneration. Human capital theory has dominated the policies of public understanding on the relationship between work and education. The human capital theory holds that education is a form of economic capital that furthering education is the foundation for employment, and that education is the primary determinant of employee performance. Furthermore, human capital theory falls short of realism. This is because of the weaknesses in the technique used which is the use of one theoretical lens. Human capital theory foists one single lens in the heterogeneity of education and work. It does not offer a clear explanation on how education increases productivity, why remunerations are becoming more unequal, or the importance of status.

Human capital has value to public service delivery when they train their employees on organizational level factors that benefit the public service in general. Effective and efficient investment in human capital and employee training matter and they have a very big impact on employee productivity which adds to the overall effectiveness of public service delivery. It's important that public service view human capital to be an asset that should be invested.

Training that is done to employees contributes to the overall human capital of public service, hence effective delivery of services to its citizens. However, most of the employee training in the public service encompasses at best some basics of the organizations specific training. For example, in the public service, training involves the use of corresponding assets which are specific to the public organizations, or at least a considered choice of the organization. It is important that the government make training decisions that will have a greater impact on enhancing public service delivery efficiency and effectiveness. Human capital is an intangible asset, and the public service need to have a greater disclosure of information which should be done with attention for monitoring and evaluation. (Riley et al., 2017)

Human resource strategy proposes that a firm-specific human capital, according to human resource management, is a source of sustainable competitive advantage. Workers, on the other hand, are often thought to be reluctant to progress in firm-specific capacity and skills because these investments could be made at the expense of improving general skills, lowering their attractiveness in the labor market. Employees' investment in firm-specific human capital is critical for value development and appropriation, but global disinvestment in firm-specific skills is believed to exist. Main idea here is the firm's views of what specific capital is, even if it is not accurate, subjective human capital that is specific to a firm may be more critical than the human capital that is objective and firm-specific in assessing the probability that firm-specific human capital will be a source of sustainable profit. (Nyberg & Moliterno, 2019)

Human capital and innovation are intertwined concepts that have a significant effect on the economy of the world. However, in order to obtain this positive effect, some steps should be taken, the first one being to provide employee training into something more realistic and practical, where they can demonstrate their maximum innovative potential. The next step is to give workers more chances to put their ideas into action and refine them. The final move is to eliminate the principle of power distance from the country's leadership in addition to making every citizen feel truly an equally valued and also that their opinions matter as much as those in power's. This helps poorly developed nations in achieving maximum economic growth and gaining a competitive edge through its human resources and individual creativity. (Alawamleh et al., 2019)

### **New Public Management Model**

The New public management (NPM) explains mediating variable of government policies. New public management entails techniques and practices of management derived from management of the private sector. New public management initiatives place a greater focus on public management rather than traditional government administration. New public management is characterised by decentralization of management of government services : the development of autonomous agencies as well as the devolved budgets and financial regulation, the increased use of markets and competitiveness in the public services provision , such as subcontract and other market type mechanisms, and a greater emphasis on performance, outputs, and customer focus, the advancement of technology, and the growing and use of international management consultants. In developing nations, main factors involve lending conditions and a growing focus on good leadership, as well as external influences and structural reform programs (Islam, 2015).

Adoption of NPM posted mixed results in terms of service delivery in diverse sectors of the public sector in Europe. New Public Management got introduced in 1980s to deal with problems relating to a non-productive as well as bureaucratic public service in the United Kingdom (U.K). The result of the adoption of NPM brought about new standards in the public sector; political independence, professionalism and neutrality that informed both the management of human resources and enhanced public service delivery (Lapsley & Knutsson, 2016, Ongaro, 2009)

### **Empirical Literature**

Chukwuemeka et al., (2017) posits that the government should continue to widen the opportunities provided by ICT in its quest to increase employee productivity by gaining new skills, expertise, and abilities which will invariably enhance worker performance and the success of the organization. Furthermore, education and development are good to provide a pool of qualified workers to drive and fulfil, vision, priorities, and objectives by delivering competent for the economy of the twenty-first century. This study concentrates more on ICT as the key driver in service delivery not bearing in mind the critical component of human resource management.

Waiganjo et al, (2016) also conducted a study on connection of training as a strategic human resource management practice and organizational performance in Kenyan corporations. The study concentrates more on strategic function of human resources to enhance productivity in organisations. However the paper does not recognise the implementation process of human resource strategies.

Kihara, (2016) adds that paying attention to human resource requirements as employee training during strategy is important to organisations. The company that provides training performs higher. These companies' leaders must be at the forefront of explaining how to execute the new plan and motivating workers through bonuses if the goals are met. Employees must also be given the opportunity to make individual contributions and provide suggestions for improving strategy implementation efforts. Leaders, on the other hand, should align their approach with human resource needs, set goals, and provide timely input. Finally, performance evaluations should be unbiased, and promotions should be based on achievement of goals. A case is also needed in the public sector firms.

### **Methodology**

This study used descriptive research design. The study also used mixed method approach. The target population was all the 52 Huduma centres in Kenya with the 52 branch managers and 1456 supervisors from the Huduma centres in Kenya. A public customer was also included into the sample to rate public service delivery, leading to 1508 persons from the public. Multistage sampling was used. Multistage sampling is commonly used when there is no sampling frame, and if the population is dispersed over a large area. (Sedgwick, 2015; Chauvet, 2015). To collect data, the researcher used structured self-administered questionnaires. Cronbarch's alpha was used to measure reliability. Data was analyzed using SPSS version 20 and presented through descriptive and inferential statistics.

### **Response Rate**

A total of 360 section supervisors and branch managers were sampled as respondents. 82 respondents did not respond to the questionnaire. This led to 278 questionnaires for managers and supervisors, having been duly answered and valid for data analysis representing a valid response rate of 77.2%. An equal number of 278 public customer respondents in Huduma centres were sampled at the Huduma centre counters to respond to public service delivery.

**Table 1**

<b>Factors</b>	<b>Cronbach's Alpha</b>	<b>Comment</b>
Employee training	0.915	Accepted
Public service delivery	0.880	Accepted
Government policies	0.729	Accepted

The results in table 1 reveal that employee training (ET), Public service delivery and the mediating variable of government policies (M) had coefficients above 0.70. Cronbach, (1951) indicated that 0.70 coefficient or higher indicates that the data is highly reliable. Therefore, those constructs that were used to measure the factors were accurate. This implies that the questionnaires were sufficient as a tool for data collection and that the questionnaires helped the study obtain reliable information from the respondents.

### **Respondents Characteristics**

There were more female managers and supervisors (57.9%), than male (42.1%) participated in the survey. public customers that participated where male (50.4%) was more than the female (49.6%). This shows there is a fairly balanced gender from the Huduma centers from which the information was obtained. This also shows that there was no discrimination on the basis of gender. Most managers and supervisors that responded to the survey, 39.2% (n=109) were aged 30-39 years, followed by 24.8% (n=69) who were aged 20-29 years followed by 24.5% (n=68) who were aged 40-49 years followed by 11.2% (n=31) who were aged 50-59 years. The least was those aged below 20 years who represented 0.4% (n=1) of the respondents. Out of all the public sampled, majority, 45.3%, were aged 20-29 years, followed by 26.3% who were aged 30-39 years, followed by 11.5% who were aged 40-49 years, followed by 6.2% who were aged below 20 years. The least were the elderly, 5.8% aged 50-59 years and 3.6% who were aged 60 years and above. From the results, it is found out that majority of those who seek the government services in Huduma centers are the youths and the middle aged. This helps to understand opinions about the study variables since public service delivery is all about motivation. Majority of managers and supervisors were bachelor's degree holders (36.3 %), closely and the Diploma holders (36.7%), and followed by masters degree holders (11.5%),

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secondary school certificate holders at 9.7%, PHD holders (0.4%) and college certificate (0.4%) who were the least. Majority of the respondents, 36.0%, showed that they had certificates in secondary school as their highest standard of education, followed by 23.4% who had attained a bachelor's degree followed by diploma holders (22.3%), followed by primary school certificates (9.4%), followed by 3.6% who had a postgraduate diploma, followed by 2.2% who had pursued their Master's degree, followed by 1.4% who were certificate holders and 0.7% who were PHD holders. The least, 0.4% were those without any education. From the findings, the public customers have the minimum education requirement to respond on service delivery of Huduma centers in Kenya.

On gender, majority of 66.2% (n=184) were married, 33.8% were single. This helps to understand in depth about the study variables. It helps also understand workforce diversity in Huduma centres which is a factor in employee motivation at the workplace in turn enhancing public service delivery of Huduma centres in Kenya. The majority of the branch managers, indicates that, 32.5%, earned a net monthly salary of Kshs. 80,000 - 99,000, followed by 22.5% who earned a net salary of Kshs. 20,000 - 39,000, followed by 17.5% who earned a salary of 100,000 and above, followed by 15% who earned a salary of 60,000 - 79,000 and finally 12.5% who indicated they earn a salary of Kshs. 40,000 - 59,000. For the supervisors, most of them earned a net salary of Kshs. 20,000 – 39,000 (31.5%) followed closely by 27.7% who earned 40,000 - 59,000, followed by 14.3% who earned 60,000 to 79,000 followed by 11.3% who earned 80,000 - 99,000. Few, 5.9 %, were found to earn below 20,000 as well as 100,000 and above. Majority of the branch managers were found to earn a basic salary of Kshs. 60,000 and above on average as most have experience and higher education earning a considerable higher net salary as compared to the section supervisors. Income levels help in the understanding of what motivates employees. (Ashraf et al., 2014)

**The Influence of Employee Training on Public Service Delivery**

An investigation of the influence of employee training and public service delivery of Huduma centres in Kenya was done.

Table 2: The Influence of Employee Training on Public Service Delivery

Employee Training	SA	A	N	D	SD	Mean	standard deviation
Training is based on the identified training needs	47.0%	40.0%	7.4%	3.3%	2.2%	4.26	0.901
Training methods are adequate and they provide behaviour and attitude change	39.5%	45.4%	9.2%	4.4%	1.5%	4.32	2.631
Training is based on career growth	30.7%	40.7%	17.0%	7.8%	3.7%	3.87	1.053
Mentoring and coaching are done to strengthen talent and continuous learning	33.6%	44.4%	12.7%	6.0%	3.4%	3.99	1.003
The in-service programs have adequately brought about development in behaviour and attitude for building capacity in Huduma centres	39.6%	44.9%	10.6%	3.8%	1.1%	4.18	0.851
Huduma Centres experience skills and competency gaps in some tasks	21.6%	41.0%	17.9%	14.9%	4.5%	3.60	1.115
There is duplication and overlapping of functions in Huduma centres	9.8%	14.3%	19.2%	35.3%	21.4%	2.56	1.246
Employee training enables easier facilitation of change management of work processes in Huduma centres	42.8%	44.6%	6.7%	4.1%	1.9%	4.22	0.883
<b>Composite mean and standard deviation</b>						<b>3.87</b>	<b>1.2104</b>
						<b>5</b>	

The composite standard deviation is 1.2104, and the aggregate mean value is 3.875. This implies that the respondents agree that employee training influence public service delivery of Huduma centres in Kenya.

Table 3: The Influence of Public Service Delivery in Huduma Centres in Kenya

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Public Service Delivery	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean	Standard Deviation
The services employees deliver in Huduma centres are of good quality	39.5	48.2	7.6	4.7	0.0	4.22	0.782
Employees are highly engaged in their work of serving clients satisfactorily	40.6	47.1	7.2	4.7	0.4	4.23	0.806
There is quick response to clients' needs	37.6	39.4	15.3	6.2	1.5	4.05	0.953
The location of Huduma Centres is accessible, reliable and convenient to customers	39.9	35.1	13.8	10.1	1.1	4.03	1.021
The services offered in Huduma centre are reliable	40.2	43.5	12.3	3.6	0.4	4.20	0.817
Huduma centres fully conform to and fulfill the provisions of the constitution and expectations of the public.	42.5	46.2	8.0	2.9	0.4	4.29	0.762
There is responsiveness to citizens' needs in Huduma centres	37.5	52.0	6.9	2.5	1.1	4.22	0.772
There is professionalism in Huduma Centres	46.0	41.2	8.4	3.6	0.7	4.28	0.824
There is respect for the rule of law in Huduma Centres	46.0	43.1	6.9	3.6	0.4	4.31	0.784
There is observance of public service values in Huduma centres	42.5	45.1	8.4	3.3	0.7	4.25	0.803
<b>Composite mean and Standard deviation</b>						<b>4.2</b>	<b>0.8</b>

According to the findings, public service delivery is effective and efficient. This is shown by an aggregate mean of 4.2 and a standard deviation of 0.8

**The Mediating Effect of Government Policies on Public Service Delivery of Huduma Centres in Kenya**

Table 4: Mediating Effect of Government Policies on Public Service Delivery

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Mean	Standard Deviation
Government policies influence public service delivery in Huduma centres	1.9	3.4	6.0	45.5	43.2	4.24	0.859
Priorities in political developments influence public service delivery in Huduma centres	5.3	17.4	20.0	35.5	21.9	3.51	1.165
Economic resources available influence public service delivery in Huduma centres	1.1	7.9	15.7	41.9	33.3	3.99	0.953
Government budgets influence public service delivery in Huduma centres	1.5	6.8	7.2	41.1	43.4	4.18	0.940
Laws that define institutional processes influence public service delivery in Huduma centres	1.5	6.8	12.9	45.8	33.0	4.02	0.933
<b>Composite mean and standard deviation</b>						<b>4.0</b>	<b>0.643</b>

Table 4 shows that on average, the respondents agreed that government policies had an influence on public service delivery (M=4.00, SD =0.643). This is a clear indication that government policies play a critical role in enhancing effectiveness of public service delivery.

**Hypothesis Testing Using Multi Regression Analysis Model**

Multiple regression analysis was performed to assess the influence that employee training has on public service delivery of Huduma centres in Kenya. Government policies (M) are the mediating variable.

Table 5: Model Coefficients for Multi regression Model - Hypothesis results  
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.207	.470		4.697	.000		
	ET	.183	.058	.189	3.167	.002	.913	1.096
2	(Constant)	2.061	.393		5.241	.000		
	ET	.168	.048	.173	3.469	.001	.912	1.096
	M	.464	.043	.580	10.881	.000	.799	1.252

a. Dependent Variable: PSD

(Source: Survey data, 2021)

Table 5 shows that in the first model, Employee training (ET);  $\beta = 0.183$ ,  $p = 0.002$ , is significant at 95% confidence level. In the second model regression analysis was used to investigate the hypothesis that government policies mediate the relationship between employee training and public service delivery. Government policies had significant mediating effect on the relationship between Employee training and PSD. As indicated by  $p=0.000$  at 95% confidence level.

Therefore, the null hypothesis is rejected and it was concluded that employee training has influence on public service delivery of Huduma centres in Kenya.

Research shows that employee training is a key and an important factor to public service delivery. Kiiru (2015) conducted a study on SHRM practices and parastatals performance in Kenya. The study postulates that employee training as a strategic human resource practice has a positive, significant influence on public service delivery. Different types of training to the employees is necessary, in order to have better delivery of public services.

Employee training is also more favorable if it is in line with the jobs since skills and knowledge is an important base for any human resource competitive advantage. It is recommended that human resource managers ensure that training is linked to the overall strategy of the public service delivery. Mwangi & Gachunga, (2016) also supports employee training and adds that employee training significantly influences public service delivery. Training is very important in public service delivery in enhancing employee career development, and that it cannot be underrated or substituted by anything else.

Okumu et al., (2018) showed that employee training has a positive relationship with the performance of employees. However, the effect of policies and employee training was insignificant for forecasting employee performance. More so, the study shown that there existed no difference between position of the employees and performance in the Kenyan judiciary. Recommendations were for the organization to do budgetary allocation and the organization to set aside adequate resources for training. The training organizers are also advised to take on other instructional approaches like teleconferencing, videoconferencing and internet. The study also recommended training needs assessment to be done before doing any training program, to ensure employee training effectiveness. However, the study only focused on the accessibility of training materials, Knowledge transfer and instructional media and their effect on employee performance.

According to Masenge et al., (2018) there are other areas like the counties where the level of public service delivery is not satisfactory and owing to a variety of challenges. These problems include a lack of equal opportunity for all employees to participate in training, resulting in skewed trainings, a lack of an internal training policy and reliance on the national government's public service training policy, that does not take care of its specific needs, and a lack of in stakeholder engagement, resulting in rare trainings that do not meet their training needs. As a result, a training needs assessment for all employees should be conducted in order to develop a superior workforce through focusing on weakness areas as well as trying to develop them through relevant courses as needed. Relevant training should be provided so as to minimize labor turnover, reduced equipment breakdowns result in lower maintenance costs and fewer customer complaints. Finally, a clear monitoring and evaluation method should be put in place to hold employees accountable for public service delivery. Organizations should keep in mind when designing training programs that training is a stimulant which workers need to improve their service delivery and capabilities, which increases organizational productivity.

Bujang (2015) found that training did not provide important effect on official government performance increase. The study's findings confirmed that the learning process' quality should be improved. It is clear that research posits that employee training is vital for Public service delivery efficiency and effectiveness. Despite the fact that training in some areas of the public sector are not well implemented, this does not rule out its importance in improving public service delivery.

### **Summary of the Findings**

From the results, it is found out that majority of those who seek the government services in Huduma centers are the youths and the middle aged. From the findings, the public who were sampled were found to have the minimum education requirement to respond to public service delivery of Huduma centers in Kenya. Therefore, it is concluded that the respondents both the supervisors, branch managers and the public customers were well placed to give adequate and reliable information. On the marital status of the Huduma centre managers and supervisors, majority of 66.2% were married, 33.8% were single. This shows that there was employee diversity on marital status.

### **Employee Training**

Employee training in Huduma centres in Kenya is based on the identified training needs. Huduma centres in Kenya were found to have adequate training methods and they provide behaviour and attitude change. Most of the respondents who were branch managers and supervisors of various sections within Huduma centres agreed that training is based on career growth. From the research findings, most of the respondents indicated that mentoring and coaching are done to strengthen talent and continuous learning.

The respondents agreed that the in-service programs have adequately provided behavioural and attitude development for capacity building in Huduma centres. It was also agreed that Huduma Centres experience skills and competency gaps in some tasks. The respondents were indifferent on average as they neither agreed nor disagreed that in Huduma centres there is duplication and overlapping of functions with majority, 56.7% disagreeing. Finally, in Huduma centres, employee training enables easier facilitation of change management of work processes. The composite mean value is 3.875 and the composite standard deviation is 1.2104. This implies that the respondents agree that employee training influence public service delivery of Huduma centres in Kenya.

### **Government Policies**

Results indicated that government policies have a mediating effect on public service delivery in Huduma centers. Respondents agreed that priorities in political developments influence public service delivery in Huduma centres. The third item asked whether economic resources available influence public service delivery in Huduma centres from which the respondents. The respondents again agreed that the government budgets did influence public service delivery in Huduma centres. Lastly on government policies, the participants were asked whether laws that define institutional processes influenced public service delivery in Huduma centres. The respondents agreed on average. On average dependent variable public service delivery has a mean of 4.2 and a standard deviation of 0.8. This implies that there was a moderate response of the influence of strategic human resource practices on public service delivery of Huduma centres in Kenya.

Hypothesis results in the multi regression model reveal that in the first model, all the study variables did not have significant betas. Employee training was significant with  $\beta = 0.183$ ,  $p = 0.002$ , The second model Regression analysis showed Government policies had significant mediating effect on the relationship between Employee training and PSD. As indicated by  $p$  value which is less than 0.05.

### **Conclusion**

Majority of the respondents agreed that employee training influence public service delivery in Huduma centres. This was indicated by an aggregate mean of 3.875 and a standard deviation of 1.2104. The findings show that employee training in Huduma centres in Kenya is based on the identified training needs, adequate training methods that provide behavior and attitude change, and that training is based on career growth. From the research findings, most of the respondents indicated that mentoring and coaching are done to strengthen talent and continuous learning. The respondents agreed that the in-service programs have adequately provided behavioural and attitude development for capacity building in Huduma centres. It was also agreed that Huduma centres experience skills and competency gaps in some tasks.

The respondents were indifferent on average as they neither agreed nor disagreed that in Huduma centres there is duplication and overlapping of functions. Finally, in Huduma centres, a majority agreed that employee training enables easier facilitation of change and management of work processes. This implies therefore that employee training is very important to ensuring efficient and effective public service delivery of Huduma centres in Kenya.

Research findings show that there is a positive significant low linear relationship with a correlation coefficient of 0.254 (which is statistically significant  $p = 0.000$ ) between employee training and public service delivery in Huduma centres in Kenya. This implies that employee training as a strategic human resource practice, has a significance influence on public service delivery in Huduma centres in Kenya.

### Conclusion and Recommendations

The education background of the Huduma center managers should be maintained. The managers were found to be well educated with a minimum educational level of a bachelor's degree. Huduma centre managers, who have bachelor's degree, should be encouraged to further their education to at least a master's degree. This is to have more knowledge and skills, and to prepare them for succession to higher level roles and responsibilities. The study also recommends that employee training being the least performed among the four variables should be taken more seriously since it enhances continuous improvement. The study also recommends the management of Huduma centre managers and section supervisors from the various ministries that serve the public customers in the Huduma centres, to ensure that there is no duplication and overlapping of functions. This is because the respondents were different on average as they neither agreed nor disagreed that in Huduma centres there is duplication and overlapping of functions.

Lastly there should be a robust monitoring and evaluation of policy implementation so that performance gaps can be identified early enough in order to advise policy change and help measure performance for the future policy making process. There should also be inclusive stakeholder participation in the process of policy making and policy implementation to ensure that policies are inclusive and well crafted.

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**Influence Of Entrepreneurial Management On Growth Of Micro And Small  
Furniture Manufacturing Enterprises**

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Background of the study •

- Micro and small enterprises are an important segment of our economy.
  - They contribute 70% of our country's' GDP and over 80% the country's employment.
  - MSEs are the main source of employment in developed and developing of country's comprising over 90% of African business operations.
  - However report indicates that MSEs ranked highest to the risk exposure related to management that either led to the collapse of others or stagnation in growth of the sector.
  - This contributes to loss of jobs and hence resulting to poor economic development.
  - High dependence of old methods of doing business lack of entrepreneurial management were ranked as the highest among risks by the businesses in Kenya.
  - Entrepreneurial management has been provided as a key determinant of growth and profitability. It has been related to firm growth.
  - Entrepreneurial management helps firms to be proactive in managing uncertainty to create long term values because uncertainty has upside potential as well as downside exposure.
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- MSEs contributed 18.4% of the country's gross domestic product (GDP) because of 80.6% of the jobs were in the MSE sub sector (The Kenya economic survey, 2015).
  - However, the main question is why MSEs continue to face low growth and stagnation despite the unfolding opportunities in the economic changes.
  - The study aim was to determine how entrepreneurial management could be a driver of growth of SMEs in the furniture manufacturing industry.
  - The study opted to find to out and suggest possible remedies to curb the poor and stagnant growth of micro and small furniture manufacturing enterprises in Kenya with Nairobi as the core area of target.
  - The study had to find out what prevents furniture manufactures from taking up spaces in supermarkets and furniture stores in the city center.
  - The study therefore sought to establish effect of entrepreneurial management its components: strategic orientation, resource orientation, reward phylosophy on growth of micro and small furniture manufacturing enterprises in Kenya.



Statement of the Problem

- Devolution in Kenya has presented micro and small enterprises with new challenges that have threatened their survival and growth.
- MSEs are faced with constant threat of failure, redundancy and most do not graduate to large enterprises.
- There is no enough public/private dialogue at the county level and little consultation with MSEs on the ground in the policy making process.
- Poor coordination between national and county government has led to poor enforcement of regulations.
- Despite their significance, past statistics indicate that 3 of 5 businesses fail within the first few months of operation
- Those that continue 80% fail before the 5th year. This problem is attributed to management issues.
- Furniture imports stand at US\$66 million and constitute 13 percent of the total market, however, exports are growing more slowly at a 10% CAGR.
- According to the trend the furniture industry is taking in Kenya this means that soon there'll be a furniture deficit in the market.
- While furniture manufacturing in Kenya drops, furniture demand in Kenya is increasing due to increased purchasing power, population and growing urbanization.
- It is clear that there is a business opportunity for the furniture business in Kenya, yet, the business still struggle with stagnated growth and failure to meet the market demand.
- Despite the problem persisting in Kenya, few studies have been conducted to shed light on the same for instance, (Bendixen & Migliorini, 2006; Hortoványi, 2010, Antoncic & Hisrich 2010; Covin & Slevin's (2011).
- Therefore, based on the above backdrops, this study sought to fill the gap in establishing the relationship between EM and growth of MSE's.
- This study specifically looked into the following variables: strategic orientation, Resource orientation, reward philosophy and entrepreneurial culture.

### Objectives of the Study

#### General objectives

To establish the influence of entrepreneurial management on growth of micro and small furniture manufacturing enterprises in Kenya

#### Specific objectives

- To establish the influence of strategic orientation on growth of micro and small furniture manufacturing enterprises in Kenya
  - To establish the influence of strategic orientation on growth of micro and small furniture manufacturing enterprises in Kenya.
- To establish the influence of resource orientation on growth of micro and small furniture manufacturing enterprises in Kenya.
- To determine the influence of reward philosophy on growth of micro and small furniture manufacturing enterprises in Kenya
  - To assess the influence of entrepreneurial culture on growth of micro and small furniture manufacturing enterprises in Kenya
  - To assess the moderating effect of networks on the relationship between manufacturing enterprises in Kenya

#### Research Hypothesis

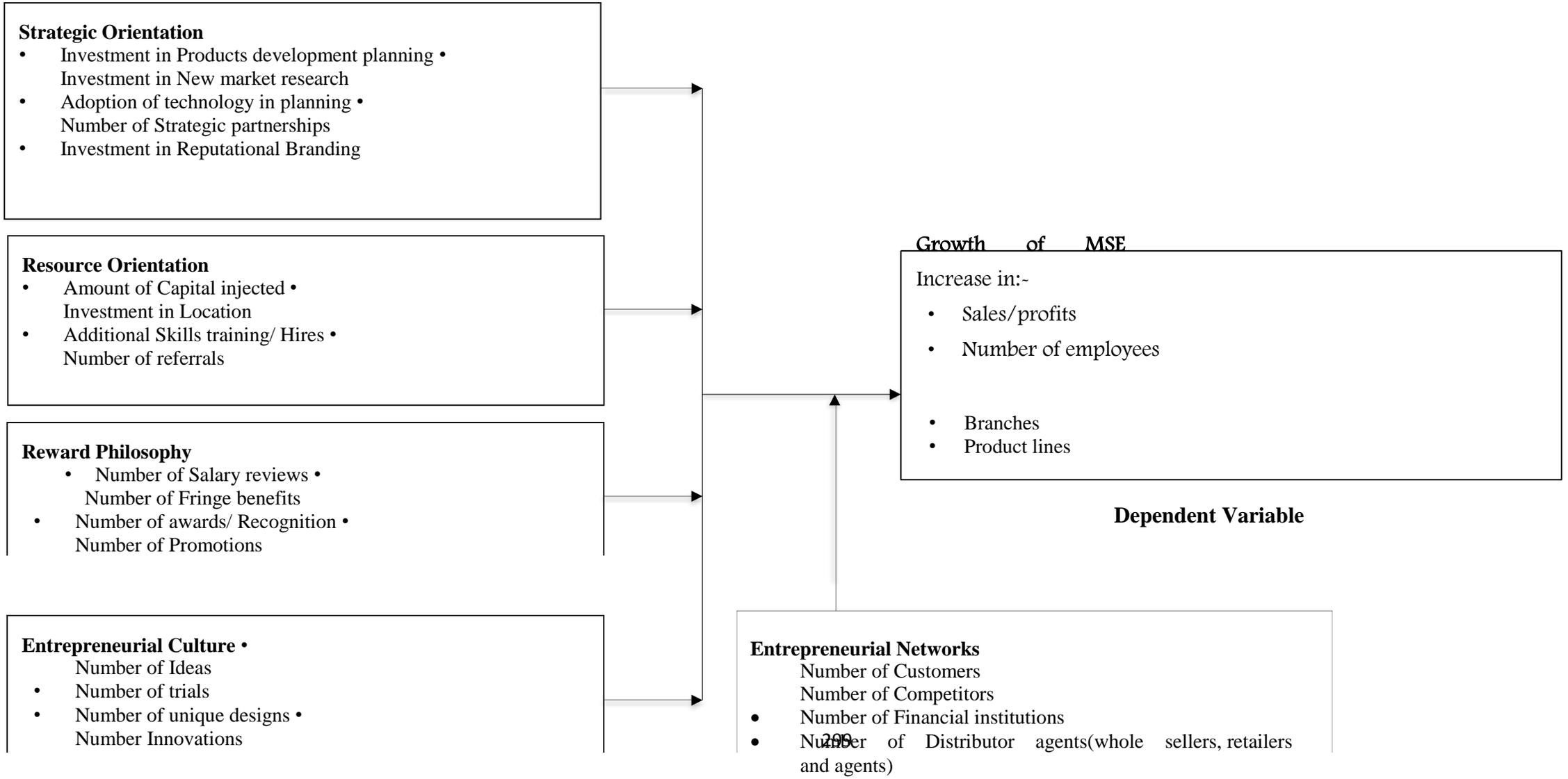
The study was guided by the following hypothesis

- Ha1: strategic orientation significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha2: resource orientation significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha3: reward philosophy significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha4: entrepreneurial culture significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha5: networks have a significant influence on the relationship between entrepreneurial management and growth of micro and small furniture manufacturing enterprises in Kenya.

The study was guided by the following theories:

- **Contingency theory (Burns & Stalker, 1961) supporting to strategic orientation.**
- **Resource based view theory (Barney's 1991; Ray, Muhanna & Barney, 2010).**
- **Herzberg hygiene theory( Herzberg et al. (1959)) in relation to reward philosophy**
- **Schumpeter's theory of innovation (Schumpeter, 1942)-**  
The theory looks into how frequently the firm encourages and promotes new ideas, creativity, experimentation, and broad search for opportunities within the firm
- **Firm growth theory (Green et al. 2006)-**The relevance of this theory lies in preposition that the growth of MSEs can contribute to poverty reduction through employment generation.
- **Network theory (Granovetter's, 1973; Burt, 1992)-**The relevance of this theory lies in preposition that the growth of MSEs can contribute to poverty reduction through employment generation.

CONCEPTUAL FRAMEWORK



Independent Variables

Moderating Variable

Methodology

Item	Description
Research Design	§ Mixed method (causal, non-experimental and cross-sectional).
Population	§ 10345 owners/managers of furniture manufacturing MSEs in Nairobi (Nairobi city county, 2017) § 3652 micro enterprises and 6693 Small enterprises
Sample and Sampling and 241 from small enterprises).	§ The sample size was 373 owners/managers of furniture business in Nairobi (132 from micro Techniques enterprises § Stratified random sampling and systematic sampling
Data and data Collection Instruments	§ Quantitative data § Primary data and secondary data § Closed-ended questionnaire
Data Collection Procedure	§ A drop and pick later method § Interviews by trained research assistants
Pilot Testing (10 owner managers of MSEs)	§ Validity – face, content (input by lectures/supervisors) and construct (KMO & Bartlett’s test) validity § Reliability - Cronbach Alpha coefficient ( $\alpha$ ) (0.7)
Diagnostic tests	§ Linearity Test, Normality Test, Multicollinearity Test and Autocorrelation (test for independence), Heteroscedasticity

Data Analysis and § Analysis involved the use of descriptive and inferential statistics

Presentation § Descriptive statistics was in form of averages, standard deviations, counts and percentages

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Analytical model

- Inferential statistics include the correlation analysis (r & p values) and regression analysis (beta Coefficients,  $R^2$  & p values).
- Data was coded and analyzed using SPSS version 23.0. § Presentation was by use of tables graphs and charts

Statistical the panel data model is represented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y = Growth of MSEs;

X1 = Strategic Orientation;

X2 = Resource Orientation;

X3= Reward Philosophy;

X4 = Entrepreneurial Culture, and;

$\beta_0$  = Constant  $\beta_1$   $\beta_2$   $\beta_3$  and  $\beta_4$  = the regression equation coefficients for each of the variables, and;

$\varepsilon$  = error.

**RESEARCH FINDINGS AND DISCUSSION.**

- The study targeted a sample size of 373 respondents
- 319 filled them correctly and returned the questionnaires making a response rate of 85.5%. • This response rate was satisfactory to make conclusions for the study as it acted as a representative.
- According to Mugenda and Mugenda (2012), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent.

	<b>Questionnaires Administered</b>	<b>Questionnaires filled &amp; Returned</b>	<b>Percentage</b>
<b>Respondents</b>	<b>373</b>	<b>319</b>	<b>85.5</b>

Reliability and Validity Results

From the table below the KMO from the pilot study was 0.715, which is close to 1 indicating relatively compact patterns of correlations, and thus factor analysis should yield distinct and reliable factors.

Test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.715
Bartlett's Test of Sphericity	Approx. Chi-Square
	Df
	Sig.
	4330.234
	465
	0.000

The pilot test showed that the scales measuring the objectives had a very high reliability.

CONSTRUCTS	CRONBACH ALPHA	No. of Items
Strategic orientation	0.834	9
Resource orientation	0.921	8
Reward philosophy	0.902	4
Entrepreneurial culture	0.850	8
Entrepreneurial networks	0.836	4

NOTE: All the constructs yield alpha values are above 0.7 and hence more reliable

### Normality Test

- Normality tests are done to determine whether the sample data has been drawn from a normally distributed population.
- In this study, the usable response rate was 319 and, hence, the Shapiro-Wilk test was used.
- All the curves are consistent with the Shapiro -Wilk test in showing that the data are normally distributed.

### Linearity Test

- Computation of ANOVA statistics was used to test for the linearity assumption.
- ANOVA results were computed with F-statistics for both the linear and the non-linear components for each independent variable.
- All the p-values are above 0.05 hence confirming insignificant deviations from linearity and thus linear relationships (constant slope) between the independent variable and the dependent variable.

REGRESSION ANALYSIS

Strategic orientation and growth model

Analysis model for strategic orientation- Anova and model summary for strategic Orientation and Growth Model

Model Summary				
R	R Square	Adjusted R Square	Std. Error of the Estimate	
.225a	0.051	0.048	0.976	

The model summary for strategic orientation shows a positive correlation of 0.225 and R square variation of 5.1% implying that strategic orientation increases growth by 5.1%.

ANOVA					
Sum of Squares	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	16.110	1	16.110	16.916	.000b
Residual	301.890	317	0.952		

Total	318	318				
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The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that **we** reject the null hypothesis and conclude that strategic orientation influences growth.

Resource Orientation and growth model

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.360a	.129	.127	.934

A correlation of 0.360 which is 36% between the resource orientation and growth of micro and small furniture manufacturing enterprises. This implies that the resource orientation is positively correlated to the growth of micro and small furniture manufacturing enterprises.

ANOVA

Sum of Squares	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	41.158	1	41.158	47.128	.000b
Residual	276.842	317	.873		
Total	318.000	318			

The model show a positive correlation of 0.36 between resource orientation and growth of SMEs with an R square variation of 12.9%. This implies that increase in growth

Model Summary				
R	R Square	Adjusted R Square	Std. Error of the Estimate	
.263a	.069	.066	.966	

is brought about by 12.9% variation in resource orientation. The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that we reject the null hypothesis and conclude that resource orientation influences growth

**Reward Philosophy and Growth Model.**

ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	21.989	1	21.989	23.548	.000b

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Residual	296.011	317	.934		
Total	318.000	318			

A correlation ( $r= 0.263$ ) between the reward philosophy and growth of micro and small furniture manufacturing enterprises. This implies that the reward philosophy is positively correlated to the growth of micro and small furniture manufacturing enterprises.

The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that we reject the null hypothesis and conclude that reward philosophy influences growth.

**Entrepreneurial Culture and Growth Model**

Independent Variable			Growth	Entrepreneurial Culture	
	Pearson Correlation		-.336	1	
Entrepreneurial Culture	Sig. (P-value)		.000		
Regression	11.873	1	11.873	12.295	.001b
Residual	306.127	317	.966		
Total	318.000	318			

The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that we reject the null hypothesis and conclude that entrepreneurial culture influences growth.

The table negative correlation of  $r = -.336$  hence implying that entrepreneurial culture is negatively correlated with growth of micro and small furniture manufacturing enterprises in Kenya..

**MULTIPLE REGRESSION ANALYSIS.**

**Model Summary for all the variables**

The study showed a positive correlation between entrepreneurial management and growth of micro and small furniture enterprises in Kenya.

R square is 23.6% implying that 23.6% variation in growth is influenced by entrepreneurial management.

The p value is 0.000 which is less than 0.05 hence implying that we reject the null hypothesis and conclude that entrepreneurial management significantly affects growth.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
	.486a	0.236	0.227	0.879		
Model	Sum of Squares		Df	Mean Square	F	Sig.
1	Regression		4	18.800	24.31	.000b
	Residual		314	0.773		
	Total		318			

The study showed a positive correlation between entrepreneurial management and growth of micro and small furniture enterprises in Kenya.

R square is 23.6% implying that 23.6% variation in growth is influenced by entrepreneurial management.

The p value is 0.000 which is less than 0.05 hence implying that we reject the null hypothesis and conclude that entrepreneurial management significantly affects growth.

**FINAL REGRESSION COEFFICIENTS AND REGRESSION MODEL EQUATION WITHOUT A MODERATOR**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	13.36	2.049		6.5203	
Strategic orientation	0.227	0.050	0.1355	4.54	0.000
Resource Orientation	0.344	0.054	0.2054	6.3704	0.000

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Reward Philosophy	0.216	0.050	0.1289	4.32	0.000
Entrepreneurial culture	-0.025	0.055	-0.0149	-0.4545	0.002
Dependent Variable: Growth	0.253	0.055	0.1510	4.6	0.000

$$Y = 13.36 + 0.227X_1 + 0.0344X_2 + 0.216X_3 - 0.025X_4 + 0.253Z$$

Where: Y = Growth of MSEs;  $X_1$  = Strategic Orientation;  $X_2$  = Resource Orientation;  $X_3$  = Reward Philosophy;  $X_4$  = Entrepreneurial Culture. The implication is that a unit change in strategic orientation leads to 0.227 increase in growth of MSEs, a unit change in resource orientation leads to 0.344 increase in growth of MSEs, a unit change in reward philosophy leads to 0.216 increase in growth of MSEs and a unit change in resource entrepreneurial to 0.025 decrease in growth of MSEs

### MODERATING EFFECT OF ENTREPRENEURIAL NETWORKS

The study also sought to establish the moderating effect of entrepreneurial networks on the relationship between entrepreneurial management and the growth of micro and small furniture manufacturing enterprises

#### Model Summary for the MMR model

a Predictors: (Constant), Entrepreneurial culture , Reward Philosophy, Strategic orientation , Resource Orientation b Predictors: (Constant), Entrepreneurial culture , Reward Philosophy, Strategic orientation , Resource Orientation, Entrepreneurial Networks

c Predictors: (Constant), Entrepreneurial culture , Reward Philosophy, Strategic orientation , Resource Orientation, Entrepreneurial Networks ,  $X_1$  intersection Z,  $X_2$  intersection Z,  $X_3$  intersection Z,  $X_4$  intersection Z d Dependent Variable: Growth

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.486a	0.236	0.227	0.879	0.236	24.312	4	314	0.000
2	.508b	0.258	0.246	0.868	0.022	9.093	1	313	0.003
3	.565c	0.319	0.299	0.837	0.061	6.933	4	309	0.000

$\hat{Y} = 0.122X_1 * Z + 0.119X_2 * Z + 0.030X_3 * Z + 0.253X_4 * Z$  becomes the final regression model equation after network is added as a moderator hence implying that entrepreneurial network has an influence between entrepreneurial management and growth of SMEs. The changes in correlation are evident from the 3 phase approach when network is added.

### CONCLUSIONS

- The study concluded that there was a significant positive relationship between strategic orientation and growth of the micro and small furniture manufacturing enterprises.
- The prime benefit of strategic orientation is that it is never isolated from any aspect of the organization. Adopting strategic orientation, micro and small furniture manufacturing enterprises may never lose their focus from any of these important business aspects.
- Strategic orientation of the firm leads to, at least in part, superior performance because of the innovative products and services which are brought to market.
- The research also concluded that there was a significant and positive relationship between resource orientation and growth of the micro and small furniture manufacturing enterprises.
- Micro and small furniture manufacturing enterprises know that, for a firm to take high levels of performance and a sustained competitive advantage, it needs to acquire heterogeneous resources and establish sufficient shield to manage resource constraints
- In addition, the research concluded that there was a significant but positive association between reward philosophy and growth of the micro and small furniture manufacturing enterprises.
- The study found the reward philosophy is one of the most critical issues for competitive advantage of the micro and small furniture manufacturing enterprises and we can conclude that it lays meaningful emphasis on innovation.
- Firms provide greater reward for innovative employees, which becomes strategic to the firm.
- Based on the data collected from the field, the study reached a conclusion that entrepreneurial culture had a significant negative association with the growth of the micro and small furniture manufacturing enterprises
- Although entrepreneurial culture is one of the crucial aspects that can differentiate one firm from another, many micro and small furniture manufacturing enterprises lack entrepreneurship skills and experience which affect the propensity of enterprises to become entrepreneurial and the likelihood of their success.

### RECOMMENDATIONS

- Given that our study found resource orientation to be the largest contributor in the model (0.344), the study recommends the government to focus more on financing the MSMEs.
- In view of the findings made and conclusions drawn from the study, the following recommendations are provided to help enhance an accelerated and sustained growth in the micro and small furniture manufacturing enterprises in Kenya.
- Access to credit is important for the growth and development of micro and small furniture manufacturing enterprises in Kenya.
- However, access to credit is still a challenge to most micro and small furniture manufacturing enterprises in Kenya, especially those in developing economies, and it is also
- There is need for the government and other partners to facilitate the accessibility of credit to micro and small furniture manufacturing enterprises in Kenya.
- A policy should be developed to ensure that entrepreneurs engaging in micro and small furniture manufacturing enterprises undergo some training before they are issued with a business license. Still a key issue both within the private and public sectors
- This will assist the micro and small furniture manufacturing enterprises in Kenya to possess a little of technical/ entrepreneurial knowledge on enterprise initiation and growth.
- The training will be important in aligning the skills of owner managers of micro and small furniture manufacturing enterprises with technological advancements and new
- Therefore, partnerships with suppliers, financial institutions and other development associations can go a long way to improve efficiency and productivity in the industry.
- Moreover, there is a dire need for capacity building support to enable micro and small furniture manufacturing enterprises to grow.
- They need to be helped to liaise with the public agencies and institutions responsible for implementing the various schemes aimed at assisting micro and small furniture manufacturing enterprises.
- Strong associations would enjoy legal recognition; negotiate with official authorities on issues such as work permits, credit and the right to occupy public land.
- Therefore, there is need for the players in the furniture manufacturing business to form associations or cooperatives to strengthen their bargain and access to resources.
- Associations could help the micro and small furniture manufacturing enterprises to improve their access to capital and information through links with formal markets.

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INFLUENCE OF ENTREPRENEURIAL MANAGEMENT ON GROWTH OF MICRO AND SMALL FURNITURE MANUFACTURING ENTERPRISES

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Background of the study •

- Micro and small enterprises are an important segment of our economy.
- They contribute 70% of our country's' GDP and over 80% the country's employment.
- MSEs are the main source of employment in developed and developing of country's comprising over 90% of African business operations.
- However report indicates that MSEs ranked highest to the risk exposure related to management that either led to the collapse of others or stagnation in growth of the sector.
- This contributes to loss of jobs and hence resulting to poor economic development.
- High dependence of old methods of doing business lack of entrepreneurial management were ranked as the highest among risks by the businesses in Kenya.
- Entrepreneurial management has been provided as a key determinant of growth and profitability. It has been related to firm growth.
- Entrepreneurial management helps firms to be proactive in managing uncertainty to create long term values because uncertainty has upside potential as well as downside exposure.

- MSEs contributed 18.4% of the country's gross domestic product (GDP) because of 80.6% of the jobs were in the MSE sub sector (The Kenya economic survey, 2015).
- However, the main question is why MSEs continue to face low growth and stagnation despite the unfolding opportunities in the economic changes.
- The study aim was to determine how entrepreneurial management could be a driver of growth of SMEs in the furniture manufacturing industry.
- The study opted to find to out and suggest possible remedies to curb the poor and stagnant growth of micro and small furniture manufacturing enterprises in Kenya with Nairobi as the core area of target.
- The study had to find out what prevents furniture manufactures from taking up spaces in supermarkets and furniture stores in the city center.
- The study therefore sought to establish effect of entrepreneurial management its components: strategic orientation, resource orientation, reward philosophy on growth of micro and small furniture manufacturing enterprises in Kenya.

Statement of the Problem

- Devolution in Kenya has presented micro and small enterprises with new challenges that have threatened their survival and growth.
- MSEs are faced with constant threat of failure, redundancy and most do not graduate to large enterprises.
- There is no enough public/private dialogue at the county level and little consultation with MSEs on the ground in the policy making process.
- Poor coordination between national and county government has led to poor enforcement of regulations.
- Despite their significance, past statistics indicate that 3 of 5 businesses fail within the first few months of operation
- Those that continue 80% fail before the 5th year. This problem is attributed to management issues.
- Furniture imports stand at US\$66 million and constitute 13 percent of the total market, however, exports are growing more slowly at a 10% CAGR.
- According to the trend the furniture industry is taking in Kenya this means that soon there'll be a furniture deficit in the market.
- While furniture manufacturing in Kenya drops, furniture demand in Kenya is increasing due to increased purchasing power, population and growing urbanization.
- It is clear that there is a business opportunity for the furniture business in Kenya, yet, the business still struggle with stagnated growth and failure to meet the market demand.
- Despite the problem persisting in Kenya, few studies have been conducted to shed light on the same for instance, (Bendixen & Migliorini, 2006; Hortoványi, 2010, Antoncic & Hisrich 2010; Covin & Slevin's (2011).
- Therefore, based on the above backdrops, this study sought to fill the gap in establishing the relationship between EM and growth of MSE's.
- This study specifically looked into the following variables: strategic orientation, Resource orientation, reward philosophy and entrepreneurial culture.

### Objectives of the Study

#### General objectives

To establish the influence of entrepreneurial management on growth of micro and small furniture manufacturing enterprises in Kenya

#### Specific objectives

- To establish the influence of strategic orientation on growth of micro and small furniture manufacturing enterprises in Kenya
  - To establish the influence of strategic orientation on growth of micro and small furniture manufacturing enterprises in Kenya.
- To establish the influence of resource orientation on growth of micro and small furniture manufacturing enterprises in Kenya.
- To determine the influence of reward philosophy on growth of micro and small furniture manufacturing enterprises in Kenya
  - To assess the influence of entrepreneurial culture on growth of micro and small furniture manufacturing enterprises in Kenya
  - To assess the moderating effect of networks on the relationship between manufacturing enterprises in Kenya

#### Research Hypothesis

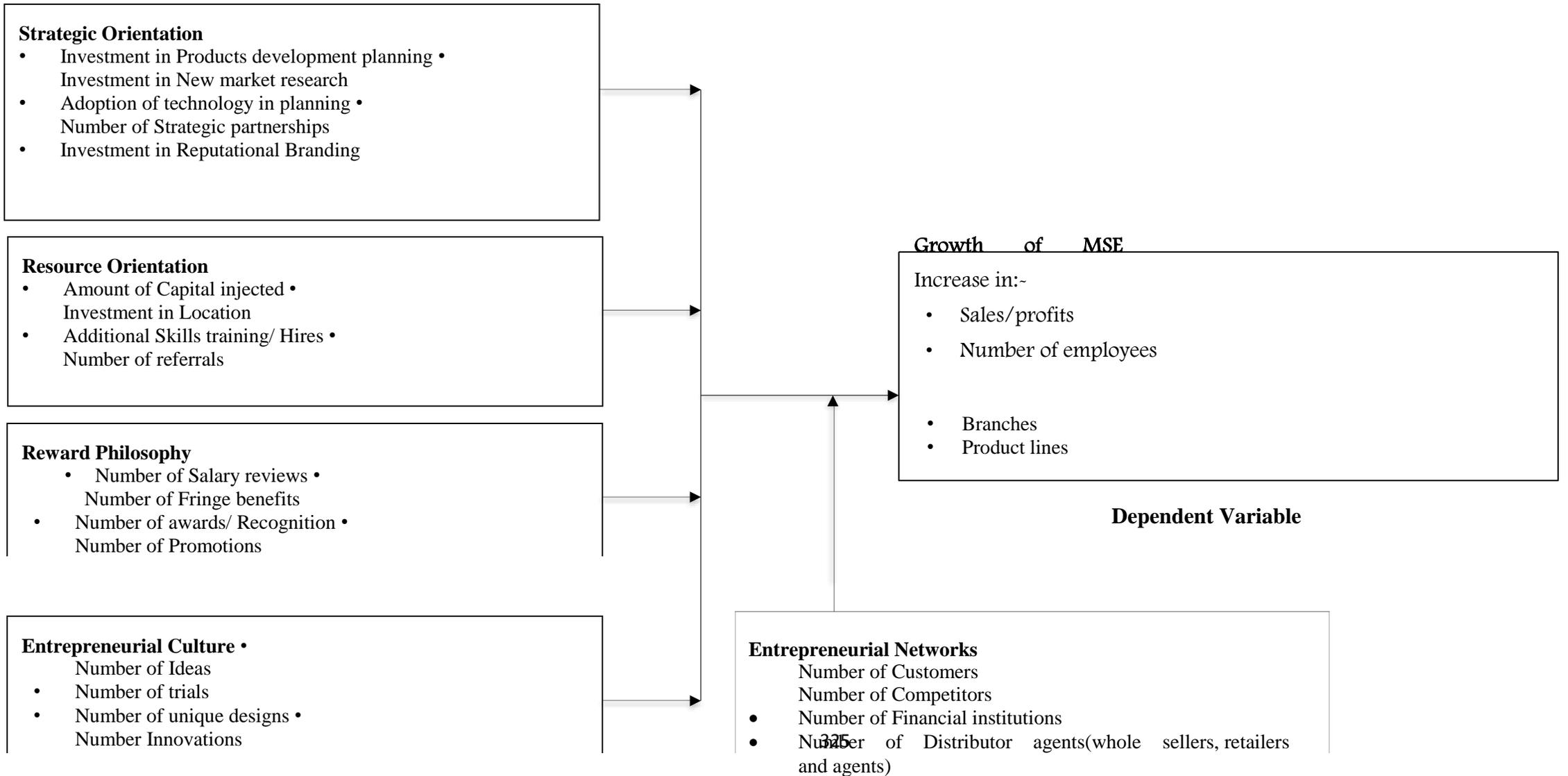
The study was guided by the following hypothesis

- Ha1: strategic orientation significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha2: resource orientation significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha3: reward philosophy significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha4: entrepreneurial culture significantly improves the growth of micro and small furniture manufacturing enterprises in Kenya.
- Ha5: networks have a significant influence on the relationship between entrepreneurial management and growth of micro and small furniture manufacturing enterprises in Kenya.

The study was guided by the following theories:

- **Contingency theory (Burns & Stalker, 1961) supporting to strategic orientation.**
- **Resource based view theory (Barney's 1991; Ray, Muhanna & Barney, 2010).**
- **Herzberg hygiene theory( Herzberg et al. (1959)) in relation to reward philosophy**
- **Schumpeter's theory of innovation (Schumpeter, 1942)-**  
The theory looks into how frequently the firm encourages and promotes new ideas, creativity, experimentation, and broad search for opportunities within the firm
- **Firm growth theory (Green et al. 2006)-**The relevance of this theory lies in preposition that the growth of MSEs can contribute to poverty reduction through employment generation.
- **Network theory (Granovetter's, 1973; Burt, 1992)-**The relevance of this theory lies in preposition that the growth of MSEs can contribute to poverty reduction through employment generation.

CONCEPTUAL FRAMEWORK



Independent Variables

Moderating Variable

Methodology

Item	Description
Research Design	§ Mixed method (causal, non-experimental and cross-sectional).
Population	§ 10345 owners/managers of furniture manufacturing MSEs in Nairobi (Nairobi city county, 2017) § 3652 micro enterprises and 6693 Small enterprises
Sample and Sampling and 241 from small enterprises).	§ The sample size was 373 owners/managers of furniture business in Nairobi (132 from micro Techniques enterprises and 241 from small enterprises). § Stratified random sampling and systematic sampling
Data and data Collection	§ Quantitative data
Instruments	§ Primary data and secondary data § Closed-ended questionnaire
Data Collection	§ A drop and pick later method
Procedure	§ Interviews by trained research assistants
Pilot Testing (10 owner managers of MSEs)	§ Validity – face, content (input by lectures/supervisors) and construct (KMO & Bartlett’s test) validity § Reliability - Cronbach Alpha coefficient ( $\alpha$ ) (0.7)
Diagnostic tests	§ Linearity Test, Normality Test, Multicollinearity Test and Autocorrelation (test for independence), Heteroscedasticity

Data Analysis and Presentation	§ Analysis involved the use of descriptive and inferential statistics
	§ Descriptive statistics was in form of averages, standard deviations, counts and percentages

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#### Analytical model

- Inferential statistics include the correlation analysis (r & p values) and regression analysis (beta Coefficients,  $R^2$  & p values).
- Data was coded and analyzed using SPSS version 23.0. § Presentation was by use of tables graphs and charts

Statistical the panel data model is represented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where;

Y = Growth of MSEs;

X1 = Strategic Orientation;

X2 = Resource Orientation;

X3 = Reward Philosophy;

X4 = Entrepreneurial Culture, and;

$\beta_0$  = Constant  $\beta_1$   $\beta_2$   $\beta_3$  and  $\beta_4$  = the regression equation coefficients for each of the variables, and;

$\varepsilon$  = error.

**RESEARCH FINDINGS AND DISCUSSION.**

- The study targeted a sample size of 373 respondents
- 319 filled them correctly and returned the questionnaires making a response rate of 85.5%. • This response rate was satisfactory to make conclusions for the study as it acted as a representative.
- According to Mugenda and Mugenda (2012), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent.

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	<b>Questionnaires Administered</b>	<b>Questionnaires filled &amp; Returned</b>	<b>Percentage</b>
<b>Respondents</b>	<b>373</b>	<b>319</b>	<b>85.5</b>

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Reliability and Validity Results

From the table below the KMO from the pilot study was 0.715, which is close to 1 indicating relatively compact patterns of correlations, and thus factor analysis should yield distinct and reliable factors.

Test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.715
Bartlett's Test of Sphericity	Approx. Chi-Square
	Df
	Sig.
	4330.234
	465
	0.000

The pilot test showed that the scales measuring the objectives had a very high reliability.

CONSTRUCTS	CRONBACH ALPHA	No. of Items
Strategic orientation	0.834	9
Resource orientation	0.921	8
Reward philosophy	0.902	4
Entrepreneurial culture	0.850	8
Entrepreneurial networks	0.836	4

NOTE: All the constructs yield alpha values are above 0.7 and hence more reliable

### Normality Test

- Normality tests are done to determine whether the sample data has been drawn from a normally distributed population.
- In this study, the usable response rate was 319 and, hence, the Shapiro-Wilk test was used.
- All the curves are consistent with the Shapiro -Wilk test in showing that the data are normally distributed.

### Linearity Test

- Computation of ANOVA statistics was used to test for the linearity assumption.
- ANOVA results were computed with F-statistics for both the linear and the non-linear components for each independent variable.
- All the p-values are above 0.05 hence confirming insignificant deviations from linearity and thus linear relationships (constant slope) between the independent variable and the dependent variable.

**REGRESSION ANALYSIS**

**Strategic orientation and growth model**

Analysis model for strategic orientation- Anova and model summary for strategic Orientation and Growth Model

Model Summary				
R	R Square	Adjusted R Square	Std. Error of the Estimate	
.225a	0.051	0.048	0.976	

The model summary for strategic orientation shows a positive correlation of 0.225 and R square variation of 5.1% implying that strategic orientation increases growth by 5.1%.

ANOVA					
Sum of Squares	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	16.110	1	16.110	16.916	.000b
Residual	301.890	317	0.952		

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Total	318	318				
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The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that **we** reject the null hypothesis and conclude that strategic orientation influences growth.

**Resource Orientation and growth model**

Model Summary					
R	R Square	Adjusted R Square	Std. Error of the Estimate		
.360a	.129	.127	.934		

A correlation of 0.360 which is 36% between the resource orientation and growth of micro and small furniture manufacturing enterprises. This implies that the resource orientation is positively correlated to the growth of micro and small furniture manufacturing enterprises.

ANOVA					
Sum of Squares	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	41.158	1	41.158	47.128	.000b
Residual	276.842	317	.873		
Total	318.000	318			

The model show a positive correlation of 0.36 between resource orientation and growth of SMEs with an R square variation of 12.9%. This implies that increase in growth

Model Summary				
R	R Square	Adjusted R Square	Std. Error of the Estimate	
.263a	.069	.066	.966	

is brought about by 12.9% variation in resource orientation. The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that we reject the null hypothesis and conclude that resource orientation influences growth

**Reward Philosophy and Growth Model.**

ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	21.989	1	21.989	23.548	.000b

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Residual	296.011	317	.934		
Total	318.000	318			

A correlation ( $r= 0.263$ ) between the reward philosophy and growth of micro and small furniture manufacturing enterprises. This implies that the reward philosophy is positively correlated to the growth of micro and small furniture manufacturing enterprises.

The model summary shows that the p values is 0.000 which is less than alpha (0.05) hence implying that we reject the null hypothesis and conclude that reward philosophy influences growth.

ANOVA					
Sum of Squares	Sum of Squares	Df	Mean Square	F	Sig.
Regression	11.873	1	11.873	12.295	.001b
Residual	306.127	317	.966		
Total	318.000	318			

The study showed a positive correlation between entrepreneurial management and growth of micro and small furniture enterprises in Kenya.

R square is 23.6% implying that 23.6% variation in growth is influenced by entrepreneurial management.

The p value is 0.000 which is less than 0.05 hence implying that we reject the null hypothesis and conclude that entrepreneurial management significantly affects growth.

FINAL REGRESSION COEFFICIENTS AND REGRESSION MODEL EQUATION WITHOUT A MODERATOR

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	13.36	2.049		6.5203	
Strategic orientation	0.227	0.050	0.1355	4.54	0.000
Resource Orientation	0.344	0.054	0.2054	6.3704	0.000
Reward Philosophy	0.216	0.050	0.1289	4.32	0.000
Entrepreneurial culture	-0.025	0.055	-0.0149	-0.4545	0.002
Dependent Variable: Growth	0.253	0.055	0.1510	4.6	0.000

$$Y = 13.36 + 0.227X_1 + 0.0344X_2 + 0.216X_3 - 0.025X_4 + 0.253Z$$

Where: Y = Growth of MSEs; X<sub>1</sub> = Strategic Orientation; X<sub>2</sub> = Resource Orientation; X<sub>3</sub> = Reward Philosophy; X<sub>4</sub> = Entrepreneurial Culture. The implication is that a unit change in strategic orientation leads to 0.227 increase in growth of MSEs, a unit change in resource orientation leads to 0.344 increase in growth of MSEs, a unit change in reward philosophy leads to 0.216 increase in growth of MSEs and a unit change in resource entrepreneurial to 0.025 decrease in growth of MSE

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c Predictors: (Constant), Entrepreneurial culture , Reward Philosophy, Strategic orientation , Resource Orientation,

Entrepreneurial Networks , X<sub>1</sub> intersection Z, X<sub>2</sub> intersection Z, X<sub>3</sub> intersection Z, X<sub>4</sub> intersection Z d Dependent Variable: Growth

Model						Change Statistics				
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### **CONCLUSIONS**

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- The prime benefit of strategic orientation is that it is never isolated from any aspect of the organization. Adopting strategic orientation, micro and small furniture manufacturing enterprises may never lose their focus from any of these important business aspects.
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## Influence of Strategic Orientation On The Growth Of Micro And Small Furniture Manufacturing Enterprises In Kenya

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### ABSTRACT

MSEs are an important segment of our economy. They contribute about 70% to Kenya's GDP and over 80% of employment. Promotion of MSEs in the informal sector is viewed as a viable approach to development. However, reports indicate that MSEs are ranked highest to risk exposure related to management. The higher exposure to risk for the MSEs leads to high collapse rate that leads to loss of job and hence low economic development. Lack of entrepreneurial management was ranked highest among the risks by businesses in Kenya. Entrepreneurial management has been fronted as a key determinant for a firm's growth and profitability. Therefore, this study sought to establish the influence of strategic orientation on growth of MSE in furniture manufacturing industry in Kenya. To achieve the objectives of this

study, the study was guided by Contingency Theory and Schumpeter's Theory of Innovation. The research approach adopted in this study was the mixed method. The target population of study was the 10,345 owners/manager of furniture

manufacturing MSEs in Nairobi.

A sample of 393 owner/managers of furniture business in Nairobi was selected using stratified random sampling. The study used a questionnaire for data collection purposes. Respondents filled in the questionnaire as the researcher waited. A drop and pick later method was employed too. The researcher did pilot testing the of research instrument to ensure its reliability and validity. The study generated both qualitative and quantitative data. The study also used multiple linear regression model to study the relationship between dependent variable growth of MSEs and independent variable strategic orientation. The study found that strategic orientation influences growth of micro and furniture manufacturing enterprises in Kenya **Key**

**Words:** *strategic orientation, growth, micro and small furniture manufacturing enterprises.*

## INTRODUCTION

Growth of SME's has presented a lot of concern not only to the owners and managers of firms but also to the policy makers globally (Fairoz et al., 2013; St-Jean, et al., 2014). Mohamed et al. (2012), in their study observed that there was a serious lack of entrepreneurial management among owner/ managers of small businesses in Malaysia resulting in poor production methods, products and services and lack of competitiveness which resulted into slow economic growth of the SMEs. The situation was worsened by the absence of government instituted policies to guide the entrepreneurs. Entrepreneurial Management, or certain of its dimensions, have been associated with positive effects related to performance in manufacturing firms in London (Coulthard, 2013).

In a study carried out on Malaysia public enterprises by Sumon, et al (2010) stated that Scholars and practitioners often associate the entrepreneurial management (EM) of a firm with private owned business entities. Within the context of organizational entrepreneurship, research shows that EM of a firm has a significant relationship with its performance (Wiklund, 1999). Majid, Ismail and Cooper (2011) did conducted a study in Malaysia. The study sought to establish prevalence of entrepreneurial management practices in technology-based firms. The results suggest that a large majority of the firms that were included in the study were seen to be entrepreneurial. Further inquiry into entrepreneurial management construct, the results were mixed on the prevalence of entrepreneurial management in the firms. For the firms with high affinity for entrepreneurial propensity, there was high prevalence of Management structure, strategic orientation and entrepreneurial culture dimensions. However, the firms sampled had average scores for the growth orientation and resource orientation dimensions.

### Manufacturing Enterprises

Manufacturing is the art of transformation of raw materials into either intermediate goods or final products through a mechanized process (Timmons, 2014). The modern African manufacturing sector is small and stagnant; there is little investment, and the sector has not managed to break into export markets. A comparative analysis of Ugandan firms in different size categories conducted by Gauthier (2013) indicates that the average low performance of the manufacturing and other sectors is worsened by the poor performance of MSEs.

Compared to large enterprises, MSEs in manufacturing are less efficient and incur high costs per unit of revenue. They use labor-intensive technologies to compensate for the lack of technical capacity in order to perform well. The larger firms are more capital-intensive than the smaller ones.

## **STATEMENT OF THE PROBLEM**

In Kenya, MSEs have consistently displayed inability to respond to random and especially high quantity of furniture orders of any particular kind from suppliers both local and international. A report by Kenya National Bureau of Statistics (2017) indicates that 3 out of 5 businesses fail within the first few months of operation and those that continue 80% of them fail before the fifth year. This high failure rate has a direct impact on the National GDP and also contributes to unemployment. MSEs create employment for 50% of the working population and contribute 18% to the gross domestic product (GDP) (KIPRA, 2013). In 2013, the furniture market in Kenya stood at approximately US\$496 million in sales, with a Compound Annual Growth rate (CaGr) of 10% over the past 5 years. Furniture imports stood at US\$66 million and constitute 13% of the total market. Imports of furniture grew at a CaGr of 24% between 2011-2015, while exports grew more slowly at a 10% CaGr. Therefore, if the gap is not filled, the ever-rising consumption in the Kenyan furniture markets will be met by imports. Ngaruiya (2014) notes that while furniture manufacturing in Kenya drops, furniture.

Demand in Kenya is increasing due to increased purchasing power, population and growing urbanization. Therefore, it is clear that there is an opportunity for the furniture business in Kenya, yet, the business still struggles with stagnated growth and failure to meet the market demand. Ngaruiya (2014) describe the entrepreneurs in MSEs as lacking creativity and vision, resources as well as access to credit services and as who enter the business only to meet their immediate financial need. They are therefore not keen on taking their business to the next level. Several empirical studies have been done in the area of entrepreneurship and entrepreneurial management. For example, Bendixen and Migliorini (2017) did a study on Entrepreneurship and women: The making of a business plan for the creation of a distribution business in Denmark. Also, Horton nyi (2013) did a study to assess entrepreneurial management in Hungarian SMEs. However, despite the empirical inquiry into the field of EM, no study either local or international known to the researcher has been conducted to establish the effect EM on growth of MSE in furniture manufacturing industry in Kenya. Therefore, this study sought to fill the gap in inadequate research on the influence strategic orientation on growth of MSE in furniture manufacturing industry in Kenya.

## GENERAL OBJECTIVE

The study sought to establish the influence of strategic orientation on the growth of micro and small furniture manufacturing enterprises in Kenya

## THEORETICAL REVIEW

This section presents the theoretical foundation of the study. In order to achieve the objectives of this study, the study reviewed various theories that are relevant to the objectives of the study. The study therefore was guided by Herzberg Hygiene Theory; Schumpeter's Theory of Innovation.

### Herzberg Hygiene Theory

Herzberg et al. (1959) moved on from Maslow's hierarchical needs to examine what they termed "motivators" and "hygiene factors" in the workplace, postulating that where job satisfaction was high there would be correspondingly high motivation. Robbins (1998) believes that the recent growth of worker participation in planning and controlling their work is due to Herzberg et al.'s (1959) recommendation that those factors which they find intrinsically rewarding (achievement, recognition, the work itself, responsibility and growth) should be emphasized. Nevertheless, if one follows Herzberg et al.'s thinking to its logical conclusion, no matter how much emphasis is placed upon factors that staff find intrinsically rewarding, such as worker empowerment, supportive management, team work, delegated authority and responsibility, if hygiene factors, such as low pay, are not addressed their full effect will not be felt.

The interdependence of intrinsic rewards with extrinsic rewards with consequences for motivation has also been postulated (de Charms, 1968). However, it would appear that there is limited applicability of this cognitive evaluation theory in the world of work and that further research is required. Herzberg Hygiene Theory will be used in the study to describe the reward philosophy in MSEs and how it motivates the employees for enhanced performance. This eventually results in growth of the organization.

### Schumpeter's Theory of Innovation

Schumpeter (1934; 1942) highlights the role of innovation in the entrepreneurial process.

Schumpeter (1942) describes a process of “creative destruction” where wealth creation occurs through disruption of existing market structures due to introduction of new goods and/or services that cause resources to move away from existing firms to new ones thus allowing the growth of the new firms. Accordingly, Schumpeter calls innovation the specific tool of entrepreneurs, the means by which entrepreneurs exploit change as an opportunity for a different business or a different service. Schumpeter (1942) stressed the role of entrepreneurs as primary agents effecting creative destruction and emphasized to the entrepreneurs the need to search purposefully for the sources of innovation, the changes and their symptoms that indicate opportunities for successful innovation; as well as their need to know and to apply the principles of successful innovation.

Schumpeter’s Theory of Innovation will explain entrepreneurial culture where ideas are more important than resources and furniture manufacturing MSEs usually have more ideas than their resources. The theory will look into how frequently the firm encourages and promotes new ideas, creativity, experimentation, and broad search for opportunities within the firm.

## **EMPIRICAL REVIEW**

### **Strategic Orientation**

Strategic orientations refer to the principles that direct and influence the activities of a firm and generate the behaviors intended to ensure the viability and performance of the firm (Gatignon & Xuereb, 2013). Magnificence in activities is achieved through key indicators (strategic) which are the back bone of a firm; strategic orientation refers to such type of key indicators. Strategic Orientation describes what factors drive the creation of strategy. The promoter’s strategy is driven by the opportunities that exist in the environment and not the resources that may be required to exploit them. As opportunities drive strategy, almost any opportunity is relevant to the firm. Once an opportunity is identified, resources to exploit it need, of course, to be marshaled. Conversely, the trustee’s strategy is to utilize the resources of the firm efficiently. The resources are the starting point and only opportunities that relate to existing resources are relevant to the firm.

According to Narver and Slater (2010), a firm's strategic orientation reflects the strategic directions implemented by a firm in order to create the proper behaviors for the continuous superior performance of the business. A firm invests its resources in activities that reflect its

strategic orientation. Three major strategic orientations can be identified from the list of factors which determine the success or failure of new products: the firm's consumer orientation and its competitive orientation—often covered jointly under the label of market.

Orientation and the firm's technological orientation. While inter-functional coordination has been considered as part of the market orientation concept (Narver & Slater, 2010). James and Hatten (2010) indicates that with the help of an organization, balances the product-market scope and creates respective aiding mechanisms to achieve superiority in a specific scope. They mentioned four mechanisms which firms use to face such kind of problems; prospectors, defenders, analyzers and reactors.

Prospectors operate in a manner that is creative innovative and creative to its core and they aim at exploring and using up untapped product and market arenas and opportunities. On the other hand, defenders, in complete contrast to prospectors, chase stability, they target to maintain total control of the pre-captured customer base and market share. While analyzers are prone to having the merits of both fore mentioned strategic orientations i.e. prospectors and defenders and seem to absorb in themselves the right things from both, because they not only aim at tapping new product-market arenas in a cause to flourish, but alongside look to maintain the serene and tranquil product market arenas on which they tend to have suzerain control. In total strategic disagreement to all other strategic orientation types' reactors tend to be altogether different because they have no proper response to the dynamic entrepreneurial problem. According to the studies in the past decades, reactors constitute a meager stake of the business firms (James & Hatten, 2010).

### **Gap in Knowledge**

The recent literature reveals a general although certainly not complete consensus around the position that successful corporate entrepreneurship is linked to growth in firms (Antoncic & Hisrich 2010). Most research about corporate entrepreneurship and firm's performance is based on Co in and Slevin's (2011) concept of entrepreneurial orientation that consists of three dimensions or behaviors: innovativeness, pro-activeness and risk taking. However, the area of entrepreneurial management; that encompasses strategic orientation, resource orientation, reward philosophy and entrepreneurial culture; and growth of enterprises have not received as much attention. Entrepreneurs are people who have a high need for achievement coupled with competitive spirit, strong self-confidence and independent problem-solving skills, and preference of taking calculated risks. Further, most of the excising literature is on blue chip companies, only a handful is in regard to Micro and Small

Enterprises and Medium and Small Enterprise. Therefore, this study was conducted among Micro and Small Enterprises and specifically in furniture manufacturing Micro and Small Enterprises.

## **RESEARCH METHODOLOGY**

### **Research Design**

The research approach adopted in this study was a mixed method. The research design was a causal, non-experimental and cross-sectional. The design also takes on a confirmatory element as it is based on priori hypotheses deduced from existing theories and empirical studies. This study seeks to explore the cross-sectional non-experimental causal effect between entrepreneurial management and growth of micro and small furniture manufacturing Enterprises in Kenya. An experimental design is where the researcher actively tries to control the research by changing the circumstances, situation, or experience of participants (Bachman, 2006). In a cross-sectional, non-experimental research design, all data are collected at one point in time and the researcher has no control of the circumstances, situations, or experience of participants.

### **Target Population**

The target population of study were 10,345 owners/managers of Furniture manufacturing MSEs in Nairobi (Nairobi City County, 2017). The distribution of the owners in micro and macro enterprises.

### **Sample Frame**

The sampling frame for this study was a population of 10,345 owner/managers of furniture business, a sample from within each group were taken using stratified random sampling which gives each item in the population an equal probability chance of being selected.

### **Sampling Size**

The sample size was 373 owner/managers of furniture business in Nairobi (132 from Micro enterprises and 241 from Small enterprises). The sampled respondents were deemed knowledgeable on subject matter and therefore, they are in a better position to provide

credible information as sought by the study. Statistically, in order for generalization to take place, a sample of at least 30 must exist (Cooper & Schindler, 2003). Therefore, the choice of 373 respondents were adequate for generalization. The distribution of the sample size across the two categories of the respondents

### **Data Collection and Data Collection Instruments**

The study collected both primary data and secondary data. Secondary data was collected from books, journals and publications. The study used a questionnaire for primary data collection purposes. A questionnaire is a tool of data collection in which each person is asked to respond to the same set of questions in a predetermined order (Bryman & Bell, 2011). Questionnaires were used because they enable a researcher to reach a large group of respondents within a short time and with less cost. They also help to avoid or reduce the biases which might result from personal characteristics of interviewers and since respondents do not indicate their names, they tend to give honest answers. The questionnaire contained closed-ended questions. Closed –ended questions guide respondents and restrict them to only specified choices given (Sarantakos, 1998).

### **Data Collection Procedure**

The researcher informed the respondents that the instruments being administered will be for research purpose only and the responses from the respondents will be kept secret and confidential. The researcher obtained an introductory letter from the university to collect data from the micro and small furniture manufacturing enterprises in Kenya then personally delivered the questionnaires to the respondents. The researcher administered the questionnaire individually to the selected sample. The researcher issued the Questionnaire and wait for the respondents to fill in the questionnaire and then collect. However, where it was difficult for the respondents to fill in as the researcher waits, a drop and pick later method was employed where the questionnaires were given out to the respondents and then collected later. To ensure high response rate, follow up calls were made to remind the respondents to complete the questionnaires. The researcher exercised care and control to ensure all questionnaires issued to the respondents are received, therefore, the researcher maintained a register of questionnaire given out and the ones returned.

### **Pilot Testing**

The researcher did a pilot testing of the research instrument to ensure its reliability and validity. The researcher conveniently selected a pilot group of 10 individuals from the population to test the reliability of the research instrument. According to Cooper and Schindler (2003), the pilot group can range from 10 to 100 subjects but it does not need to be statistically selected. The pilot data was not included in the actual study. The pilot study allowed for pre-testing of the research instrument. The clarity of the instrument items to the respondents were established so as to enhance the instrument's validity and reliability. The pilot study enabled the researcher to be familiar with research and its administration procedure as well as identifying items that require modification. Pilot study helped the researcher to correct inconsistencies arising from the instruments, which ensured that they measure what is intended.

### **Validity of the Research Instrument**

To establish the validity of the research instrument the researcher sought the opinions of experts in the field of study especially the researcher's supervisors and lecturers. This facilitated the necessary revision and modification of the research instruments thereby enhancing validity.

### **Reliability of the Research Instrument**

Reliability refers to the extent to which a measurement scales or test is dependable, consistent, predictable and stable (Salkid, 2012). Pretesting helped the researcher to correct inconsistencies arising from the instruments, which ensured that they measured what is intended. The researcher intends to conveniently select a pilot group of 10 individuals to test the reliability of the research instrument. According to Cooper and Schindler (2003), the pilot group can range from 10 to 100 subjects but it does not need to be statistically selected. This reliability estimate was measured using Cronbach Alpha coefficient ( $\alpha$ ). Nunnally (1978) recommends that instruments used in research should have reliability of about 0.70 and above.

### **Data Analysis and Presentation**

The study generated both qualitative and quantitative data. There are three main objectives for analyzing data. The objectives include: getting a feel of the data, testing the goodness of the data and testing the hypothesis developed for the research Sekaran (2006). The feel of

the data gave preliminary ideas of how good the scales were, how the coding and entering of data has been done. Testing of the goodness of data was accomplished by submitting data to factor analysis, obtaining the Cronbach's alpha reliability of the measure as stated earlier.

Also, conceptual content analysis was used for analysis. Content is defined by Creswell (2013) as a technique for making inferences by systematically and objectively identifying specific characteristic of messages and using the same approach to relate trends. According to Mugenda and Mugenda (2003) the main purpose of content analysis is to study the existing information in order to determine factors that explain a specific phenomenon. According to Kothari (2000), content analysis uses a set of categorizations for making valid and replicable inferences from data to their context. The study used correlation to show the degree of association between the independent variables and the dependent variable. Correlation is used when a researcher wants to predict and describe the association between two or more variables in terms of magnitude and direction (Oso, 2009).

Quantitative data collected through the questionnaires was checked for completeness and accuracy and usability. Descriptive statistics and content analysis were used to analyze the data collected. Closed questions were analyzed through the help of the statistical package for social Science (SPSS) computer software by assigning numbers to responses for analysis of qualitative data as it is efficient and give straight formal analysis.

The researcher further employed a multivariate regression model to study the relationship between strategic orientation and growth of MSEs in the furniture industry in Kenya on the other. The researcher deemed regression method to be useful for its ability to test the nature of influence of independent variables on a dependent variable. Regression is able to estimate the coefficients of the linear equation, involving one or more independent variables, which best predicted the value of the dependent variable. The researcher used multiple linear regression analysis to analyze the data. The regression model will be as follows:

$$Y = \beta_0 + \beta_1 X_1 + \epsilon$$

Where: Y = Growth of MSEs; X<sub>1</sub> = Strategic Orientation;  $\beta_0$  = Constant;  $\beta_1$  = the regression equation coefficients for each of the variables  $\epsilon$  = error

## RESEARCH RESULTS

### Factor analysis

To assess validity of the research instrument, factor analysis was carried out. Validity is the suitability of the instrument that is measured by assessing how well the instrument measures the study constructs. According to Henson & Roberts (2006) and Kieffer (1999) factor analysis is one of the most useful methods in instrument development for establishing validity evidence based on internal structure. Factor analysis techniques are commonly used to assess the structure of scales and in measurement the scales. Both Exploratory factor analysis (EFA) and Confirmatory factor analysis (CFA) are standard statistical tools for dimension reduction which are commonly used in the development of measurement scales.

### Convergent Validity

Convergent validity assesses whether items measuring the same construct which are expected to be related are actually related. Convergent validity is measured by determining the average variances extracted (AVEs) for each construct (John & Veronica, 2010). The research instrument is said to exhibit convergent validity if the AVEs are above 0.5 Kane (2013). As shown in table 4.2, the AVEs for all the factors from the retained items were all above 0.5 implying that the instrument exhibited convergent validity.

**Table 1: Average Variance  
Extracted**

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<b>Construct</b>	<b>AVE</b>
Strategic Orientation	0.845

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### Reliability Analysis

Cronbach Alpha was determined for every objective which formed a scale in the research. The pilot study involved 10 respondents conveniently selected. Cronbach's Alpha is a

measure of internal consistency, that is, how closely related a set of items are as a group. To assess the reliability of the instruments thus the internal consistency to indicate how well different items on a scale measure the concepts which they are purported to measure a reliability test was done. Internal consistency is calculated by measuring a statistic known as the Cronbach's alpha. Cronbach's alpha is considered a good measure of reliability in social science research when it is found to be 0.70 or above. This pretest was done among conveniently selected owner/managers of furniture business in Nairobi. A construct composite reliability co-efficient (Cronbach alpha) of 0.7 or above, for all the constructs, is considered adequate. The acceptable reliability coefficient is 0.7 and above (Nunnaly, 1978), if the Cronbach alpha is below 0.7 the reliability of the questionnaire is considered too low and thus the research tool should be amended.

The findings of the pilot test showed that 'Strategic Orientation' scale had a Cronbach's reliability alpha of 0.834. The pilot test showed that the scales measuring the objectives had a very high reliability.

**Table 2: Cronbach's Alpha**

	<b>Cronbach's Alpha</b>	<b>No. of Items</b>
Strategic Orientation	.834	9

### **Regression Analysis**

Regression analysis is a statistical process for estimating the relationships among Variables. With this analysis, one is able to understand how the typical values of the dependent variable change when one of the independent variable is varied, while the other variables are held constant/fixed. For this study, a multiple regression model was applied to identify the impact strategic orientation on growth of micro and small furniture manufacturing enterprises. This variable was measured using the responses on each of the variables obtained from the respondents. The collected data satisfied the assumptions for multiple linear regression as shown in the diagnostics test above.

The model summary table provides information about the regression line's ability to account for the total variation in the dependent variable. It demonstrates how the observed y-values are highly dispersed around the regression line. The output indicates that the strength of

association between the dependent variable and the independent variables jointly is moderately high ( $R = 0.486$ ). The coefficient of determination (R-square) was found to be 0.236. This is the explanatory power of the model which shows that 23.6% of the variation in the dependent variable growth is explained by the variation of predictor in the model (strategic orientation). This therefore means that other factors not studied in this research explain the remaining 76.4% of the growth of micro and small furniture manufacturing enterprises.

**Table 3: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.486a	0.236	0.227	0.879
a. Predictors: (Constant), Strategic Orientation				
b. Dependent Variable: Growth of Micro and Small Furniture Manufacturing Enterprises				

Analysis of variance (ANOVA) is an analysis tool used in statistics that splits the aggregate variability found inside a data set into two parts: systematic factors and random factors. The systematic factors have a statistical influence on the given data set, but the random factors do not. The researchers in the study used the analysis of the variance to test how independent variable affect the dependent variable amid a regression study. ANOVA in regression analysis involves calculations providing information about levels of variability within a regression model and form a basis for testing the general significance of the regression model. The ANOVA table is a breakdown of the variance in the outcome variable (growth). The table shows the proportion of the total variance of the dependent variable that is apportioned to the variation that can be explained by the predictor in the model and the remaining variance due to the residuals that cannot be explained by the independent variables in the model. The general significance of the model is determined by testing that the estimates of the model are jointly not equal to zero.

From the ANOVA table, the P-value of the F-statistic is less than 0.05 showing that the

coefficient estimates of the model are jointly not equal to zero. This implies that the model is Statistically significant in predicting how strategic orientation impact the growth of micro and small furniture manufacturing enterprises. This shows that the regression model has a less than 0.05 likelihood (probability) of giving a wrong prediction. This therefore means that the regression model has a confidence level of above 95% hence high reliability of the results. According to Kotter (1996), this is model can be used for estimating purposes.

**Table 4: ANOVA**

Model		Sum Squares	of df	Mean Square	F	Sig.
1	Regression	75.198	1	75.198	98.178	.000b
	Residual	242.802	317	0.766		
	Total	318.000	318			

a. Dependent Variable: Growth of Micro and Small Furniture Manufacturing Enterprises

b. Predictors: (Constant), Strategic Orientation

Regression analysis is a form of predictive modelling technique which investigates the relationship between a dependent (target) and independent variable (s) (predictor). This technique is used for forecasting and finding the causal effect relationship between the variables. It also indicates the significant relationships between dependent variable and independent variable and the strength of impact of multiple independent variables on a dependent variable. Regression helped the researchers to eliminate and evaluate the variable to be used for building predictive models that govern the association between strategic orientation impact on growth of micro and small furniture manufacturing enterprises.

The coefficients table shows the regression coefficients for the independent variables and statistics that determine how significant the variables are in predicting the growth of micro and small furniture manufacturing enterprises. The findings show that entrepreneurial management (Strategic Orientation) significantly influenced the dependent variable. Strategic orientation (p value=0.000) was found to be significant predictors of growth of micro and small furniture manufacturing enterprises.

Table 5: Regression Coefficients

	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	0.000	0.049		0.000	1.000
Strategic orientation	0.227	0.050	0.227	4.505	0.000

a. Dependent Variable: Growth of Micro and Small Furniture Manufacturing Enterprises

Inferring from the regression equation a unit increase in levels of strategic orientation while setting the coefficient of other independent variable constant would lead to a 0.227 change in growth of micro and small furniture manufacturing enterprises. The results from the multiple regression was used for hypothesis testing to draw conclusions on the objectives of the study on the influence of strategic orientation on the growth of micro and small furniture manufacturing enterprises in Kenya.

**Ha:** Strategic orientation significantly improves growth of micro and small furniture manufacturing enterprises in Kenya.

The p-value of the coefficient of strategic orientation in the model was found to be 0.000 which is less than 0.05. The coefficient of strategic orientation was positive implying improvement of growth with increases in strategic orientation. Therefore, the alternative hypothesis was accepted and a conclusion drawn that strategic orientation significantly improves growth of micro and small furniture manufacturing enterprises in Kenya.

## DISCUSSION OF THE FINDINGS

From the findings, we can establish that new product development was cited by the respondents as an aspect of strategic orientation however it was temporarily employed. The respondents contended that the objective of new product development was to cultivate, maintain and increase the market

share and to satisfying consumer demand. Some respondents suggested that since not every product will appeal to every customer or client base, so defining the target market for a product is a critical component that must take place early in the product development process. A majority of the respondents also indicated that they had ventured into new markets. These study results concur with the research findings by Gatignon and Xuereb, (2013) that strategic orientations help organizations find solutions to problems, create new capabilities, and improve business performance. Gatignon and Xuereb (2013) further indicates strategic orientation helps firms to develop strategies that drives a firm to realization of opportunities and how to exploit resources in to realize the said opportunities.

In view of the findings generated, many of the respondents indicated that their resources determined how they identified, pursued and implemented their strategic business opportunities. In addition, the study found that the micro and small furniture manufacturing enterprises were ready and willing to adopt new technology to transform their businesses. The respondents are in agreement that micro and small furniture manufacturing enterprises can compete with large businesses by being more swift and agile, and responding to change faster. Information technology can improve the enterprises efficiency and decrease human error by developing automated processes. These findings are in line with the study findings by Narver and Slater (2010), which indicates that strategic orientation of the firm reflects its operational, marketing, and entrepreneurial posture, thus by doing so, a firm achieves its goals in markets by taking risks, investing in innovation, becoming proactive, and developing future-oriented foresight.

In relation to contingency theory, that indicates that there is no single best way to organize an organization to realize organizational goals (Burns & Stalker, 1961). According to Morgan (2007) contingency theory depicts about every strategic orientation type and states that there is a manner that fits a firm's traits which lead to enhanced performance of the firm. In line with the study findings, micro and small furniture manufacturing enterprises in Kenya embrace new product development, ventured into new markets to maintain and increase the market share and to satisfying a consumer demand. They engaged this mix of strategic orientation in order to peruses multi dimensions of realizing objectives of the firm. These patterns depict various interconnected and reinforcing traits of the organization that are imperative to the materialization of organizations strategic goals. Strategic fit is the prime concept of strategy formation on the grounds of normative models; trivially this concept has been restricted to optimum performance (Seyranian, 2012).

Further, in line with Schumpeter's Theory of Innovation (1934; 1942) which highlights the role of innovation in the entrepreneurial process, the results indicates that the entrepreneurs were ready and willing to adopt new technology as a strategy to transform their businesses and achieve the objectives of their firms. Accordingly, Schumpeter calls innovation the specific tool of entrepreneurs, the means by which entrepreneurs exploit change as an opportunity for a different business or a different service.

## **CONCLUSIONS**

The study reached a conclusion that there was a significant positive relationship between strategic orientation and growth of the micro and small furniture manufacturing enterprises. The prime benefit of strategic orientation is that it never isolated from any aspect of the organization (Partnerships with other businesses, new product development and adoption of new technologies and processes). It links the customer, competitor and the product approaches together to define an environment of operation of the company. Adopting strategic orientation, micro and small furniture manufacturing enterprises may never lose their focus from any of these important business aspects. Strategic orientation of the firm leads to, at least in part, superior performance because of the innovations which are brought to market. Indeed, this is consistent with the adoption of innovation research, which indicates that the strategic orientation are strong determinants of the adoption of an innovation.

## **RECOMMENDATIONS**

There is a dire need for capacity building support to enable micro and small furniture manufacturing enterprises to grow they need to helped to liaise with the public agencies and institutions responsible for implementing the various schemes aimed at assisting micro and small furniture manufacturing enterprises. Strong associations would enjoy legal recognition; negotiate with official authorities on issues such as credit and the right to occupy public land. Therefore, there is need for the players in the furniture manufacturing business to form associations or cooperatives to strengthen their bargain and access to resources. Associations could help the micro and small furniture manufacturing enterprises to improve their access to capital and information through links with formal markets.

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## Influence of Project Technical Skills on Performance of Community based Human Immuno Deficiency Virus Projects in Kiambu, Kenya

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### Abstract

Identifying factors that are critical for the success of HIV projects not only leads to initiating mechanisms for efficiency and effectiveness in projects, but also for implementation of projects on time. This study sought to establish how project environment factors influence performance of HIV projects that are based at the community level in Kiambu, Kenya. The International community has committed to end AIDS by 2030, but this remains a big concern for the 160 Countries under the United Nations Joint Programme on AIDS (UNAIDS) on how to reach this target and achieve the Sustainable Development Goals. HIV prevalence in Kenya has stabilized at 6% for the last ten years, hence the need for more innovative ways of implementing projects. With 53% of HIV financing being channeled through extra budgetary allocation to Not for Profit Organizations to implement community-based HIV projects, there is need to identify CSF that will lead to value for money for every HIV intervention. With only half of Africa's development projects succeeding, and with majority of the projects failing to be delivered within schedule, cost, and quality, it is of essence that critical success factors that influence community-based HIV projects are established. These factors relate to efficiency, effectiveness, relevance and sustainability. The scope of the study was NPOs in Kiambu, Kenya. The study used descriptive survey research method and adopted stratified random sampling to identify a sample size of 151 respondents out of the target population of 249 NPOs implementing HIV projects in the 12 sub-Counties in Kiambu. A structured questionnaire with closed and open-ended questions collected primary data. A pilot study to test the reliability of the research instrument using Cronbach's alpha and validity using Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity was undertaken. The primary data collected was edited, cleaned and analyzed using descriptive statistics with the aid of Statistical Package for Social Science (SPSS 21.0). Correlation and regression was used to determine the relationship between project technical skills and performance of Community based HIV projects. Data was presented in tables and figures. The study found that technical skills were found to have a positive and significant relationship with project performance. The study recommends that project managers and the project team should possess professional qualifications and training in monitoring and evaluation, and effective communication skills. The projects should also have a monitoring and evaluation plan, and a communication plan or strategy targeting each stakeholder. Lessons learnt should be identified and documented as the project progresses rather than waiting to identify them at key milestones or at the end of the project as the team may have forgotten them or may be focused in closing the project rather than documenting lessons learnt.

**Key words:** Kenya, Kiambu, critical project success factors, project performance, community-based HIV projects, project technical skills

### 1.0 Introduction

#### 1.1 Background of the Study

Critical Success Factors define key areas of performance needed by the project to achieve its objectives. These key areas if made explicit to all in the organization provide a focus where the project must focus on to achieve its mandate. The concept of CSFs has evolved from primary measures of efficiency (time, scope and budget) to long term measures related to effectiveness and outcome (Muller, 2016). Project

success was initially associated with achieving the project objectives and the intended results within time, cost and quality. However, with more research, this golden triangle was identified as insufficient to define project success (Beleiu *et al.*, 2014). With time, project success criteria has grown from quantifiable triangle of cost, schedule and scope which measure efficiency to an improved perspective of quantifying impact and effectiveness (Bryde, 2005; Muller, 2016). The concept of CSF has generated considerable interest in project management as CFS support management to strategize, manage, monitor and achieve project goals (Ika, 2012). The concern with project success is relevant as the number of projects failing is rising with over 30% of projects not meeting their objectives (PMI, 2013).

Critical success factors relate to all projects whether they are in Information Technology, Physical projects such as the construction and engineering; or social projects such as health, or education. Critical success factors are important in any project, hence the need to identify, analyze and prioritize them based on their contribution to the project performance. The critical success factors have in its underlying assumptions that for all projects to be successful, they must be within cost, schedule and quality. Prabhakar (2008) disagrees with this view and argues that most projects experience low performance in terms of time, scope and budget but are perceived successful while others are within this triangle but have been considered failed as they didn't address sustainability issues and community participation during the project cycle.

Research in Critical success factors has not yielded a complete list that meets the needs of all projects (Ika, 2009) as there is variance between projects based on their scope, uniqueness, and complexity (Wateridge, 1995). Despite each project's uniqueness, there is need for stakeholders to agree on what constitutes CSFs. Development of CSFs ought to take into account the various stages of the project cycle from conceptualization to closure. If these factors are identified before project commencement, project failure is minimized. Mobey and Parker (2002) noted the importance of the entire project team understanding the project CSF at initiation and across the project cycle.

Most of the CSFs studies have been global and context specific making it difficult to apply them locally, hence the need for CSFs specific to community based HIV projects in Kenya. HIV has been identified under the Kenya Government's Universal Health Coverage agenda as one of the diseases requiring accelerated prevention, care and treatment, and stigma reduction. The Kenya Vision 2030 and the three Medium Term Plans (MTP) identified HIV under the social pillar and set to reduce Kenya's prevalence. The country has from the two completed MTPs not been able to meet its target of reducing HIV prevalence (NACC, 2016a). This calls for innovative implementation of HIV projects especially at the community level. Most of the HIV interventions at the community level are undertaken through projects by NPOs. Donor funding for HIV and AIDS is channeled either through the government budgetary system or donor administered programs by NPOs. Donors' extra budgetary allocation to NPOs is greater than the government on-budget support and has been increasing gradually (Kelly *et al.*, 2005). In reality, the performance of community HIV projects has been poor as evidenced by the high HIV prevalence, budget overruns, delay in project completion and inability to meet beneficiary expectations.

### **1.2 Statement of the Problem**

Projects are vectors for change and for the implementation of strategies and innovations that can bring competitive advantages to companies (Osorio *et al.*; 2014). They contribute to organizations achievement of their strategic goals and objectives. Toor & Ogunlana (2009) observes that there is evidence of poor project performance across various industries and types of projects, with the failure going unnoticed and suppressed, often with serious consequences. The performance of community HIV projects has been poor as evidenced by the high HIV prevalence, budget overruns, delay in project completion and inability to meet beneficiary expectations. With threats of reduction in donor funding for HIV, and with international sources accounting for 63% (NACC 2014), the need for efficiency and

effectiveness in these projects is paramount. The International community has committed to end AIDS by 2030, but this remains a big concern for the 160 Countries under the United Nations Joint Programme on AIDS (UNAIDS) on how to reach this target and achieve the Sustainable Development Goals. Africa has the highest epidemic, with Kenya having the second highest burden globally. (Toefy, 2017). Though there are disparities across counties, 65% of new infections can be traced to 9 out of the 47 counties (NACC *et al*; 2013). HIV therefore remains a disease of concern as it continues to burden households and health systems as well as causing morbidity and mortality. Kenya made a commitment under the Millennium Development Goal six (6) to halt and begin to reverse the spread of HIV and AIDS by 2015 (NACC, 2016a). However, the HIV estimates for 2015 indicated that the national prevalence was 5.9%, an increase of 0.8% from 2012, with 77,647 new infections recorded in 2015 (NACC, 2016a). To accelerate the reduction in HIV infections, Kenya adopted a multisectoral response by bringing on board all stakeholders to respond to HIV within their context (NACC, 2014). The community was engaged to address HIV prevention, stigma reduction and support for those infected and affected. Community based interventions were expected to yield highest return on investment as communities understand their problem better and respond appropriately within their local context.

HIV financing in Kenya is either through the government budgetary system or donor administered programs by NPOs. Donors' extra budgetary allocation to NPOs is greater than the government on-budget support and has been increasing gradually (Kelly *et al.*, 2005). Kenya's expenditure on HIV for the period 2009/10 – 2011/12 totaled 2,466 Million US\$, with 70% of this resource coming from donors. Out of this amount, 49%-53% accounted for resources that the NPOs utilized in the HIV response in the 3 year period. (NACC KNASA, 2014). Though the World Bank has spent close to US 5 \$ Billion in the last 20 years on 700 projects in Africa, 50% of these failed (Dugger, 2007), a failure rate that is above the 40% recorded in other poor regions in the world. With 50% success rate, the African projects are therefore lagging behind (Chauvet *et al.*, 2010) translating to projects failing to deliver on quality, schedule and cost. Due to the economic and social impact of HIV on communities, HIV projects should deliver on expected results within schedule and cost. This is especially since 53% of HIV financing in Kenya is channeled through community-based projects (NACC KNASA, 2016). However, the amount of donor aid supporting HIV has not translated to proportionate reduction in new HIV infections, stigma and AIDS related deaths. The lack of expected results amounts to financial loss and stakeholder dissatisfaction. There is need therefore for more innovative ways of running these projects. To address this gap where efforts of project stakeholders do not translate to results, it is important to identify critical success factors that the project team should focus on. Since donors have strict limitation on budgets, scope and schedule for HIV projects, the need to identify CSFs that lead to successful projects that meet donor and beneficiary expectations need to be prioritized.

### **1.3 Objective of the study**

This study sought to evaluate the influence of project technical skills on performance of community-based HIV projects in Kiambu, Kenya.

## **2.0 Review of Related Literature**

### **2.1 Theoretical Framework**

Two theories have been discussed in this paper. These are human capital theory and skills theory. Human Capital as a theory was proposed by Schultz (1961). In 1981 he further developed on this term arguing that human abilities are either inborn or acquired, and these abilities transform into human capital when developed further (Armstrong, 2009). Fisher *et al.*, (2003) and Bontis *et al.*, (1999) observes that human resource which include intelligence, skill and mastery is most important in organizations, and how this resource is managed gives the project a competitive edge. Armstrong (2009) notes that human capital includes intellectual, social and organizational capital, with knowledge, networks and interactions and stored information being key. Human capital remains a

valuable asset in projects and is key in determining their performance. Fugar *et al.*, (2013) supports this view that human capital remains core in projects and determines their competitiveness and profitability. Specifically, the project manager ought to have well developed communication skills, be able to manage people, time and resources well, be able to resolve conflicts and be willing to take risks (Sudhakar, 2012). The theory recognizes people as assets and the need for an organization to realize so and invest in them to generate returns. This theory supports project manager competence and technical skills as critical factors for performance of community-based HIV projects. Though the human capital theory addresses the project team skills aspect, it does not address their attitude which could affect acceptance of the project and consequently its implementation.

Skills theory focuses on what characteristics make leaders effective. This theory was proposed by Robert Katz in 1955 and Michael Mumfords in 2000. According to the leadership approach the skills, knowledge and abilities of a leader determines their effectiveness. A leader can learn skills and accomplish more after achieving competency and proficiency (Northouse, 2007). Therefore, the degree of importance of each skill whether conceptual, human or technical is a correlation of the project team member's position in the project (Katz, 1995). This theory lays more emphasis on learned skills as a determinant of performance than traits. Mumford *et al.*, (2000) observes that an effective leader should have personal attributes, competencies, experience, leadership skills and ability to handle environmental influences. A leader's performance is therefore influenced by their knowledge and skills. Skills theory places leadership performance on learned skills rather than on personal traits. Therefore, any person could learn and adapt to a specific set of skills to become a leader.

## **2.2. Empirical Review**

Shair (2016) studied the role of project technical skills on success of Kazi Kwa Vijana government projects in Kenya. Using a descriptive research survey design, he administered a questionnaire to 217 respondents after selecting the sample using simple random sampling from a population of 500. Using SPSS, descriptive and inferential statistics were generated and study findings presented in charts and tables. The results were that recruitment of KKV employees wasn't informed by similar projects and that since there was no regular trainings, the employees couldn't transfer the gained knowledge. Further, the project lacked internal systems to monitor finances leading to poor budgeting. Similarly, the project lacked schedule and activity tracking and as such project progress evaluation and reporting wasn't done. This study supported the research by identifying technical skills as project CSFs.

Serhan and Draganov (2016) study aimed at exploring how the project manager as a leader is communicating with the different stakeholders in order to reach the sustainable goals of his/her project. Primary data was collected using a questionnaire that was sent to project managers from different countries, that are working with projects focusing on implementation of sustainability in their projects and project managers that are not focusing on sustainability in their projects. A comparison between the answers of the different project managers was made, in order to determine in each phase of the project, if there is a difference in the stakeholder engagement and use of communication skills, when it comes to project managers working on construction projects with a focus on sustainable development. Communications skills are essential for addressing the sustainable aspect of a construction project, because it is more complex. Therefore, communication is essential for solving the sustainable challenges of a project.

Bwoma (2011) undertook a study on the influence of technical skills on performance of youth projects in Kisii. Using a descriptive survey, he targeted a population of 1400 youths. He sampled 302 youths and administered questionnaires to 21 youth groups. He used quantitative and qualitative techniques to analyse the collected data. The findings were that the youth groups required training on entrepreneurial skills including financial management, leadership skills and business and marketing

skills. This study supported the current research by identifying technical skills as influencing performance. Rotich *et al.*, (2014) administered a questionnaire and interview schedule to 36 project managers from 7 NGOs in Uasin Gishu County. Their research identified planning, leadership and monitoring as affecting project performance. Though this research contributes to CSFs in the NGO sector, it failed to put into consideration stakeholder participation and community ownership of the project. Doherty (2011) in his study of CSF for IT projects administered a questionnaire to 519 project managers with experience on IT projects and who were members of Project Management Institute (PMI). He proposed six critical success factors which included top management, clear project goals, project manager skills, expertise of the project team, realistic project schedule, and obtainable project requirements. While this research informs the present study, it did not address stakeholder involvement and environmental factors.

Mbawi and Muchelule (2015) identified planning, management support and social capital, communication, monitoring and evaluation as CSFs for performance of public universities in Kenya. They administered a questionnaire to 12 project managers and 124 team members. Their study supports the current study for search for CSFs by identifying planning, governance and technical skills but failed to address stakeholder involvement and environmental factors. Mwaura and Karanja (2014) administered a questionnaire to 52 respondents from Community Based Organizations in Kisii County on performance of their projects. They identified project governance, project management, financial management and community participation as critical factors for project performance of CBO projects. This study contributed to the search for CSFs for community projects. It however did not address top management and project goals as CSFs.

In their study of CSF for International Development projects in Maldives, Yamin and Sim (2016) received 41 responses to a questionnaire administered to a project team. They observed that coordination; monitoring; project design; institutional environment; and training were ranked as the most important project CSFs. Their study identified monitoring and environmental factors, but failed to consider stakeholder support and acceptance by beneficiaries. Its main focus was only on organizational internal factors thus ignoring CSF associated with factors external to the organization. Wang and Hu (2012) undertook a study on role of communication on project performance. They collected data using questionnaires which was analysed using SPSS. They found that communication was positively and significantly related to project completion on schedule, hence overall performance. Phiri (2015) studied influence of monitoring and evaluation on project performance. The study conclusion was that monitoring and evaluation had a positively and proportional influence on project performance. The study noted that there was need for the project to have an M&E plan before commencing implementation.

### **3.0 Research Methodology**

This study used a descriptive survey to determine the relationship between project technical skills and performance of community-based HIV projects. Proportionate stratified sampling was used to generate a sample from each of the 12 subcounties in Kiambu County. The total population of NPOs implementing HIV community-based HIV projects is 249. A sample size of 151 was generated with the sample size of each stratum/subcounty being proportionate to the population size of the same stratum/subcounty. The number of NPO in each strata/ sub-county was listed and a random number generator used to identify the NPOs in each stratum who would form the sample size. A structured questionnaire with closed and open-ended questions collected primary data. A pilot study to test the reliability and validity of the data collection instrument was done. Cronbach's alpha  $\alpha$  assessed the reliability coefficient of the research instrument. The Cronbach's Alpha was above 0.7 making the study reliable. Study validity was tested using The KMO and Bartlett's Test of Sphericity (BTS). The KMO value was above 0.5 and BTS below 0.05 making the study valid. The questionnaire data was tabulated using

computer excel package and analysed using IBM Statistical Package for Social Science (SPSS) version 21.0. Descriptive statistics, measure of central tendency, measure of dispersion and inferential statistics comprising of coefficient of determination, ANOVA, correlation and linear regression model were used to study the relationship between the independent and dependent variables. Data was presented in tables.

#### 4.0 Results and Discussion

##### 4.1 Descriptive analysis

Descriptive analysis was conducted on the statements on project technical skills. The results are shown in Table 4.1. To interpret the results, totally agree was combined with agree to be agree and totally disagree was combined with disagree to give disagree.

Table 4.1: Descriptive Statistics for Project Technical Skills

Statements	totally disagreed (%)	Disagreed (%)	not sure (%)	agree (%)	totally agree (%)	Mean	Std. Deviation	CV
Progress against objectives	1.50	3.80	0.00	54.60	40.00	4.28	0.79	0.18
Progress against budget	2.30	5.40	4.60	45.40	42.30	4.20	0.93	0.22
Project status report	3.10	3.10	3.80	36.20	53.80	4.35	0.93	0.21
Project monitoring plan	2.30	6.90	3.80	36.20	50.80	4.26	0.99	0.23
End of project report	2.30	0.80	9.20	29.20	58.50	4.41	0.87	0.20
Stakeholders updated	3.10	5.40	5.40	46.90	39.20	4.14	0.96	0.23
Effective communication	0.80	1.50	0.00	49.20	48.50	4.43	0.66	0.15
Lessons learnt	1.50	6.20	6.90	43.80	41.50	4.18	0.92	0.22
PMIS used	4.60	6.20	29.20	31.50	28.50	3.73	1.08	0.29
Communication plan	33.80	21.50	16.90	13.10	14.60	2.53	1.44	0.57
<b>Average</b>						<b>4.05</b>	<b>0.96</b>	<b>0.25</b>

Results in Table 4.1 indicated that majority respondents at 94.6% (55.6%+40.0%) agreed with the statement that the organization routinely track progress of the project activities to ensure that objectives are met. The statement had a mean score of 4.28 and a standard deviation of 0.79 implying that majority respondents agreed to the statement with low response variation. The results also showed that majority respondents totaling 87.7% (45.4%+42.3%) agreed to the statement that the organization routinely track progress of the project activities against budget. The statement had a mean score of 4.20 and a standard deviation of 0.93 indicating majority respondents agreed to the statement with low response variation. Further, the results indicated that majority respondents at 90% (36.2%+53.8%) agreed to the statement that the project manager submits project status reports to management. The response had a mean score of 4.35 and standard deviation of 0.96 implying that majority respondents agreed to the statement with low response variation. Furthermore, the results showed that majority respondents at 87% (36.2%+50.80%) agreed with the statement that project monitoring plan is developed prior to implementing project. The statement response had a mean of 4.26 and standard deviation of 0.99 implying majority respondents agreed with the statement with low response variation. Additionally, the results indicated that majority respondents at 87.7% (29.2%+58.50%) agreed that end of project report is used for decision making to inform future projects. The statement had a mean of 4.41 and a standard deviation of 0.87 implying majority respondents agreed to the statement with low response variation. This is in line with Luke (2014) who found out that monitoring tracks project progress against time, resources and performance schedules, and identified areas requiring attention and action. This tracking of progress against targets ensures the project completion is within schedule and budget. Monitoring is a short-term continuous assessment and takes into consideration project activities and outputs while evaluation looks at outcomes and impact. In addition, results indicated that majority respondents totaling 86.1% (46.9%+39.2%) agreed with the statement that project stakeholders are well informed

on project progress as necessary. The statement had a mean of 4.14 and a standard deviation of 0.96 indicating majority respondents agreed to the statement with low response variation.

Moreover, results revealed that majority respondents at 97.7% (49.2%+48.50%) agreed to the statement that project manager is able to communicate effectively with the team and top management. The statement had a mean of 4.43 and a standard deviation of 0.66 which indicates that majority respondents agreed to the statement with low response variation. The results also revealed that majority respondents at 85.3% (43.8%+41.5%) agreed that the project team regularly documents lessons learnt and best practices to inform future projects. The statement had a mean of 4.18 and a standard deviation of 0.98 meaning that most respondents agreed to the statement with low response variation. The results equally revealed that majority respondents at 60% (31.50%+28.50%) agreed that documents/information sharing and storage is done using Project Management Information System (PMIS). The mean of the statement was 3.73 and the standard deviation was 1.08 meaning that majority respondents agreed to the statement with low response variation. Finally, majority of the respondents 27.7% (13.1%+14.6%) agreed that there is a project communication plan for communicating with stakeholders. The statement response mean was 2.53 and the standard deviation was 1.54 implying majority respondents agreed to the statement with low response variation. This concurs with Larson & Gray (2014) who noted that since communication involves giving and receiving feedback, it is critical in the project cycle.

The success of the project will largely depend on how the project manager communicates with the project team, stakeholders and the beneficiaries. A communication plan is important as it outlines information flow to the project stakeholders and forms part of the project plan. Overall, the average mean of the responses was 4.05 indicating that majority of the respondents agreed to the statements in the questionnaire on project technical skills. The standard deviation was 0.96 indicating that responses clustered around the mean response. Nazari and Nurbakhshian (2016) found that communication skills are effective in improving the management process of managers and to achieve the organizational goals. Serhan and Draganov (2016) found that communications skills are essential for addressing the sustainable aspect of construction projects due to their complex nature.

Pinto and Slevin (1987) notes that the typical project manager is charged with successful project results within constraining power, budget and people. They note the need for the project manager to have requisite tools to help transition from strategic to tactical aspects throughout the project cycle. To further succeed, the project manager requires technical and administrative skills as well as good rapport with top management (Pinto & Slevin, 1987, Morgan, 2012). Project success is affected by the level of autonomy and authority that the project manager exerts on the project. Larson and Gray (2014) observes the need for the project manager to have autonomy and authority to make project decisions.

#### **4.2 Content Analysis**

The respondents were asked to give reasons why they consider project monitoring and evaluation as critical in project performance. The results are presented in table 4.2.

Table 4.2: Importance of Project Monitoring and Evaluation

<b>Monitoring and evaluation</b>	<b>Themes</b>	<b>Frequency (%)</b>
1	Tracking of budget progress	19
2	To inform future projects	16
2	Identifying problems	10
4	Evaluation of objectives	42
5	Effective resource utilization	13

**Total** **100**

Majority of the respondents (42%) indicated that project monitoring and evaluation is important in determining if the project objectives are being met. Otieno (2000) observed the important role of project monitoring and evaluation when it is timely and professionally done. Since each project is unique, the project monitoring and evaluation plan should be agreed on during the planning phase. According to Mahaney and Lederer (2010), the role of monitoring is to ensure that the project is within expected budget, schedule and quality.

Respondents were asked to provide information on channels of communication available to the project team and stakeholders, and the barriers to effective communication. The results are presented in Table 4.3 and 4.4.

Table 4.3 Channels of communication

Channels of communication	Themes	Frequency (%)
	1 Meetings	10
	2 Emails	7
	3 SMS	42
	4 Reports	17
	5 Cell phone calls	24
<b>Total</b>		<b>100</b>

Majority of the respondents (42%) indicated that SMS is the major channel of communication. Each stakeholder requires an effective communication channel as success of a project largely depends on how efficient its communication network is. This communication process that is clear, concise, effective and efficient ought to be available during the project cycle to stakeholders and the team. According to Rajkumar (2010), only 7% of our communication is verbal with 93% being nonverbal and inclusive of tone of voice, posture and facial expressions. As such, the project manager should be aware of both the communications content and the unspoken messages. Project expectations or targets at every project stage should be communicated in an open and honest manner. Hvyari (2006) found that communication significantly contribute to project performance. The PMI reported that among companies with highly effective communication, 80% of projects met their goals, compared to a 52% success rate for those with minimally effective communication. The more effective communicators enjoyed much higher rates of on-time and on-budget performance, as well. Such communication as status meetings should have a regular schedule while others may be impromptu as need arise. A communication plan should clearly detail the communication requirements of each stakeholder, which include what is to be communicated, when, by who, and how it is to be done based on the stakeholder interest and influence in the project.

Respondents were also asked to list down the barriers to effective communication in the community-based HIV project. The results are presented in Table 4.4.

Table 4.4: barriers to effective communication

Barriers	Themes	Frequency (%)
1	Language barrier	43
2	Fear of victimization	10
3	Culture	5
4	Age	7

5	Time	11
6	Literacy level	24
<b>Total</b>		<b>100</b>

Language barrier was found to be the major barrier encountered in communication as indicated by majority of the respondents who were 43%. Some of the identified barriers to effective communication according to Rani and Amat (2017) include; logistics, language, technical capability, experience and workload.

### 4.3 Correlation analysis for project technical skills

Table 4.5 Correlation analysis between project Technical Skills and performance

Variable		
Project Technical Skills	Pearson correlation	.730**
	Sig. (2 tailed)	0.000

Results showed a positive relationship between project technical skills and project performance ( $\rho = 0.730$ ). Phiri (2015) noted that monitoring and evaluation has a directly proportional influence on project performance hence a need for project monitoring and evaluation plan.

### 4.4 Regression Results for Project Technical Skills

Table 4.6 presents the model fitness for used for regression model in explaining the study phenomena.

Table 4.6: Model Fitness for Project Technical Skills

R	R Square	Adjusted R Square	Std. Error of the Estimate
.730a	0.534	0.53	0.36273

The results in table 4.6 show that project technical skills were found to be satisfactory in explaining project performance. This is supported by coefficient of determination also known as the R square of 53.4%. This means that project technical skills explain 53.4% of the variations in the dependent variable which is project performance. Phiri (2015) showed that technical skills have directly proportional influence on project performance.

Table 4.7 presents the ANOVA results for project technical skills

Table 4.7: ANOVA Results on Project Technical Skills

	Sum of Squares	df	Mean Square	F	Sig.
Regression	19.27	1	19.27	146.456	0.000
Residual	16.841	128	0.132		
Total	36.111	129			

Table 4.7 provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant. Further, the results imply that project technical skills as the independent variable is a good predictor of project performance. This was supported by an F statistic of 146.456 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level. Serhan and Draganov (2016) noted that technical skills such as communication is essential for solving the sustainable challenges of a project.

Table 4.8 presents the optimal model for project technical skills.

Table 4.8: Optimal Model for Project Technical Skills

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.605	0.271		2.23	0.027		
Technical skills	0.799	0.066	0.73	12.102	0.000	1.000	1.000

Regression coefficients in Table 4.8 revealed that there was a positive and significant relationship between project technical skills and project performance ( $r=0.799$ ,  $p=0.000$ ). This was supported by a calculated t-statistic of 12.102 which is larger than the critical t-statistic of 1.96 (Kothari, 2013). These results agree with Phiri (2015) that monitoring and evaluation influence project performance. Larson and Gray (2014) noted that communication is important in the project cycle as it involves giving directions and receiving feedback. The success of the project will largely depend on how the project manager communicates with all project stakeholders and beneficiaries. A communication plan is important as it outlines information flow to project stakeholders and forms part of the project plan.

The model for project technical skills is

$$Y=0.605+0.799X_1 + \varepsilon$$

Where:

Y= Project Performance

X<sub>1</sub>= project technical skills

$\varepsilon$ = Error term

### Hypothesis testing for project technical skills

The hypothesis to be tested was

***H<sub>01</sub>: Technical skills have no significant influence on performance of community-based HIV projects in Kenya.***

The hypothesis was tested using simple linear regression (Kothari, 2013) and determined using p-value (Table 4.8). The acceptance/rejection criteria was that if the p value is greater than 0.05, the null hypothesis is not rejected, but if it is less than or equal 0.05, we reject the null hypothesis. The null hypothesis is that critical skills have no significant influence on performance of community-based HIV projects in Kenya. Results in Table 4.8 show that the p-value was 0.000. This was supported by a calculated t-statistic of 12.102 which is larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that technical skills have a significant influence on performance of community-based HIV projects in Kenya.

## 5.0 Summary Conclusions and Recommendations

### 5.1 Summary

The objective was to determine the influence of project technical skills on the performance of Community based HIV projects in Kenya. The findings were that project technical skills satisfactorily explained project performance. The ANOVA analysis results showed the model as statistically significant. Results indicated project technical skills as the independent variable is a good predictor of the dependent variable. Overall result showed a positively significant relationship between project technical skills and project performance.

## 5.2 Conclusion

The study concluded that technical skills have a positive and significant relationship with project performance. Monitoring and evaluation as well as communication skills are an essential component of project implementation. A project manager who effectively communicate with the project team and stakeholders will achieve a successful project as correct, adequate and timely information reaches the audiences. Effective communication channels should be used based on the beneficiaries' literacy level, culture, age and available resources. Monitoring and evaluating of the project's progress should be done in order to identify problems that may arise, and solve them timely. Monitoring and evaluation also ensures that allocated resources are efficiently and effectively utilized and project's objectives are achieved.

## 5.3 Recommendations

Based on findings that technical skills positively affect project performance, the study recommends that project managers and the project team possess professional qualifications and training in monitoring and evaluation, and effective communication skills. The projects should also have a monitoring and evaluation plan, and a communication plan or strategy targeting each stakeholder. These should be agreed upon before project execution. Project managers and top management should make communication a priority by developing a communication strategy for the project to address who needs what information and when. Stakeholders should be kept updated on the project progress and these updates should be clear and concise, with clear information on what is expected of them and the timelines. There is also need for a feedback mechanism from the project manager to the team and stakeholders and vice versa. Open communication including clearly articulating setbacks and problems in the project and possible solutions also be done. What's more, communication channels should be diverse including emails, face to face updates, phone calls, short messages to keep the message recipient interested and for them to pay attention to the details. Project managers should strengthen monitoring the project throughout the project cycle to provide timely updates on the project progress, to measure the progress made in achievement of objectives and use of the project budget. Lessons learnt should be identified and documented as the project progresses rather than waiting to identify them at key milestones or at the end of the project as the team may have forgotten them or may be focused in closing the project rather than documenting lessons learnt. Furthermore, documentation of lessons learnt should be included in the projects standard procedures or templates.

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## Influence of Trade credit on the Growth of Small and Medium Size Manufacturing Enterprises in Rwanda

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### Abstract

The purpose of this study was to analyze the influence of trade credit on the growth of manufacturing SMEs in Rwanda. To achieve the objective, the study used a mixed research approach involving both qualitative and quantitative methods. The target population of this study consisted of all the 868 small and medium manufacturing enterprises registered with Rwanda Development Board from which a sample of 273 firms was taken by way of stratified random sampling technique. Close-ended questionnaires were used in data collection. The data collected was analyzed using Statistical Package for Social Science 22 to generate descriptive statistics including percentages, frequency tables and mean scores. Multiple regression analysis was used to explore the relationship between Trade credit finance structure and the growth of small and medium size manufacturing enterprises in Rwanda.  $R^2$  was deployed to measure the extent of the goodness fit of the regression model. The findings from the study show beta values of ( $\beta=0.082$ ,  $p=0.047$ ) for trade credit finance. Hence, trade credit influences the growth of small and medium manufacturing enterprise in Rwanda. Among recommendations, the management of the SMEs should learn how to use account receivables and account payable to fully take advantage of trade credit finance. This will ensure SMEs continue producing or manufacturing during time of low liquidity and financial constraints.

**Key words:** *Trade credit; Small and Medium Size Manufacturing Enterprises; Rwanda*

### 1.1 Introduction

Al-Qaisi (2018) argues that trade credit is a key source of funds for firms especially where external funding via credit institutions is not a viable option and so, an important alternative to bank loans for the SME sector in developed and developing economies alike. Hence, Paul, Guermat and Devi (2018) note that in the UK, at least 80% of corporate sector transactions take place on credit. The authors report that the value of trade credit in the UK exceeded 59 billion pounds in 2006. In the US, they maintain that the size of trade credit supply exceeds the credit supplied by the country's entire banking system and remains the most important supplier of short-term business credit. In France and Italy accounts receivable amounts to 29% of firm's total asset. Trade credit is equally important in Eastern Europe where the ratio of accounts payable to total liabilities vary between 21% in Hungary and 49% in Bulgaria while evidence from Asia shows that the private sector firms in China also largely based on trade credit. In East Asia, Tan and Ma (2016) shows that firms make use of trade credit to stimulate their growth during financial crises while Aslam and Hussain (2017) in Pakistan demonstrate that trade credit is a growing source of finance for industrial sector in Pakistan.

In Africa, despite the impressive contribution made by SMEs, most of them perform below capacity as a result of inaccessibility to credit financing. SMEs in Africa are highly limited by credit constraints compared to larger firms which hinders their growth and expansion potential. In South Africa for instance, Abor, (2010) estimates that 91% of the business entities are SMEs accounting for 57% of GDP while in Ghana, SMEs make up to 81% of the private business entities. In East Africa, SMEs have

increasingly acted as a key instrument for job creation and income generation through self-employment and hence according to Arinaitwe and Mwesigwa (2015), SMEs contributed to reduction of poverty and supply the economy with ideas and innovation required to foster competitiveness and proper resource allocation.

Rwanda's SMEs sector contributes to national economic development. However, the main strategic bottleneck they face is limited access to finance which hinders their growth and expansion (Akimana, 2017; Ndikubwimana, 2016; Gamba; 2019 and Harelimana; 2017). Hence, although Rwanda is among the ten fastest growing economies in Africa, limited access to finance makes its manufacturing sector fail to keep pace with the overall national growth (Behuria, 2019). The sector currently contributes an estimated 6% to GDP per year compared to the service industry which stands at 48% to GDP (NISR, 2016)

Furthermore, the manufacturing sector is less well diversified as 92 percent of the country's total manufacturing is generated from only seven sub sectors: food, beverages and tobacco, textiles and clothing, wood, paper and printing, chemicals, rubber and plastics, non-metallic minerals as well as furniture (United Nations Industry development Organization, UNIDO 2013). Thus, according to MINECOM (2014) Rwanda's manufacturing sector has failed to attract the required investment for growth and expansion thereby remaining a small player in the Rwanda economy.

### **1.2 Problem Statement**

Sindani, Namusonge and Sakwa (2016) observe that majority SMEs fail due to limited finances and poor management of the available scarce resources citing millions of bankrupt and cash strapped SMEs due to poor cash flow in form of uncollected accounts receivables. According to Wongma (2016) SMEs need to efficiently and effectively acquire finance in order to grow and compete in the market. Yet, according to Sharmilee and Hoque (2016) financial institutions credit processing is cumbersome with most commercial banks reluctant to provide SMEs with adequate capital.

Moreover, in Rwanda, the private sector has limited access to credit instruments as most Rwandan banks are conservative and risk averse, trading in a limited number of commercial products (International Trade Administration, ITA, 2020). Furthermore, Harelimana (2017) intimates that a significant number of firms in Rwanda (35.5%) operate their enterprises using internal finance sources with a further 61.3% having their loan applications rejected due to lack of collateral and lack of information on their operations.

Casey and O'toole (2014) further find that constraints on available credit from banks and other financial institutions force firms to resort to use of trade credit. Hermes, Lensink and Meesters (2018) equally argue that firms having troubles accessing important resources need to rely on suppliers to partially offer key resources. Yet, Gamba (2019) highlights that available research on Rwandan SMEs financing especially with regard to use of trade credit is scanty. Hence, there is a gap in extant literature on firm use of trade credit as a finance alternative and its benefits for SMEs in Rwanda. A study on the influence of trade credit on the growth of SMEs in Rwanda therefore becomes crucial since SMEs play a vital role in a private sector led economy.

### **1.3 Objectives of the study**

- i. *To investigate the influence of trade credit finance structure on the growth of small and medium manufacturing enterprises in Rwanda.*

### **1.4 Research Question**

- i. What is the influence of trade credit finance structure on the growth of small and medium manufacturing enterprises in Rwanda?

## **2.0 Literature review**

Agostino and Trivieri (2014) in a study of 4,543 firms in Italy confirm that there is indeed a positive correlation between trade credit and bank loan accessibility for SMEs. Huang, Shi and Zhang (2015) use data from Chinese firms to highlight evidence of substitution of trade credit for bank credit which show counter-cyclical pattern. Kapkiyai and Mugo (2015) further use evidence from several studies which concur that SMEs with low credit worthiness are likely to be more financed by trade credit suppliers. Hence, there is a positive linear relationship between trade credit finance structure and the performance of firms arising from the fact that the advantages associated with trade credit transcend the costs of vendor financing. Furthermore, the benefits of a firm using trade credit might differ based on certain firm attributes. For instance, larger and more creditworthy firms tend to advance trade credit to smaller customers' thereby growing the firm's sales and creating an implicit rate of return. Hence, larger and more liquid firms gain superior returns on receivables as opposed to smaller and less liquid firms.

According to Nanyondo (2017) in Egypt, most SMEs are inclined to use alternative finance in the form of trade credit. Using secondary data from the Central Bank of Egypt (CBE), analysis indicated that 19% of SMEs use formal bank finance, compared to 81% usage by large enterprises. In addition, the descriptive statistics indicated that fewer than 50% of SMEs in Egypt sought formal bank finance in the period 2012 to 2013. The respondents indicated that SMEs dislike the bureaucracy that surrounds access to formal finance. Likewise, loan officers indicated that nearly 80% of SMEs lack accepted collateral to secure the loans and insufficient guarantors to secure the finance.

Daskalakis, Balios and Dalla, (2017) explored the contributing factors to the use of trade credit by small English firms. Key among their findings is that large firms with better access to both internal and external finance at favorable cost require less trade credit from suppliers and that firms with larger growth opportunities make more use of trade credit so as to fund their additional sales volumes.

Aslam and Hussain (2017) aimed to analyze the role of trade credit in upgradation of cement sector using 17 listed firms in the cement sector of Pakistan Stock Exchange (PSX). The analyses were carried out by using 8-year data, starting from year 2007 to 2014 and study findings indicate that trade credit has a very significant positive affect on sales growth of the firms.

Muchuri and Shukura (2017) highlight trade credit aspects that influence a firm's financial performance of SMEs registered with the private sector federation in Rwanda. The factors highlighted include: the term to maturity of the loan with (mean 3.56) implying to a great extent and uncertainty about loan amount to a moderate extent (mean 3.24). High interest rates were found to affect the firm's financial performance to a great extent (mean 3.86) while a mismatch of funds was revealed to influence a firm's financial performance to a moderate extent (mean 3.21). Finally, undue pressures for repayment was found to affect a firm's financial performance to a great extent (mean 3.83)

Ferrando, Popov and Udell (2017) argue in addition that firms are likely to supply more trade credit to buyers who are temporarily in short supply of cash flow. This subsequently fosters their sales, as the otherwise distressed clients would be unable to acquire the goods. Firms will however only offer additional trade credit when they believe there is a prospective likelihood for a long-term relationship with that customer.

Mateut and Chevapatrakul (2018) have demonstrated that trade credit provides a safety valve for firms facing distinctive liquidity shocks as they transfer a quarter of shocks to suppliers through acquisition of more trade credit. Thus, trade credit helps SMEs to build a stable commercial relationship in the long run despite the fact that it may increase customers' reliance on suppliers, leading to a higher implicit

interest rate. According to Rodriguez (2016) trade credit helps suppliers reduce transaction costs related to insolvency of each individual commercial exchange.

### **3.0 Research Methodology**

#### **3.1 Research design**

Coopers and Schindler, (2008) define a research design as a framework for guiding a study which connects the questions or objectives of the study to the data gathered. This study adopted mixed methods research design. Elahi and Dehdashti (2011) argue that the mixed methods research design is ideal when the study objectives require determining the degree to which study variables are associated and making predictions regarding the occurrence of phenomena.

#### **3.2 Target population**

Castillo, Olivos and Azar, (2018) defines a target population as the whole set of individuals or objects to which researchers are interested in making generalizations. The target population for this study is all SMEs in the Rwanda manufacturing sector. According to Rwanda Development Bank (RDB 2017) there are 868 SMEs in the Rwandan manufacturing sector.

#### **3.3 Sample Size and Sampling Techniques**

Kothari (2014) refers to sampling as the process of acquiring information on an entire population by testing only a part of it. The study adopted stratified random sampling technique. Orodho (2009) argues that stratified random sampling method ensures that small-categories in the population are adequately represented in the sample. Hence, stratified random sampling technique was adopted to ensure that sub-groups in the population get an adequately representation in the sample. Afterwards, simple random sampling was deployed in choosing respondents from each stratum. SMEs owners and finance managers were interviewed as well. Thus, the study used simple random sampling to select SMEs from each stratum.

#### **3.4. Data Collection Methods**

Both primary and secondary data were collected for this study. Saunders (2019), defines data collection as a way in which information gets acquired from the selected subjects of an investigation. The author stresses that the most prevalent instruments used in data collection are interview schedules, questionnaire, observational forms and standardized tests.

In this study, questionnaires were deployed in collection of primary data from the proprietors or the manager of SMEs selected in the study sample. Both open and close ended questions were integrated in the questionnaire. Secondary data was collected from Rwanda's National Institute of Statistics (NISR), Rwanda Development Board, (RDB) and Ministry of Trade and Industry since they are main Government departments that oversee the SME sector.

#### **3.4 Data Processing and Analysis**

Data analysis entailed use of statistical package for social science (SPSS) version 22. Cronbach coefficient alpha values were utilized in checking the goodness of fit of the data as well as the consistency and reliability of measures obtained from the Likert scale items. According to Adeniran (2019) Cronbach's Alpha values should not go below the traditional cutoff mark of 0.7 as a rule of thumb. The study deployed inferential statistical approaches; correlation and regression analysis to test for relationships between variables.

### **4.0 Research Findings and Discussions**

#### **4.1 Introduction**

This part presents and discusses the results of data analysis. The section has findings on demographic features of study participants, descriptive and inferential statistics showing the effect of independent variables on the dependent variable.

#### 4.2 Response Rate

In this study, 273 questionnaires were administered to selected respondents. The questionnaires that were dully filled and returned equaled 225 while 48 were not properly filled and some not returned. A response rate of 82% was recorded which according to Mugenda and Mugenda (2009) is deemed adequate for one to proceed with data analysis.

#### 4.3 Summary of the Scale Reliability Results

Table 4.1 shows a summary of findings from the reliability test obtained from pilot study. The finding indicates the Cronbach Alpha scores on trade credit of 0.887. These findings point to a high reliability measure for the scale deployed to assess the study variables and so, all attributes used to measure the variable were maintained in the final survey.

Table 4. 1: Summary of the Reliability Statistics

Variables	No of Items	Cronbach's Alpha	Remarks
Trade credit	9	0.887	Accepted

#### 4.4. Demographic Information

This section analyzed the demographic information of the respondents which included age bracket, gender, highest level of education, among other characteristics. Background information enabled the researcher to understand the respondents and whether their characteristics reflected attributes of the entire the population so as to make generalizations.

##### 4.4.1 Age Bracket of the Respondents

Table 4.2 presents findings on the age bracket of respondents. As indicated, 34.7% of the respondents were aged between 31 and 40 years, 32% between 21 and 30 years and 22.7% between 41 and 50 years.

Table 4. 2: Age Bracket of the Respondents

Age Bracket	Frequency	Percent (%)
21-30 years	72	32
31-40 years	78	34.7
41-50 years	51	22.7
51-60 years	18	8
Over 60 years	6	2.7
<b>Total</b>	<b>225</b>	<b>100</b>

##### 4.4.2 Sex of the Respondents

Table 4.4 shows findings on the sex of respondents. As revealed in the table, 55% of the study participants were male while 45% of the respondents were female. This study finding implies that information collected by the study was gender representative.

Table 4. 4: Sex of the Respondents

Sex	Frequency	Percent
Male	123	54.7
Female	102	45.3
<b>Total</b>	<b>225</b>	<b>100</b>

#### 4.4.3 Highest Level of Education attained

The results on the highest level of education attained in Table 4.5 show that 38.3% of the respondents had attained secondary education, 32% had primary education, and 20% were undergraduates.

Table 4. 5: Highest Level of Education

Highest level of education	Frequency	Percent
Primary School	72	32
Secondary School	86	38.3
Undergraduate	45	20
Graduate	22	9.7
Total	225	100

#### 4.5 Influence of trade credit finance structure on SMEs growth

The objective of the study was to investigate the influence of trade credit finance on the growth of manufacturing SMEs in Rwanda. Thus, the study used various tests such as factor analysis, descriptive and inferential statistics to answer the study objective.

##### 4.5.1 Factors Analysis for Trade Credit Finance Structure Indicators

Table 4.6 reveals findings of factor analysis which show that all constructs used to test for trade credit finance structure have factor loading values above the threshold of 0.4 as recommended in related studies. Hence, all the attributes used under trade credit finance structure reached significant levels in terms of explaining the variable and so none of them was eliminated.

Table 4. 6: Factors Analysis for Trade Credit Finance Indicators

No	Statements	Factor Loading
1	Customers honor their commitment to pay in agreed credit period	0.759
2	Appropriate credit period creates repeat business for the company	0.753
3	The business considers the length of credit period for the customer before trade credit approval	0.689
4	The business prefers giving favorable credit terms and standards to customers than cash sales in return of long-term relationship building	0.587
5	The business receives payments from suppliers based on contract credit terms and standards	0.728
6	Shorter and strict credit terms and standards reduce sales revenue for my business	0.695
7	The business trade discounts do not conflict with the liquidity demands of my firm	0.637
8	Customers' loyalty and goodwill increase whenever I offer favorable trade discount facilities	0.805
9	The business grants trade discount only to big organizations	0.726
	Extraction Method: Principal Component Analysis.	

##### 4.5.2 Correlation Analysis for Trade Credit Finance structure and SMEs Growth

The study used correlation analysis to check for the nature of relationship between trade credit finance and growth of manufacturing SMEs in Rwanda. Table 4.7 reveals that trade credit finance has a moderate positive association with growth of manufacturing SMEs in Rwanda as shown by the correlation value of  $r = 0.428$  and  $p=0.000$ . The correlations were found to be significant at 0.05. The results imply that increasing trade credit finance leads to a rise in growth of manufacturing SMEs in

Rwanda. The finding corroborates those by Nasr and Pearce (2012) in Egypt, who found that most SMEs deploy alternative finance in the form of trade credit as it helps firms generate growth and expansion unlike debt. Ogawa, Sterken, and Tokutsu (2014) equally maintain that firms tend to rely more on trade credit when distressed financially and this plays a crucial role in substituting bank credit while helping financially constrained firms leverage their growth and expansion prospects.

**Table 4.7: Correlation Analysis for Trade Credit Finance structure and SMEs Growth**

Variable	Statistics	Trade Credit Finance	Growth SMEs
Trade Credit Finance	Pearson Correlation	1	.428**
	Sig. (2-tailed)		0
	N	225	225
Growth of SMEs	Pearson Correlation	.428**	1
	Sig. (2-tailed)	0	
	N	225	225

\*\* Correlation is significant at the 0.05 level (2-tailed).

#### 4.5.3 Univariate regression analysis of trade credit finance structure and SMEs growth

The study further used univariate regression to test the influence of trade credit finance on the growth of small and medium manufacturing enterprises in Rwanda. The results of the regression analysis are presented in tables 4.8 to 4.9.

**Table 4.8: Model Summary trade credit and SMEs growth**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.428 <sup>a</sup>	0.183	0.179	.43433

a. Predictors: (Constant), Trade Credit Finance

Table 4.8 shows coefficient of determination (R-square) =0.183 which reveals that other factors held constant, trade credit finance accounts for 18.3% of the variation in the growth of the manufacturing SMEs in Rwanda. The findings further imply that trade credit finance is a good predictor variable for growth of small and medium manufacturing enterprises. The results are congruent with Shao, (2019) who argues that trade credit helps direct resources flow to the financially constrained SMEs hence increasing their aggregate productivity and fostering their growth prospects. According to Fu, Matous, and Todo, (2018) trade credit is the most important source of short-term financing for firm growth and expansion in Japan where 78 percent of small and medium enterprises (SMEs) in the manufacturing sector utilize trade credit, and 34 percent rely more on transactions using trade credit than on immediate payments. Rodriguez (2016) also found that SMEs receive more capital from market, gaining more investment and growth opportunities through the use of trade credit finance structure.

**Table 4.9: ANOVA for Trade Credit Finance structure and SMEs Growth**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.421	1	9.421	49.941	.000 <sup>b</sup>
	Residual	42.067	223	.189		
	Total	51.488	224			

a. Dependent Variable: Growth of SMEs

b. Predictors: (Constant), Trade Credit Finance

Table 4.9 highlights findings from analysis of the variance (ANOVA) of the model used to link manufacturing SME growth to use of trade credit. As it is quite evident, the result of F=49.941 with a

corresponding  $p=0.000$  imply that the model was found to be statistically significance. This means that the study failed to reject the null hypothesis on the goodness of fit and so, trade credit finance was found to significantly explain the variation in growth of manufacturing SMEs in Rwanda. Such finding is concomitant with one earlier found by Boissay and Gropp, (2007) as well as Cunat (2007) who maintain that trade credit provides a safety valve for firms facing distinctive liquidity shocks. Cole (2012) in addition finds that 20 percent of small firms used trade credit to boost their firm growth, and about 40 percent used both bank and trade credit which is evidence that trade credit can be complementary to bank credit since trade credit is primarily short term.

Table 4. 10: Regression Coefficients for Trade Credit Finance structure and SMEs Growth

Variables	Unstandardized coefficients		Standardized coefficients		
	$\beta$	Std. Error	Beta	t	Sig.
(Constant)	2.743	0.115		23.9	0.000
Trade Credit Finance	0.25	0.035	0.428	7.067	0.000

a Dependent Variable: Growth of SMEs

Table 4.10 presents the findings of regression coefficients for trade credit finance structure and growth of manufacturing SMEs. The findings reveal a beta coefficient value of  $\beta=0.250$ ,  $p=0.000 < 0.05$  which implies that trade credit finance has a positive and significant effect on growth of manufacturing SMEs in Rwanda when all other factors are held constant. Hence, a unit increase in trade credit finance would results into a proportionate rise of 0.250 units in growth of manufacturing SMEs in Rwanda when all other factors are put on hold. The findings concur with those of Rodriguez (2016) who maintains that trade credit helps suppliers reduce transaction costs related to insolvency of each specific commercial transaction thus fostering survival, growth and expansion of firms. Hermes, Lensink and Meesters (2018) argue that firms need to rely on suppliers to for key resources.

## 5.0 Conclusion

The study concludes that manufacturing SMEs in Rwanda that use trade credit finance in their financial structure have high probability of the achieving their growth objectives. Trade credit ensures that firms continue to be serviced by their suppliers on credit and the available resources can be channeled for alternative growth opportunities.

## 5.1 Recommendations

The management of the SMEs should further learn how to use account receivables and account payable to fully exploit advantages of trade credit finance structure. This will ensure the SMEs continue producing or manufacturing during times of low liquidity. Also, both the government and SMEs should come up with a proper legal framework to regulate the use of trade credit finance in Rwanda.

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## Influence of Communities of Practice on Employee Performance in Public Universities In Kenya

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### Abstract

Knowledge Management plays an important role in any organization by facilitating the capture, storage, transformation and dissemination of knowledge in order to achieve organizational goals. It is a collaborative and integrated approach adopted on an organization-wide basis to ensure that an organization's knowledge assets are best utilized to increase organizational performance. Universities as 'knowledge intensive' organizations thrive on the production and dissemination of knowledge which calls for its professional management. Effective management of this knowledge can only happen when well-established platforms exist, which have clear laid down strategies and policies on how employees can share their know-how. Communities of practice is a knowledge management practice that can be used to encourage knowledge sharing among employees in universities. Through descriptive research design the study examined the influence of communities of practice on employee performance in public universities in Kenya. Simple regression analysis revealed positive and significant influence of communities of practice on employee performance in public universities in Kenya.

**Key words:** *Knowledge management practices, Communities of practice, Employee Performance*

### 1. Introduction

Communities of Practice (CoPs) are groups of people, who share a common interest in a particular area of knowledge, and learn by exchanging and sharing ideas as they interact regularly on how they can perform better as professionals, (Salalah, 2011). As Ramachandran, Choy & Ismail, (2009) suggest, it is possible to access external knowledge through such professional networks which can then be linked with current or new knowledge, (Garavan & Carbery 2007). Such linkages developed over time with peers in a profession helping an individual make meaning out of their unique experience to build on the knowledge they already possess and in the process enrich it as well, (Loyarte & Rivera, 2007).

CoPs not only provide a forum for individuals to learn from each other, it also focuses on the daily challenges at work, building creative and innovative ideas of improving ways and tools of working and developing issues in the particular field and identifying what has been obsolete and what remains relevant. CoPs are preferred only if individuals see value in participating in them at individual and group levels, (Loyarte & Rivera 2007). This value can be deduced from several perspectives. According to Schenkel & Teigland (2008), CoPs have gained popularity in the recent past especially in academia as they are seen as key contributor of knowledge creation which is an initial step in managing knowledge in organizations as it serves as a source of competitive advantage for organizations, (Garavan & Carbery 2007).

Secondly, for organizations to remain invincible in the face of competition, organizations need to access all kinds of knowledge, (Lei, 2014). This can only occur if regular interactions and sharing of knowledge takes place between experts. Thirdly, CoPs have received recognition as important pathways for KM to promote the development of an organization's intellectual capital. This is done through supporting and encouraging knowledge sharing platforms and putting in place policies that encourage continuous learning and development among employees, (Rendenrick, 2008). Universities hire professionals with varied expertise whose primary role is to contribute to the generation and improvement of new and existing knowledge, (Cranfield, 2011).

Since they are known to be knowledge organizations, it is imperative for them to improve how they manage their knowledge to be able to react appropriately to emerging issues within their competitive environments. These environments both experience rapid developments and changes which require establishment of inbuilt capabilities to respond and manage the forces of change, (Kilika, et al., 2012). This implies that the management of the knowledge workers needs to be well organized and coordinated so that as professionals they are able to see value in participating in sharing platforms like CoPs and the universities also stand to gain by encouraging the practice.

It is important that the balance between implementation of KM practices and institutional objectives is handled tactfully. There is a risk that if the KM practice is too broad then it may lack adequate ownership from relevant individuals since expectations may be unclear to many and may ultimately seem like a top management driven initiative. Similarly, if the initiative is too narrow, then it may stifle adequate levels of interactions between the experts to achieve desired outcomes, (Schenkel & Teigland, 2008). It is important to mention that the basis of developing CoPs is to not only enrich interactions internally and externally so that institutions get access to useful knowledge, but also enrich their capacity to build creativity and innovation ideas by sharing valuable knowledge for its current and future needs, (Small & Sage, 2009; Dobrai, 2011).

According to Mathew (2008), interactions between employees plays an important role especially in view of the tacit knowledge which is largely personal and is not easily shared or exchanged unless it is within a suitable context or environment that encourages that to happen, (Mathew, 2008 as cited in Salalah, 2011). Many studies aforementioned, (Loyarte & Rivera, 2007; Dobrai, 2011; Garavan & Carbery, 2007; Rendenrick, 2008), all agree that knowledge can be generated in different ways be it through training, education, experience, or sharing among others in the context of interacting as a group both within and outside the institution. This study proposes to measure the extent to which universities can foster collaborations/alliances both internally and externally as ways of improving their employee's knowledge base which include, partnerships with other institutions, attendance to conferences and seminars, benchmarking, among many others, (Ramachandran, et al., 2009).

## **2. Theoretical and Empirical Literature**

### **2.1 Knowledge Based View**

This theoretical concept is developing out of concern for knowledge management, and is an important extension to information economics. It essentially regards the 'product life cycle' of knowledge, applying this to either an internal market within an organization or to the external (consulting) marketplace, a commercial market for professional knowledge. From this perspective, managing the knowledge economy within an organization is important because professional knowledge is a valuable commodity, (Powell & Snellman, 2004). The knowledge-based view of the firm emerges as an extension of the resource based view of the firm and proposes that heterogeneous knowledge bases among firms and the ability to create and apply knowledge are the main determinants of performance difference (Decarolis & Deeds, 1999). The key components of a knowledge economy include a greater reliance on intellectual capabilities than on physical inputs or natural resources, combined with efforts to integrate improvements in every stage of the production process, (Drucker, 1993).

According to this view, there are several important management decisions that are directly informed by the knowledge economics rationale. One decision, for example, is determining how and when to develop professional knowledge internally and under what circumstances it is more attractive to use external experts (Drucker, 1993, Nonaka & Takeuchi 1995, Prusak 1997). Another decision regards how internal knowledge should be combined with external knowledge, that is, consultants. Finally,

there is a decision regarding both how and when internal knowledge should be marketed externally, (Salina & Wan Fadzilah, 2010). This study looks at how the internal knowledge can be improved the use of communities of practice, within a structure and culture that encourages knowledge sharing.

Knowledge economy theory describes the need for 'professional support' in organizations. A study by Aminga (2013), recommends implementation of KM practices policy to improve institutional performance in public universities. A study by (Gichuhi, 2014) also recommends the adoption of KM strategies to empower employees with techniques of creating and utilizing their knowledge. An organizational culture that encourages knowledge sharing, creation and contribution to organizational knowledge impacts on its overall performance both at team and individual levels, (Ajmal & Koskinen, 2008). The basic functions of professional support include communication with the environment, reduction of complexity and risk, coordination of the routine tasks issuing from reduced complexity, and standardization, adaptation, and improvement of such routines.

## **2.2 Communities of Practice and Employee Performance**

Communities of Practice (CoPs) are informal groups of people who engage in social learning on a subject of common interest for a period of time which may be medium or long term and in the process share ideas on how they can improve specific aspects of doing things in the shared concern, (Laves, 2014). A study by Chong, Yen & Gan, (2014) on the Strategies and Barriers of knowledge sharing among faculty in universities in Malaysia concluded that performance evaluations that were deemed fairly done and rewards that were non-financial in nature were associated with knowledge sharing intentions in private universities while financial rewards and recognition, opportunities to research and publish influenced the same in public universities. This implies that employees do require some level of motivation to share and participate in CoPs.

According Lopez-Saez, Real and Valle, (2010) who studied the utilization of the Socialization, Externalization, Combination and Integration (SECI Model), on KM processes concluded that the management of tacit knowledge requires a different approach from the management of explicit knowledge because of its inherent nature, embedded in the human mind. This approach the study revealed must be appealing to such an extent that the individual develops a desire to share it. CoPs are viewed as one of the ways of promoting innovation by facilitating the sharing of the tacit knowledge within a group.

A study by Bagaja and Guyo, (2015) on the impact of sharing knowledge on the performance of public universities in Kenya showed that the sharing practice among employees in the institutions can only be effective if there is a major change in employee behavior and the organizational culture. This is echoed by a study of Israilidis, Siachou, Cooke & Lock (2015), which sought to identify the factors that affect knowledge sharing in a multinational organization. The study found that employees' ignorance on the benefits of sharing knowledge is likely to hinder their willingness to share it which has a negative impact on the organization's performance.

The study concluded that lack of awareness limits the ability of an individual to appreciate the impact of changes in the environment due to their poor adaptability skills. Employees' performance relies to a large extent on what they know, and are able to do, which can then be enriched by engaging in knowledge sharing activities like CoPs, being trained or attending seminars and conferences, (Small & Sage, 2009). Understanding of individual variables that contribute to knowledge sharing behavior is important if the public universities are to manage their knowledge assets effectively for improved performance.

According to a study by Loyarte and Riveria (2007), on a Model of Communities of Practice, results showed that CoPs have a significant relationship with performance of individuals by providing them with a forum for knowledge sharing with professional colleagues. The study created a model which included the detection, analysis and evaluation of CoPs in organizations. A study by Schenkel & Teigland, (2008) on improved organizational performance through CoPs in a construction project in Sweden revealed that those CoPs that operated under stable conditions showed a marked improvement in their performance. However, the one CoPs that was exposed to a change in its communication channels never quite bounced back to its original status of coming up with innovative ideas. The relationship between channels of communication and performance was therefore found to be significant in a CoPs.

According to Mugalavai and Muleke, (2016) study on CoPs in selected public universities in Kenya, findings indicated that although a high volume of knowledge is generated within the institutions, there were insufficient sharing mechanisms in place to enable the knowledge creators contribute to existing body of knowledge. This was attributed to lack of recognition and incentives to do so and recommended the development of a knowledge sharing model to suit the needs of the institutions.

The benefits of CoPs on employee performance have been demonstrated as significant particularly in relation to sharing of knowledge. CoPs enrich personal skills; facilitates build-up of networks and collaborations; group members develop a standard language; and develop a professional code of ethics that members must follow, (Dobrai, 2011). As organizations that are primarily engaged in the knowledge business, public universities in Kenya need to constantly improve the management of its knowledge in order to respond effectively to the rapid changes that occur in their environments and remain relevant by investing in the development of CoPs as a KM practice.

### **3. Research Methodology**

#### **3.1 Research Design**

Research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data, (Kothari 2013). Further, Oso and Onen (2009) posits that through descriptive research design, questions pertinent to what is happening, how it has happened and why it has happened can be answered. Cooper and Schindler (2011), further indicates that a descriptive study is concerned with finding out the what, where and how of a phenomenon. The study used descriptive research design since it will enable the researcher generalize the findings to a larger population to obtain information concerning the current status of the phenomena and to describe "what exists".

#### **3.2 Target Population**

The complete enumeration of all the elements under consideration in a study is known as target population, (Polit & Beck, 2004). According to Commission for University Education (CUE) website ([www.cue.or.ke](http://www.cue.or.ke)), Kenya has 31 public chartered Universities. The target population was drawn from employees working in the 10 chartered public universities in Kenya which is estimated at 495 based on information obtained from the university websites. The unit of analysis was 10 selected public universities using the criteria of those which have been in existence for more than 10 years.

#### **3.3 Sampling Frame and Techniques**

A sampling frame is a complete list of all the members of the population that we wish to study. Sample is a subset of the total population which is selected to be the true representative of the target population. A sample is selected through sampling process (Oso & Onen, 2009). Sampling technique can be either

probabilistic or non-probabilistic, in the former there are equal chances of being selected while in the latter the respondent is selected through subjective criteria (Kothari, 2013).

The study used stratified sampling method that uses a stratum which is a subset of the population that shares at least one common characteristic, (Kothari, 2013). This technique allows the researcher to perform a sound study on a small sample selected to provide information which is rich in qualitative context in order to answer research questions and meet objectives. Additionally, the method has a higher statistical precision compared to simple random sampling because the variability within the subgroups is lower compared to the variations when dealing with the entire population. This also means that it requires a small sample size which can save a lot of time, money and effort of the researchers. The sample size for students was calculated based on Yamane’s formula (Yamane, 1967).

$$n = N / (1 + N \cdot e^2)$$

where, n= the sample size,  
 N = the size of population,  
 e = the error of 5 percentage points;  
 $n = 495 / (1 + 495 \cdot 0.05^2)$   
 n = 221.

By using Yamane formula with sampling error of 5% and 95% confidence intervals yielded a sample of 221 from a target population of 495. Resultant sample from each stratum will be distributed as shown in Table 3.1.

Table 3.1 Sample Size Public Universities - 10 years old and above

<b>University</b>	<b>Deans/Directors</b>	<b>Senior Management</b>	<b>Total</b>
University of Nairobi	33	22	55
Moi University	27	16	42
Kenyatta University	20	11	31
Masinde Muliro	19	5	24
Egerton University	15	4	19
Maseno University	13	3	15
Kisii University	6	2	8
Technical University of Mombasa	4	2	6
Technical University of Kenya	11	2	13
Dedan Kimathi University	5	2	7
<b>Total</b>	<b>153</b>	<b>68</b>	<b>221</b>

### 3.4 Data Processing and Analysis

After the data collection the questionnaire were coded, entered and analyzed using Statistical Packages for Social Scientists (SPSS) version 22. The social demographic characteristics of the respondents were analyzed using descriptive statistics. According to Brace, Kamp & Snelgar (2003) descriptive statistics are statistical tools used to summarize large volumes of data with very few figures. Simple regression analysis was carried out to show the nature of the relationship between employee core competencies and employee performance, (Kothari, 2011). The level of significance was tested at 5% whereby if the p value was less than 0.05 then there was enough evidence to reject the null hypothesis and accept the alternative hypothesis. Regression model was of the form;

$$Y = \beta_0 + \beta_1 X_1 + \epsilon$$

Where; Y = Employee Performance, X<sub>1</sub> = Communities of Practice

#### 4. Findings and Discussions

##### 4.1 Descriptive Statistics of Knowledge Mapping

The study determined the influence of communities of practice on employee performance in Kenya public universities. Communities of Practice (CoPs) are informal groups of people who engage in social learning on a subject of common interest for a period of time which may be medium or long term and in the process share ideas on how they can improve specific aspects of doing things in the shared concern.

Concerning CoPs in Kenya public universities, majority 44.1 percent agreed and 30.2 percent strongly agreed that they represent an area of common interest for a number of staff/customers/clients/partners. Secondly, majority 47 percent agreed and 34.7 percent strongly agreed that they currently have clear focus on their organization theme/mission. Thirdly, majority mean = 4.1 and standard deviation of 1.0 agreed that their CoPs accords them a sense of belonging. Further, majority 41.6 percent agreed and 22.8% strongly agreed that CoPs aides in relationship building. Moreover, majority 46.5 percent agreed and 24.8 percent strongly agreed that CoPs helps in networking.

Also, 42.1 percent agreed and 23.3 percent strongly agreed that they benefit in their daily work from relationships they have built. Majority agreed mean =3.7 and standard deviation 1.2 that CoPs has enhanced their willingness to participate in university activities. Majority agreed 41.6 percent and 22.8 percent strongly agreed that CoPs has motivated them to share work related knowledge. Further, majority agreed mean = 3.5 and standard deviation 1.2 that CoPs has broken down communication barriers amongst members. Finally, majority 39.1 percent agreed and 36.1 percent strongly agreed that CoPs has built an agreed set of communal resources over time.

These findings mirrored the study of Chong et al., (2014) who reported that there is need to develop measures that would enhance knowledge sharing amongst public and private universities citing both monetary and recognition factors being the main hindrances. If eliminated, the scholars added, employees would be willing to share knowledge in defined forums. Additionally, the study mirrored that of Lopez-Saez et al., (2010) that supported the need for building externally generated knowledge by developing institutional support for accessing the same. Indeed, such efforts will help in optimizing the use of resources to improve performance within organizations, (Bagaja & Guyo, 2015).

Table 4.1 Descriptive Statistics of Communities of Practice

My CoPs	n=202						Mean	Std. Dev
	SD	D	NS	A	SA			
Represent an area of common interest for a number of staff/customers/clients/partners	3	8.4	14.4	44.1	30.2	3.9	1.0	
Currently has a clear focus in its theme	2.5	6.9	8.9	47	34.7	4.0	1.0	
Gives me a sense of belonging	2.5	7.4	9.9	36.6	43.6	4.1	1.0	
Helps me build relationships with others	3.5	7.9	24.3	41.6	22.8	3.7	1.0	
Helps me network with others	4.5	6.4	17.8	46.5	24.8	3.8	1.0	
Benefit my daily work from the relationships established	5.4	12.4	16.8	42.1	23.3	3.7	1.1	

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Is mainly driven by the willingness to participate	5.4	15.3	12.9	37.6	28.7	3.7	1.2
Motivate me to share work-related knowledge	10.4	8.9	16.3	41.6	22.8	3.6	1.2
Breaks down communication barriers among members	5.9	16.3	20.3	33.7	23.8	3.5	1.2
Builds up an agreed set of communal resources over time	6.4	9.4	8.9	39.1	36.1	3.9	1.2
<b>At my university</b>							
Employees are assisted to access important information through journals, research reports etc.	15.8	13.9	11.4	29.2	29.7	3.4	1.4
If important information is unavailable within, the institution buys it	2.5	5	14.9	38.6	39.1	4.1	1.0
Employees are encouraged to share knowledge among common interest groups e.g. research groups	0	9.4	10.4	38.6	41.6	4.1	0.9
Supports activities of common interest groups e.g. room for meetings	5.4	3	11.9	47	32.7	4.0	1.0
Employees are encouraged to join external professional networks and associations	5	6.4	13.9	37.6	37.1	4.0	1.1
Employees are encouraged to be active in external professional networks and associations	5.4	12.9	23.8	30.7	27.2	3.6	1.2
<b>Overall average</b>						<b>3.8</b>	<b>1.1</b>

\*SD- Strongly disagree. D- Disagree, NS-Not sure, A-Agree, SA- Strongly agree

At the respective universities, 29.2 percent agreed and 29.7 percent strongly agreed that their respective employees are assisted to access important information through journals, research reports etc. Secondly, majority either agreed mean = 4.1 that their institution purchased important information which was missing or employees were encouraged to share knowledge in line with their common areas of interest. Further, majority mean = 4.0 agreed that they are either supported internally for example being allocated rooms for meetings or employees were encouraged to join professional networking and associations. Also, majority agreed mean = 3.6 and standard deviation 1.2 that their employees were encouraged to be active in external professional networks and associations. On average majority agreed mean = 3.8 and standard deviation =1.1 that communities of practice had influence on employee performance in their respective universities.

These findings collaborated with Israilidis et al., (2015) who argued that inability of an organization to create knowledge sharing platforms depicts its inability to access and take advantage of internal and external opportunities thus exposing it to potential threats and competition which affects performance at individual, group and organizational levels. Also, the findings mimicked those of Lovarte & Riveria (2007), whose model evaluates organization information needs and aligns it to development of CoPs. Moreover, creation of external links aids the employees acquire to current knowledge in the industry and contributes significantly to an institution's ability to perform well by developing its knowledge spread. Schenkel & Teigland, (2008) further advocate for creation of appropriate communication channels to promote the growth of harmonious knowledge sharing platforms and alignment of information needs to its core competencies. In contrast, the study refuted findings by Mugalayai & Muleke (2016) who found insufficient knowledge generation within public universities in Kenya which was attributed to lack of employee recognition for those who shared their knowledge. This was

supported by a study of Thiga, (2012) which showed that dissemination practices in public universities requires more improvement to by encouraging vibrant knowledge sharing practices among employees. This study showed that this situation has since changed since employees in public universities are encouraged to continuously generate and share their knowledge.

#### **4.2 Communities of Practice has no Significant Influence on Employee Performance in Public Universities in Kenya**

The hypothesis of the study stated that there was no significant influence of communities of practice on employee performance in public universities in Kenya. As shown in Table 4.2 regression model summary shows an R squared on 0.68, which depicts that 68 percent of changes in employee performance is significantly influenced by communities of practice in public universities in Kenya.

Table 4.2 Model Summary on Test for Significant Influence of Communities of Practice on Employees Performance in Public Universities in Kenya

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.826a	0.683	0.681	0.52

a Predictors: (Constant), COP

As shown in Table 4.3 analysis of variance on test for significant influence of Communities of Practice on employee performance in public universities in Kenya revealed that it was significantly influenced (F = 430.591, p value <0.05).

Table 4.3 Analysis of Variance on Test for Significant Influence of Communities of Practice on Employees Performance in Public Universities in Kenya

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	118.178	1	108.173	430.591	.000b
	Residual	54.891	200	0.274		
	<b>Total</b>	<b>173.069</b>	<b>201</b>			

a Dependent Variable: EMP

As shown in Table 4.4, there was positive and significant influence of communities of practice on employee performance in public universities in Kenya ( $\beta=0.81$ , p value <0.05). This shows that an increase in communities of practice increases employee performance by 0.81 units.

Table 4.4 Regression Coefficient on Test for Significant Influence of Knowledge Mapping on Employees Performance in Public Universities in Kenya

<b>Model</b>		<b>Unstandardized Coefficients</b>		<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>
		<b>B</b>	<b>Std. Error</b>	<b>Beta</b>		
1	(Constant)	0.04	0.04		0.097	0.92
	COP	0.82	0.04	0.83	20.75	0.00

a Dependent Variable: EMP

These findings agreed with Chong et al., (2014) who found positive and significant influence between knowledge sharing and employee performance. Similar sentiments were echoed by Bagaja and Guyo (2015) who found significant influence of knowledge management practices and optimal resources utilization. Consequently, there is need to support institutional needs as argued by Lopez-Saez et al., (2010) who found significant positive contribution of institutional support on employee performance.

$$\text{EMP} = 0.004 + 0.81 \text{ COP} \dots\dots\dots 4.2$$

## 5. Conclusion and Recommendations

Communities of practice which are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly was found to have positive and significant influence on employee performance in Kenyan public universities. This implies that improved communities of practice enhanced employee performance in Kenyan public universities.

Thus, there is need for more clarity on organization themes, mission and vision statements, development of inter and intra relationships among employees and employees being encouraged to share their knowledge freely by creating environments that promote kind of culture. Additionally, measures ought to be adopted to harmonize communication structures among departments in public universities to enhance accessibility to shared knowledge. Employees should also be accorded time and support to meet with peers both internally and externally.

Further, universities should improve employee information access in relevant journals and missing information ought to be acquired in the shortest lead time. Employee participation in professional networks and bodies ought to be facilitated to enhance knowledge sharing and employee performance. Communities of practice were therefore seen as important in so far as they support the creation of knowledge and development of skills, provide access to new thinking and innovation, support the change management process, and promote effective sharing of knowledge.

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## Transactional Leadership and Organizational Performance of Private Universities in Kenya

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### Abstract

Private universities are undergoing through tough times due to reduced number of students, financial crisis, poor academic programs and general management crisis. The manner in which the vice chancellors dispense with their authority has to a great extent affected the performance of lecturers which has great effect to the performance of these universities. Therefore, this study sought to find out the effect of transactional leadership style on the performance of in private universities in Kenya. Descriptive research design was used as a method of study. The study used primary data collected by use of structured questionnaires. Data obtained was cleaned, coded and entries made into Statistical package for social sciences. Descriptive and inferential analysis was conducted for quantitative data. Mean and standard deviations were also used as measures of central tendencies and dispersion respectively. Results were presented in form of tables and charts. The study found that transactional leadership had a significant and positive influence on performance of private universities in Kenya. The study further established that the perceived supervision support had insignificant moderating effect on the relationship between transactional leadership and performance of private universities in Kenya. The study concluded that as a result of transactional leadership, performance of private universities in Kenya was enhanced. The study recommended that the private universities which face performance challenges should uphold transactional leadership as an aspect of integrative leadership so as to steer their performance.

**Key Words:** *Leadership, Transactional Leadership, Integrative Leadership, Private Universities, Chattered Universities.*

### 1.0 INTRODUCTION

#### 1.1 Background to the Study

In an era of volatile economic environment, emerging economies should be able to develop its human resources as a source of competitive advantage (Shin, Heath & Lee, 2011). In order to develop and enhance workforce capabilities and to successfully compete in the 21<sup>st</sup> Century, organizations have to embark on future oriented human resources strategies. It could be argued that the individual competencies of the workforce in any organization under robust leadership would determine its overall success (Uhl-Bien & Marion, 2011). This success, among other things, may be attributed to the socio-behavioral characteristics and adjustments this leadership has to make in their job-role and position-power to gain common ground in any organizational setting (Yukl, 2011).

As such, in order for the organizations to remain focused and competitive in the global business, there is need for alignment of leadership with various changes which affect the core objectives and the mission of organization's existence (Zhu, Sosik, Riggio & Yang, 2012). These changes most often affect employee's ability to perform their roles and functions positively or negatively dependent on the leadership approach by the person steering the organization (Houglum, 2012). The dynamic systems that control the heartbeat of organizations performance gravitates around the systems that the

leadership of an organization has put in place to motivate and inform organizational performance positively (Duin, 2010).

Transactional leadership is comprised of two fundamental dimensions, contingent rewards, and management by-exceptions, while transformational leadership is comprised of four central components, charisma, and inspiration, individualized, consideration and intellectual stimulation, contingent rewards take place when the leader and follower have mutual understanding of the rewards or sanctions for performance or non-performance (Glynn & DeJordy, 2010). The emphasis is on completing tasks that have been agreed upon based on previous expectation. In management –by-exception, however, the leader takes action only when deviation from plans is evident (Wood, 2014).

According to Piccolo and Colquitt (2013), transactional leadership, also known as Managerial leadership, focuses on the role of supervision, organization, and group performance, transactional leadership is a style of leadership in which the leader promotes compliance of his followers through both rewards and punishments. Transformational leadership is not seen as futile but interested in paying attention to followers ‘work in order to find faults and deviations. This type of leadership is effective in crisis and emergency situations, as well as when projects need to be carried out in specific fashion (Odumeru & Ifeanyi, 2013).

Private Universities in Kenya are established under both the Universities Rules, 1989 which details the Establishment of Universities, the Standardization processes and procedures, accreditation as well as Supervision and the Universities Act 1985 (CAP 210B). Private universities in the country operate under two main categories, those with a full charter or those operating under an interim charter awaiting full charter. Private universities in Kenya offer both undergraduate and postgraduate programs with different programmes including certificates, diplomas and degrees. With 19 currently registered in Kenya, private universities in the country, attributable to a host of other factors, the growing demand for university education and consequently a strain on public universities to handle the subsequent demand. Being profit making entities, fees in private universities are accordingly charged in conformity to market forces on the grounds of full cost recovery (Boit and Koskei, 2015).

## **1.2 Statement of the Problem**

The intensified competition for student enrolment among private universities internationally as well as the Kenyan context has pushed the institutions into becoming more customer focused and resorting to strategies that will enhance their positions within the market and improve market share (McNamara, 2014; Ng’ongah, 2012).

In the wake of this competition, and in order not to compromise on the quality of education thereof, university leadership among private universities has been considered, in international studies, as key in translating this competition into enhanced organizational performance underscored by such desirable competitive practices as the recruitment of high caliber teaching staff, improving student facilities and overall infrastructure as well as providing cutting-edge technology and teaching aids (Research Universities Futures Consortium, 2012; Davenport, 2013; Kaczynski, 2013). With the increasing growth in the number of private universities in Kenya, it is imperative to establish the role played by leadership among these universities in checking performances thereof, in view of the stiff competition for student enrolment.

## **1.3 Objectives of the Study**

- i. To examine the influence of transactional leadership on performance of chartered private universities in Kenya

- ii. To determine the moderating effect of perceived supervision support on the relationship between transactional leadership and performance of chartered private Universities in Kenya

#### 1.4 Research Hypotheses

Ha<sub>1</sub>: Transactional leadership has a significant effect on performance of chartered private universities in Kenya

Ha<sub>2</sub>: Perceived supervision support has a significant moderating effect on the relationship between transactional leadership and performance of chartered private Universities in Kenya

## 2.0 LITERATURE REVIEW

### 2.1 Theoretical Foundation

#### 2.1.1 *The Motivational Model*

The motivational model states that increasing the level of participation in decision making may increase performance through increased motivation (Sashkin, 1976). Previous scholars suggest that participative behavior of superiors have an important role in providing sub-ordinates with the experience of intrinsic motivation, feelings of self-worth and a sense of self-determination (Deci et al., 1989). This type of leadership behaviour promotes a feeling of “psychological ownership” of subordinates (Sashkin, 1976); increase subordinates’ feelings of believing in themselves and control, and reduce their sense of powerlessness (Arnold et al., 2000). Other scholars suggest that participative leadership behaviour may promote the feeling of empowerment among subordinates (Ahearne et al., 2005; Leach et al., 2003).

The theory was employed in studying how when the university staff are involved in administrative decision making with implications on their welfare as well as in taking part in intrinsically motivating work, they may discover that the performance of their work is more benefiting, and consequently, they are motivated to put more effort to achieve their work objectives.

#### 2.1.2 *Organizational Effectiveness (OE) Theory*

Organizational effectiveness (OE) has been one of the most extensively researched issues since the early development of organizational theory (Rojas 2010). Organizational theory has spawned a rich body of literature that has had a major influence on management accounting studies (Hopper and Powell 2009). Performance measurement models have moved from a cybernetic view whereby performance measurement was based mainly on financial measures and considered as a component of the planning and control cycle to a holistic view based on multiple nonfinancial measures where performance measurement acts as an independent process included in a broader set of activities. As such, in the present study, the theory was used in understanding how the various universities have performed across the years as well as how much of the performance can be attributed to integrative leadership thereof.

## 2.2 Conceptual Framework

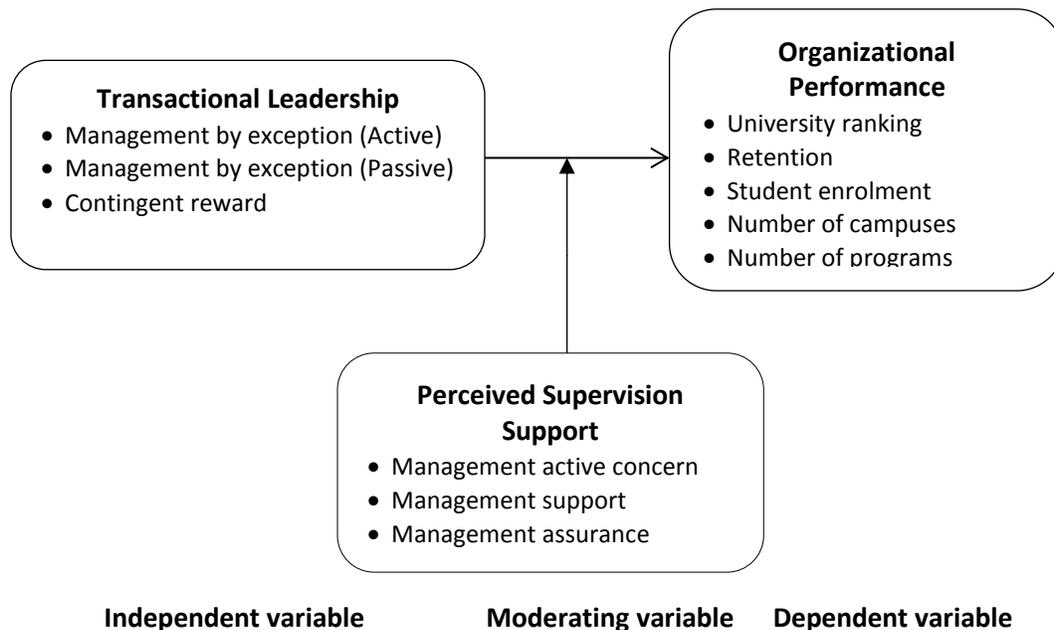


Figure 1: Conceptual Framework

## 2.3 Empirical Review

According to Realawam *et al* (2015) transactional leadership is based on the exchange process where the leader administers rewards and sanctions. One way or another, the leader and follower agree, explicitly or duplicity that desired follower behaviors will be rewarded, while undesirable behaviors will draw out pediments, potential rewards include an increase in salary, promotions, and more benefits. Bryman (2012) initially had pointed out that, transactional leadership model, is not satisfactory for most of the situations. Indeed, one could say that transactional leadership behaviors do not even qualify for the true leadership label. According to Boxall and Bartram (2011) transactional leadership approach is based on exchange, the leadership does not seek to motivate followers beyond the level that is required to avoid punishment or gains extrinsic reward.

Garev (2012) contends that, transactional leadership cannot be labelled as a true leadership model, based on the fact that, it is an exchange transaction between the leader and follower. Such that the leadership does not seek to motivate followers beyond the level that is required to avoid punishment or gain extrinsic rewards. Waldman *et al* (2011) support that to maximize their effectiveness; leaders should exhibit both transformational and transactional behaviors and not one in isolation.

## 2.4 Research Gaps

It is evident from the foregoing literature that a vast majority of studies have been conducted internationally in developed economies while regional and Kenyan literature remains scanty. It is also noted from the literature that no study has been conducted on integrative leadership and organizational performance among private universities in Kenya. Overall, the studies carried out on transactional leadership are not conclusive as they focus mainly on one or two dimensions of integrative leadership.

In view of the above illuminated gaps, this study will attempt to investigate the effect of integrative leadership style on organizational performance in private Universities in Kenya.

### 3.0 RESEARCH METHODOLOGY

#### 3.1 Research Design

This study used a descriptive research design. According to Dawson (2002) the purpose of a research design is to set out a description of, and justification for, the chosen methodology and research methods. The ultimate objective of descriptive research study is to accurately portray characteristics of persons, situations, or groups, and/or the frequency with which certain phenomena occur. This research sought to present facts as they are and therefore descriptive research design that is confirmatory in nature was deemed most appropriate.

#### 3.2 Target Population

The study targeted the teaching staff from all the seventeen (17) chartered private universities as enlisted by CUE. The commission is established under the Universities Act, No. 42 of 2012, as the successor to the Commission for Higher Education and is the Government agency mandated to regulate university education in Kenya. With an anticipated large target population, the study however narrowed down the scope to the universities that have been chartered for 10 years and above.

#### 3.3 Sample Size and Sampling Design

Owing to the anticipated large number of employees, the study employed the Fisher et al. (1983) formula for determining sample size in large population. This is as shown below:

$$n = \frac{Z^2 pq}{d^2}$$
$$\text{Therefore } n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

The study thus reached a total of 384 employees proportionately distributed across the selected universities. This gave a sample size of 384 employees which can be adjusted when population is less than 10,000 using the following relationship (Neuman, 2012).

$$nf = \frac{n}{1 + \frac{(n-1)}{N}}$$
$$nf = 384 / 1 + (384 / 2453) = 331.89 = 332$$

#### 3.4 Data Collection Instruments

The study used primary data which was largely quantitative and descriptive in nature. The questionnaire was designed to solicit the data on constructs pertinent to establishing the interrelationship between the independent and dependent study variables. The study employed structured questionnaire with close-ended questions. This helped guide respondents' answers within the choices given to ensure they stay in focus with the study objectives.

#### 3.5 Data Collection Procedures

At the data collection stage, in order to reach the 384 respondents from across the selected private universities in Kenya at the required timeframe, the study utilized a total of 10 research assistants to aid in the exercise. The questionnaires were distributed on a drop and pick basis whereby the researcher

administered the questionnaires to respective respondents who were allowed time to respond after which the duly filled questionnaires were collected.

### 3.6 Data Analysis and Presentation

After data collection, the data obtained from the field was filled-in and returned questionnaires was edited for completeness, coded and entries made into Statistical package for social sciences (SPSS version 24). Qualitative data was analyzed by content analysis while quantitative both descriptive and inferential analysis was conducted for quantitative data. Mean and standard deviations were used as measures of central tendencies and dispersion respectively. The purpose of conducting descriptive statistics was to reduce, summarize data and analyze items and constructs. This provided insights into the characteristics of the samples. Descriptive statistics provided a basis for inferential statistics using correlation and multiple regressions.

## 4.0 RESEARCH FINDINGS

### 4.1 Response Rate

The study surveyed 332 respondents from 7 private universities in Kenya using a structured questionnaire. A total of 271 questionnaires were filled and returned for analysis. This implied a response rate of 81.6%. On the other hand, 61 questionnaires were not returned, returned while not fully filled or returned completely blank. This represented a non-response rate of 18.4%.

### 4.2 Descriptive Analysis of the Study Variables

#### 4.2.1 Transactional Leadership

The first objective of the study was to determine the influence of transactional leadership on the employee performance among private universities in Kenya. The respondents were asked specific questions based on the measures of the variable which were; active management by exception, passive management by exception and contingent reward. Likert's scale questions were used by asking the respondents to indicate their level of agreement or disagreement. The findings are as shown in table 4.1.

The findings go hand in hand with the argument by Piccolo and Colguitt (2013) that a transactional leader ought to embrace managerial leadership qualities by not only influencing followership but also effectively supervising to ensure that there is conformity with the set guidelines and procedures. However, the findings do not harmonize with those by Boxall and Bartram (2011) that transactional leaders formulate expectations and are keen to ensure that the followers strictly adhere to the guidelines towards achieving those expectations. The findings moreover reaps support from the motivational model whereby it is depicted that transactional leaders focus on motivating the employees to the point where it equalizes with their contribution and effort towards attaining the organizational goals (Sashkin, 1976; Ahearne et al., 2005).

Table 4.1: Transactional Leadership

Statement	Mean	Std. Dev.
I am aware of the link between the effort and reward	3.93	0.91
I motivate followers by setting goals and promising rewards for desired performance	4.13	0.76

I believe leadership depends on the leader's power to reinforce subordinates for their successful completion of the bargain	3.79	0.94
I often use technical knowledge to determine the change process	3.48	1.05
To realize achievement I offer support	3.71	0.99
I pay special attention to the breaking of rules and deviation of set standards	3.94	0.98

#### 4.2.2 Perceived Supervision Support

The study sought to find out the moderating role of perceived supervision support on the impact of transactional leadership style on performance of private universities in Kenya. Five-points Likert's scale was used to identify the respondent's views on the variables whereby specific statements were formulated based on the specific measures of perceived supervision which were; management active concern, management support and management assurance. The findings are as shown in table 4.2.

Table 4.2: Perceived Supervision Support

Statement	Mean	Std. Dev.
There is a clear connection between supervision and Professional development in my institution	4.06	0.79
Supervision aligns with the institution's goals and other professional-learning activities	2.64	1.08
Supervision focuses on core content and modelling of teaching strategies for the content	3.10	0.94
Supervision includes opportunities for active learning of new teaching strategies	3.41	0.99
Supervision provides the chance for the staff to collaborate	3.47	0.96
Supervision includes follow-up and continuous feedback which is effective in growth process	3.45	0.97
Supervision is grounded in day-to-day administrative and teaching practice, and is designed to enhance staff's instructional practices around content	3.86	0.93
Supervision is integrated into the workday, and part of a continuous improvement cycle in my institution	3.91	0.87
Supervision is directly connected to learning and application in daily practice	4.01	0.76

The findings concur with those by Tansuhaj, Randall and McCullough (2011) who found that large organizations in the modern business market ought to focus on closer supervision of the employees through which the employees become more cautious and their productivity increases as well. According to Lewin and Minton (2014), effective supervision of the employees by the senior management enables the flow of command to be as effective so as to enhance the employee productivity at the end of the day.

#### 4.2.3 Organizational Performance

The study sought to find out the current situation of the universities as far as their organizational performance is concerned. The main measures of organizational focused on in the study were academic ranking, employee turnover, number of branches as well as enrolment rate of the students.

##### *Employee Turnover*

The findings imply that the employee turnover at the universities focused on in the study has been increasing systematically for a period of five years and indication that the performance of the universities could be declining. According to Hopper and Powell (2009), employees are most likely to leave an organization when they realize that the performance is declining hence they are not assured of their job security.

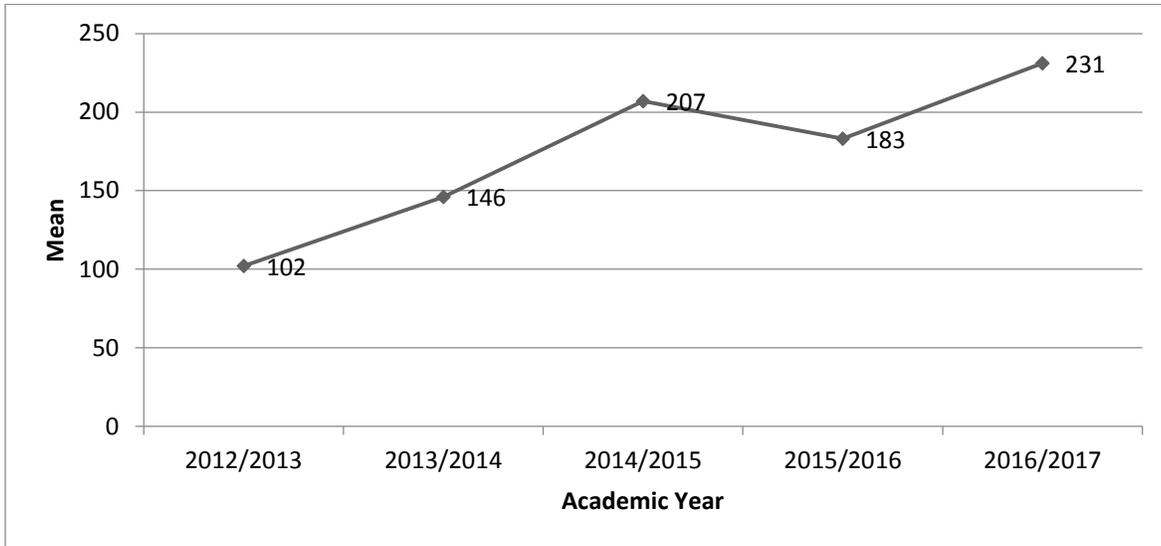


Figure 2: Employee Turnover

**Number of Branches (Campuses)**

The study sought to find out the number of new branches and/or campuses opened by the universities in a period of five years prior to the study period. According to Elenkov (2012), a well performing organization has a high flow of customers thus it is forced to have other branches to take the services/products closer to the customers. In the same, a good performing university would open new campuses to meet the growing number of students.

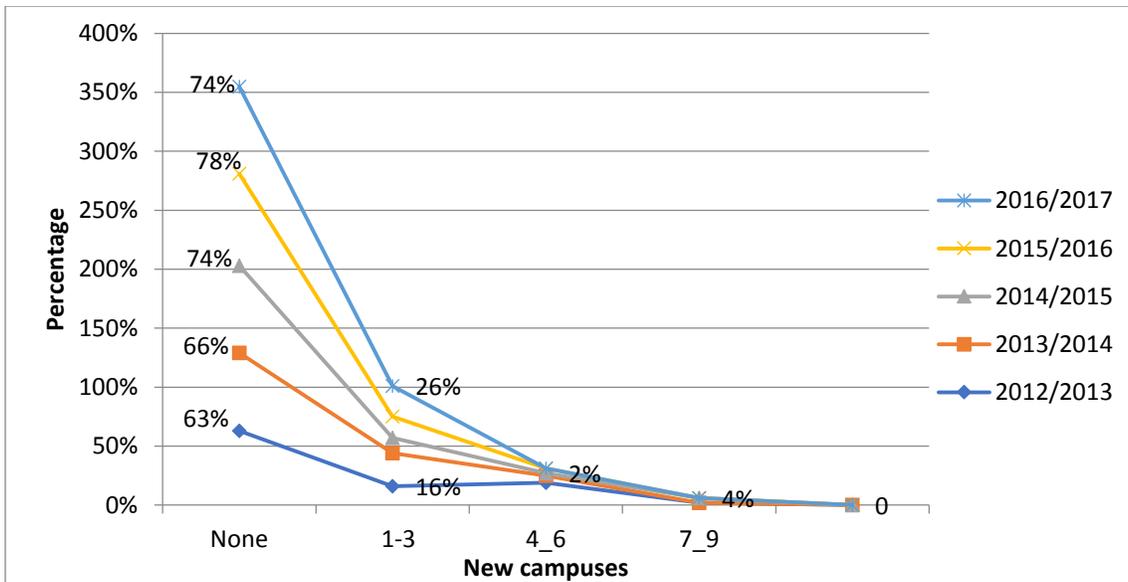


Figure 3: Number of New Campuses Opened

**4.3 Hypothesis Testing**

*Ha: Transactional leadership model has a significant effect on organizational performance in chartered private universities in Kenya*

To know about the impact of the transactional leadership on performance of private universities in Kenya, multiple regression using the following model was adopted:

$$Y = \alpha_j + \beta_2 X_2 + \varepsilon$$

The model summary as shown in table 3 below revealed that the R-value is 0.714. Therefore, R-value (.714) for the transactional leadership suggested that there is a strong effect of the independent variable on performance of private universities in Kenya. It can also be observed that the coefficient of determination, the R-square ( $R^2$ ) value is 0.509, which represents 50.9% variation of the dependent variable (organizational performance), which is due to the change in independent variable (transactional leadership).

**Table 3: Model Summary for Transactional Leadership**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.714 <sup>a</sup>	.509	.491	.20128

- a. Predictors: (Constant), Transactional Leadership  
 b. Dependent Variable: Organizational Performance

From the ANOVA results on transactional leadership and organizational performance as shown in table 4, it is evident that an F statistic of 405.259 was observed which indicated that the model was significant. This was supported by a P-value of (0.000). The reported P-value of (0.000) is less than the conventional P-value of (0.05) thus implying that model applied can significantly predict the change in the organizational performance of private universities in Kenya as a result of transactional leadership. The study, therefore, accepted the alternative hypothesis  $H_{A2}$  at 95% confidence interval, meaning there was a significant relationship between transactional leadership and organizational performance of private universities in Kenya.

**Table 4: ANOVA for Transactional Leadership**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.660	1	15.660	405.259	.000 <sup>b</sup>
	Residual	28.048	269	.104		
	Total	43.708	270			

- a. Dependent Variable: Organizational Performance

The coefficients for transactional leadership and organizational performance are as shown in table 5. From the coefficients, the new model now becomes  $Y = 0.133 + 0.784X_2 + \varepsilon$ . This implies that at a p-value of 0.000, a unit increase in transactional leadership results to 78.4% increase in the organizational performance of the private universities in Kenya. The alternative hypothesis is thereby accepted and the inculcation made that transactional leadership has a positive and significant effect on organizational performance of chattered private universities in Kenya.

Table 5: Coefficients for Transactional Leadership

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.133	.097		1.371	.091
Transactional Leadership	.784	.084	.791	9.334	.000

a. Dependent Variable: Organizational Performance

### Structural Equation Model (SEM) for Transactional Leadership

Structural equation model was also used to test for the influence of transactional leadership on organizational performance of private universities in Kenya. The findings as shown in figure 4 revealed that the path coefficient beta ( $\beta$ ) value for transactional leadership and organizational performance was 0.830 implying that a unit change in transactional leadership explained up to 83.0% increase in organizational performance of private universities in Kenya. Specifically, on the sub-constructs of transactional leadership, active leadership style had the strongest influence on performance with a coefficient of 0.58 followed by passive style with a coefficient of 0.40 and contingent was the least with a coefficient of 0.29. On the other hand, of the influence that transactional leadership had on performance, ranking was the most influenced with a coefficient of 0.71 followed by the number of programs with a coefficient of 0.65 and employee came last with a coefficient of 0.27. This is to imply that transactional leadership will influence the university ranking and the number of programs more than it will influence the retention of the university staff and the number of campuses.

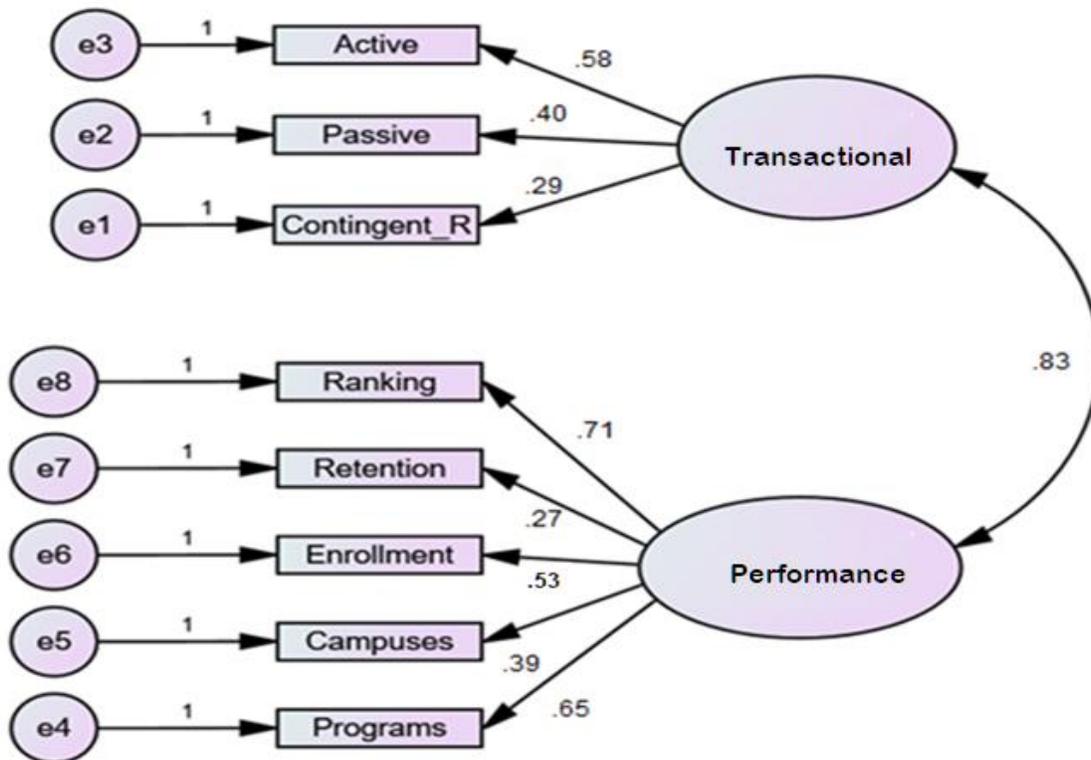


Figure 4: Structural Model for Transactional Leadership

#### 4.3.2 Moderating Effect of Perceived Supervision Support

The study sought to find out the moderating effect of the perceived supervision support on the relationship between transactional leadership and organizational performance among private universities in Kenya. The results as shown in table 6 revealed that perceived supervision support has no significant moderating effect on the organizational performance of private universities in Kenya. This is evidenced by the P-value of 0.613 which is way above the standard p-value of 0.05. This is also revealed by the t-value of 0.924 which is less than the t-critical value of 1.96 at a 95% confidence level. The results thereby satisfies the verdict to fail to accept the alternative hypothesis that perceived supervision support has a significant moderating effect on the relationship between integrated leadership and organizational performance of private universities in Kenya.

Table 6: Regression Coefficients (Moderated Model)

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	3.702	.057		64.924	.000
Transactional_Moderator	-.195	.084	-.274	-2.312	.022

a. Dependent Variable: Performance of Private Universities

#### 5. Conclusion

The main aim of the study was to assess the effect of Transactional leadership on organisational performance e of private universities in Kenya. From the findings, the study concluded that transactional leadership is a critical aspect in ensuring and promoting performance of private universities in Kenya. The study concluded that most of the universities considered rewarding as a mere form of appreciating the employees while the management of the institutions upheld the concept of management by exception whereby the management actively gets involved in supervision aspects to steer performance.

#### 6. Recommendation

The management of the private universities should create an environment where employees run any projects as if they are their own so as to enhance accountability. As transactional leaders, the managers at the universities should embrace adopting and seeking employees' input and ideas so long as they are bound to the interests of the firm out of which diversity and innovativeness is embraced.

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RELATIONAL BEHAVIOR AND PERFORMANCE OF MANUFACTURING FIRMS IN KENYA

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ABSTRACT

The main aim of this study was to assess the relationship between relational behaviour and the performance of manufacturing firms in Kenya. While the internal and external environmental factors are pushing businesses to undergo tremendous changes, the supply chain management is becoming one of the core areas that organizations need to align for continued performance. The manufacturing sector in Kenya, although it is one of the critical sectors in the country's economy, has been undergoing through turbulent times in the recent past where over 40% of the industry's leading companies have been posting declined revenues and the profit margin. The tussle of relational behaviour as a an aspect of supply chain alignment has however not been adequately addressed in the sector. This study therefore seeks to assess the influence of rational behaviour on the performance of manufacturing firms in Kenya. The study also focused on assessing the moderating effect of quality control and certification on the relationship between relational behaviour and performance of manufacturing firms in Kenya. The paper was anchored on partnership theory. Descriptive research design was adopted. The researcher preferred this method because it allows an in-depth study of the subject. The population of the large sized registered members as per the directory is 461. This study employed Cochran's formula to sample 160 large manufacturing firms from the total population. Semi-structured questionnaires was administered to collect qualitative and quantitative data. Secondary data was collected from firm's reports and websites. Quantitative data was analyzed using both descriptive and inferential statistics and with the help of SPSS while qualitative data was analyzed using content analysis. Multiple regression models was used to show the relationship between the dependent variable and the independent variables. The findings revealed that relational behaviour was one of the key aspect of supply chain alignment that significantly influence the performance of manufacturing firms in Kenya. The quality control and certification was also found to significantly moderate the relation between relational behaviour and performance of manufacturing firms. The study concluded that relational behaviour through interactions among stakeholders, flexible logistics and customer focus was essential in the performance of the manufacturing firms. The paper recommends that the manufacturing firms have the duty of ensuring the customers are given effective feedback while interaction between the stakeholders is enhanced for better relationship and enhanced collaboration.

**Keywords:** Relational Behaviour, Supply chain Alignment, Firm performance, Manufacturing Firms

## 1.0 INTRODUCTION

### 1.1 Background to the Study

Most of the modern companies are striving to sustain their performance and operations in the market, despite the growing dynamism and over-volatile operating environment. One of the issues of concern that has been arising during these efforts has been the alignment of supply chain practices to ensure effectiveness, efficiency and at the same time save on operational costs. Among the main issues of supply chain alignment that has been arising is the relational behaviour. This is the collection of activities and strategies that a company upholds to build and maintain customer relationships and stakeholder interactions within the supply chain network (Skipworth & Julien, 2015). Internal relational behavior is characterized by cross functional team, logistical flexibility to your end users, mutual understanding, joint problem-solving and joint planning.

The benefits of cross-functional teams have been widely recognized (Fassoula, 2013). The use of cross-functional teams is found to enable strategic alignment of account systems (Yasin, Bayes, & Czuchry

2015). To encourage cross-functional team working, a cross-departmental reward system may be used. Cross-functional activities often improve mutual understanding. The existence of different goals within an organization inhibits internal collaboration (Sabath & Whipple, 2014). Alignment of internal relational behavior is essential to achieve mutually accepted outcomes (Pagell, 2014; O’Leary-Kelly & Flores, 2012).

Since a conflicting objective is often the main obstacle to customer responsiveness, this study suggests stakeholder interactions, logistical flexibility and responsiveness to customer feedback as crucial indicators for relational behavior in supply chains. The lack of shared goals with suppliers is one of the inhibitors of collaboration in planning, forecasting and replenishment (Barratt & Oliveira, 2011). Very often any transaction or joint effort in improving a supply chain will incur costs and these costs are often unevenly distributed. Supply chain members that choose to push additional costs to other members often inhibit alignment efforts (Chung & Leung, 2012).

Relational behaviour is the consistency and fit in strategic goals, metrics and activities between firms interlinked from upstream to downstream and which are involved in customer value creation (Melnyk, Stewart & Swink, 2014). Supply chain relational behaviour involves strategic collaboration and coordination across the supply chain. Flynn, Huo and Zhao (2010) underscore the value of supply chain relational behaviour alignment in managing intra and inter firm relationships in a value chain. The management of a supply chain emphasizes the need to align all the activities that create value for customers and are performed across the supply chain, in order to achieve high levels of customer service in a cost-effective way (Skipworth & Julien, 2015).

The sharing of goals, cost and profits is only part of relational behavior. At an operational level, focal firms need to jointly solve problems and plan with the stakeholders and customers to improve delivery performance (Auramo *et al.*, 2010). Sanders and Premus (2015) suggested that closer collaboration with stakeholders increases supply chain integration and performance.

In Africa supply chain alignment is on an upward trend due to the following drivers for this model include: expanding companies that require additional resources but cannot afford or are not willing to invest in their acquisition; the pursuit and attraction of new talent; the reduction of operating costs; and carbon footprint reduction. Supply chain alignment has meant that capital investments in this model are minimal (Von Maltitz, (2014). The manufacturing sector is the third biggest industrial sector after agriculture and transport and communication (KPMG, 2014). It is the third leading sector contributing to GDP in Kenya. Although Kenya is the most industrially developed country in East Africa, the manufacturing sector constitutes merely 10 per cent of the industrial sector contribution to GDP (RoK, 2014). The growth in manufacturing industry has declined to 3.3 per cent in 2011 as compared to 4.4 per cent in the year 2010 mainly due to a challenging operating environment (KNBS, 2012). Furthermore, the manufacturing sector has high yet untapped potential to contribute to employment and GDP growth.

Statistics from World Bank (2016) show that Kenyan manufacturers have registered stagnation and declining profits for the last five years due to unpredictable operating environment. Further statistics from Kenya Association of Manufacturers have shown that certain firms announced plans to shut down their plants and shift operations to Egypt as a result of reduced profits (KAM, 2014).

### **1.2 Statement of the Problem**

The manufacturing sector is one of the Kenya’s main economic pillars, contributing over an average of 12% of the country’s annual GDP. Despite the essentiality of the sector, its performance has been declined over the recent past. This has been characterized by declined revenues and profits, increased losses, closure of operations, and increased redundancy and retrenchment to salvage the costs of operations (KAM, 2019). While supply chain alignment through aspects such as supplier relational behaviour has been proved to influence performance particularly among the manufacturing firms, this has inadequately been proved in the Kenya’s context. This raises the question on whether indeed, relational behaviour as an aspect of supply chain alignment could be the missing factor. This study

therefore seeks to fill the existing methodological, contextual and empirical gaps by assessing the relationship between relational behaviour and performance of manufacturing firms in Kenya.

### 1.3 Study Objectives

1. To establish the relationship between relational behaviour and performance of manufacturing firms in Kenya.
2. To determine the moderating influence of quality control and certification on the relationship between supply chain alignment and performance of manufacturing firms in Kenya.

### 1.4 Study Hypotheses

1. Ho: There is no significant relationship between relational behaviour and performance of manufacturing firms in Kenya
2. Ho: Quality control and certification has no significant moderating effect on the relationship between relational behaviour and performance of manufacturing firms in Kenya

### 1.5 Scope of the Paper

The study's scope is to investigate the relationship between relational behaviour and performance of manufacturing firms in Kenya. The study focused on the manufacturing firms in Kenya. The KAM (2019) lists 461 large manufacturing firms drawn from 12 sub-sectors. The supply chain management form these companies will be the units of observation for the study.

## LITERATURE REVIEW

### 2.1 Relational Behavior and Firm Performance

In practice, management studies have rarely considered concurrently the various supply chain alignments such as shareholder and customer alignment. For example, the value chain theory of Porter focuses on the building blocks by which a firm creates a product, which is valuable to the customers, assuming that there is no need to trade-off with shareholder value. However, in the mid-2000s some studies have started to examine the links between shareholder and customer value (Bourguignon, 2015).

The tension between delivering customer and shareholder value is a problem all profit-driven organizations have to manage. Still, there is debate in the literature over whether shareholders, or customers, should take priority (Rappaport, 2013). The reality is that the ultimate goal of any company is to make a sustained return for their shareholders. Some argue that organizations are in business primarily to maximize shareholder value and can do so by also delivering customer value, thereby maintaining competitiveness. Some scholars have argued that customer value come first because a business is more likely to achieve its goals when it organizes itself to meet the current and potential needs of customers (Doyle, 2014).

Supply chain between different stake-holder is meant to inform and complement each other. Such a novel theoretical lens to supply chain alignment is interesting because it considers the alignment, or fit, between shareholder and CA, as a reason for achieving sustainable business performance. Marquez and Blanchard (2009) emphasize the importance of connecting customer value with business targets, and Cao *et al.* (2012) find evidence that strategic alignment (where functional strategies are aligned with business strategies) may not lead to improved firm performance if those strategies are not appropriate for the competitive environment.

Customer alignment can inform the process of supplier alignment and therefore allow shareholders to better align their objectives with a congruent business strategy. Frohlich (2012) argues that the lack of alignment between business models and practices and response to customer needs will have an adverse effect on shareholder value. In a way, supply chain alignment or doing the right things ensures customer loyalty and thus promises continuous revenue, thus contributing to shareholder value.

Shareholder value promises continuous investment which supports the implementation of the business unit and supply chain strategies to meet customer need (Slater & Narver, 2014; Kaplan & Norton, 2014), thus suggesting the joint effects of Customer and supplier alignment for enhancing both shareholder and customer value, therefore leading to superior business performance. From this perspective, SA and

CA reinforce each other, meaning that supply chain alignment positively affects customer value and eventually business performance.

### 2.2 Quality Control and Certifications and Firm Performance

Casadesus and De-Castro (2015) affirmed that quality management and other quality practices plays a considerable role in better managing and aligning supply chain relations. Theodorakioglou *et al.* (2016) examined how the EFQM model facilitates intra-firm coordination and concluded that quality practices results in better intra-organizational alignment. Yang *et al.* (2013) developed and applied a six sigma methodology in a leading manufacturing organization to improve supply chain operations. They concluded that such methodology could play a considerable role for successful supply chain thinking. Similarly, Mehrjerdi (2013) confirmed the role of implementing six sigma tools in improving coordination efforts in supply chains.

It is widely accepted that the ultimate aim of implementing ISO standards is to satisfy the demand of external customers as well as potential customers (Douglas, Coleman & Oddy, 2013). Bagchi *et al.* (2013) referred to a study conducted in the USA and the UK in 2004, 2005, 2006 that concluded that the internal benefits of earlier versions of ISO 9000 takes precedence over external benefits. However, Robinson and Malhotra (2015) argued that quality practices must expand from traditional intra-firm mind sets to include inter-organizational supply chain activities. In that sense, Boiral and Roy (2010) assumed that ISO 9000 leads to better intra-organizational processes and in turn will provide organizations with better ability to respond to customers and competitors pressures. Several studies referred to the importance of the dual focus on internal (intra-organization) and external (inter-organization) quality performance as a key strategy for achieving competitive differentiation (Mellat-Parast, 2013).

In that sense, Carmignani (2009) highlighted the importance and the potentiality of quality models to support the supply chain integration efforts. Casadesus and DeCastro (2015) analysed the impact of ISO 9000 quality assurance implementation on adherence to strategies in favour of a SCM philosophy through examining whether ISO 9000 implementers improves relationship with suppliers. The results provided doubtless affirmation on how ISO 9000 implementation favours SCM strategies. Yet, they concluded that quality management practices provide a great deal of help and support for relationships in the supply chain.

### 2.3 Theoretical Review Partnership Theory

The study was informed by partnership theory. The theory is built on the urge to enhance the relationships and partnerships between the stakeholders in an organization, for an enhanced effectiveness and efficiency in operations. In its basic nature, the partnership model depicts the buyer and supplier as partners with a common interest which is customer satisfaction (Xu, Huo & Sun, 2014). Partnership is a relationship based on mutual trust, openness, shared risks and rewards that enables an organisation gain competitive advantage leading in the company achieving a performance that's far much greater than the firm would have achieved when operating as single entities (Kumar, 2013).

The theory further states that any partnership is always based on value and present for each other (Wong *et al.*, 2012). The solid and long term relationship simply implies continuous improvement of the organization performance. Suppliers must provide better services that are of high quality than his competition at a price reasonable and still achieve goals to remain in business. Partnership model according to Zhao and Yeung (2011), increases company efficiency through way of cooperative; both parties obtain cost reduction which leads to price reduction and therefore increasing the market share profit margin as well. This leads to a company gaining a competitive edge and efficiency (Wagner & Bode, 2013).

The partnership theory has three elements which are drivers, facilitators' and used components. The drivers each party must have a driver strong enough to provide them with realistic expectation of significance benefit through strengthening of the relationship (Gianakis, 2012). Facilitators on the other hand have included corporate compatibility, mutuality, managerial philosophy and techniques and symmetry. In conclusion in order to gain leadership position against your competitors and ensure the

company grows partnership can be used to achieve the above. This theory is relevant because relational behaviour entails partnering with various players in the supply chain.

#### 2.4 Conceptual Framework

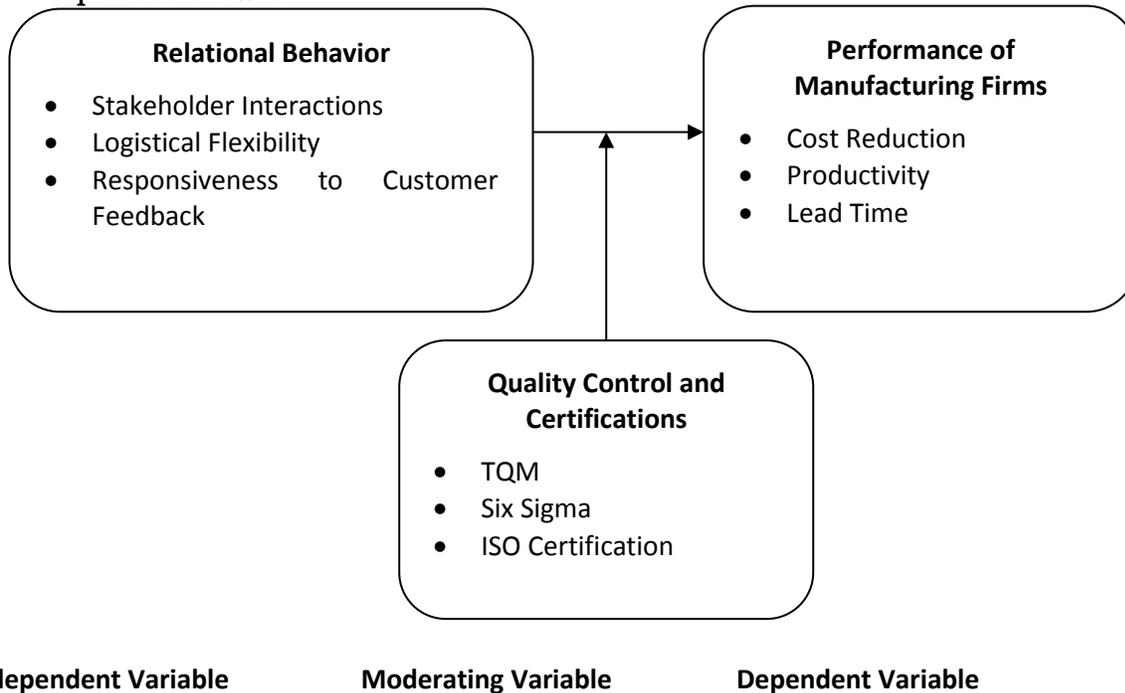


Figure 2: Conceptual Framework

### 3.0 RESEARCH METHODOLOGY

#### 3.1 Research Design

A descriptive design was adopted in this paper. The design is used because it sets out to describe weather supply chain alignment is related to performance of manufacturing firms in Kenya. The study adopted the design as it helps describe the situation as it exists. Earlier, related studies had also utilized descriptive research design such as those by Mugo (2012) and Rotich (2011) who studied strategic supply chain practices influence on performance of institutions in Kenya.

#### 3.2 Population of the Study

The study targeted the manufacturing firms in Nairobi Kenya. The KAM directory has listing of members (firms) by sectors which contains a register of 12 sectors of those in manufacturing firms spread all over the country (KAM, 2017). The population of the large sized registered members as per the directory is 461.

#### 3.3 Sampling

A sampling formula by Cochran (1977) was used to establish the appropriate sample size for the study. formula was used to calculate the sample size as advanced.

$$n_0 = z^2 p(1-P) / e^2$$

$$n_1 = 246 / \{1 + 246/461\} = 160$$

Where;

$n_1$  is the corrected sample size and  $n_0$  the >5% sample calculated above. This gave a sample of 160.

#### 3.4 Data Collection Instruments

The research utilized a structured questionnaire to collect data. The questionnaire was divided into six sections. The first section focused on background information of the organizations while the other five sections each focused on a single research objective.

### 3.5 Data Collection Procedures

In relation to the data collection procedure the study developed a timetable for data collection and scheduled appointments with the respondents, specifying in detail the date, time and place where the data was to be collected. The unit of analysis in this study was the manufacturing firm. Since the study was majorly based on supply chain alignment influence on performance of manufacturing firms, the target respondents were the heads of procurement in charge of supply chain management or its equivalent.

### 3.9 Data Analysis and Presentation

This study adopted a descriptive data analysis and inferential data analysis. Descriptive data analysis was adopted for this study because descriptive analysis was used to describe the basic features of the data in a study. It provides simple summaries about the sample and the measures (Kothari, 2014). The study adopted inferential data analysis in order to enable it reach conclusions that extend beyond the immediate data alone to infer from the sample data about the population. Inferential statistics facilitate inferences from sample data to population conditions. The study used SPSS version 21 and MS Excel to facilitate the analysis of data. SPSS is used to undertake calculations on the data. The study utilized SPSS to develop a multiple regression model to make inferences on the effect of each of the independent variables on the dependent variable.

## DATA ANALYSIS AND DISCUSSION

### 4.1 Instrument Return Rate

Out of the 160 questionnaire issued, 127 questionnaires were properly filled and returned for analysis. This represented a response rate of 79.4%.

### 4.2 Reliability Test

Table 1 shows the reliability test results. The findings revealed that all the variables had a Cronbach's alpha above the 0.70 threshold. This implied that they had met the reliability test hence reliable for analysis.

**Table 1: Reliability Test Results**

Variable	Number of Items	Cronbach's Alpha
Relation Behaviour	13	0.814
Quality Control and Certification	13	0.799
Firm Performance	8	0.822

### 4.3 Influence of Relational Behaviour on Firm Performance

The study sought to assess the relationship between relational behaviour and performance of manufacturing firms in Kenya. The study sought to evaluate the influence of stakeholder interactions, logistical flexibility and responsiveness to customer feedback on the performance of manufacturing firms in Kenya. These were the main aspects of relational behaviour. The respondents were asked to indicate their level of agreement with specific statements on relational behaviour. The findings are as shown in Table 2.

The findings imply that the aspects of relational behaviour have not been satisfactorily met among the surveyed manufacturing firms. According to Chae, Yen, and Sheu (2015), relational behaviour is mainly aimed at enhancing the connection between the customer and the organization and between the suppliers and the organization. This relationship is directed towards minimizing the costs of operations and ensuring that the organization attracts and retains customers at the lowest cost possible. The findings are in line with those by Wagner and Bode (2013) who found out that enhancing the relationship between the company and its stakeholders is one of the key aspects of supply chain alignment that steer the performance and competitiveness of modern businesses.

**Table 2: Descriptive Results on Relational Behaviour Systems**

Measurement Aspect	N	Mean	Std. Dev.
The company carries out a frequent stakeholder analysis practice to identify key stakeholders	127	3.75	0.90
The stakeholders in the company are effectively involved in key decision making processes	127	3.72	0.89
There are frequent stakeholder meetings to assess their views on various aspects on the organization	127	3.67	1.01
There are flexible logistics frameworks in our company	127	3.8	0.97
The management has embraced a way of rotating cycles and procedures in our logistics process	127	3.85	0.98
There are follow-ups to ensure the timelines in our logistics process can be adjusted when need be	127	3.99	0.87
There is a customer feedback platform to ensure customers receive feedback effectively	127	3.7	0.97
The customer queries are received and replied to timely	127	3.96	0.94
The company has embraced use of ICT in handling customer feedback and communication	127	4.12	0.92

#### 4.4 Quality Control and Certifications

The study sought to establish the relationship between quality control and certifications and performance of manufacturing firms in Kenya. The respondents were asked to indicate their level of agreement or disagreement on specific statements regarding influence of quality control and certifications on the performance of manufacturing firms in Kenya. The findings are as shown on Table 3. The findings reveal that indeed the quality control and certifications have been instrumental to the utilization of relational behaviour in enhancing the performance of manufacturing firms in Kenya.

**Table 3: Descriptive Results on Quality Control and Certification**

Measurement Aspect	N	Mean	Std. Dev.
The six sigma tool plays a significant role in cost reduction	127	3.86	0.93
ISO certifications play a significant role in cost reduction	127	3.84	0.91
Total quality management plays a significant role in improving productivity	127	3.98	0.93
The six sigma tool plays a significant role in improving productivity	127	3.91	0.83
ISO certifications plays a significant role in improving productivity	127	3.9	0.94
Total quality management plays a significant role in improving lead time	127	4.08	0.86
The six sigma tool plays a significant role in improving lead time	127	3.85	0.91
ISO certifications plays a significant role in improving lead time	127	4.06	0.97
ISO certifications plays a significant role in improving lead time	127	3.86	0.93

#### 4.5 Performance of Manufacturing Firms

The study sought to establish the performance of the manufacturing firms in Kenya. The findings as shown in Table 4 revealed that majority of the respondents disagreed that their company has been committed to reduce the costs of operation in all its activities. Majority of the respondents disagreed that through focus on waiting time and reduce it significantly we have achieved better supply chain

performance. It was further established that most of the organizations did not adequately involve their suppliers in designing of the products based on the customer specifications to enhance satisfaction. The respondents further disagreed that through continued focus on process automation their respective companies were able to enhance productivity and reduce lead time.

**Table 4: Descriptive Results on Organizational Performance**

Statement	Mean	Std. Dev.
Our company has been committed to reduce the costs of operation in all its activities	2.61	1.35
Through focus on waiting time and reduce it significantly we have achieved better supply chain performance	2.46	1.35
We adequately involve our suppliers in designing of the products based on the customer specifications to enhance satisfaction	2.51	1.28
We have adopted new technologies in the supply chain systems to reduce lead time and promote effectiveness	3.21	1.27
Through continued focus on process automation we are able to enhance productivity and reduce lead time	2.18	1.29

#### 4.6 Hypotheses Testing

*H<sub>01</sub>: There is no significant relationship between relational behaviour and performance of manufacturing firms in Kenya*

The linear regression model was carried out to reveal the relationship between the two variables and the findings are as herein presented. As the model summary in Table 5 reveal, the R Square (R<sup>2</sup>) for the model was 0.193. This implies that relational behaviour influences up to 19.3% variation in the performance of manufacturing firms in Kenya. This confirms that relational behaviour has an influence on the performance of manufacturing firms in Kenya.

**Table 5: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.439 <sup>a</sup>	.193	.187	.61302

a. Predictors: (Constant), Relational Behaviour

The Analysis of Variance (ANOVA) result are as shown in Table 6. As the findings indicate, the F-Statistics for the model was 29.891 at a significant level of 0.000<0.05. This implies that there is a significant influence of relational behaviour on the performance of manufacturing firms in Kenya. Zachmann (2012) stated that when relational behaviour is well though and directed towards meeting the customer needs, it significantly influences the organizational performance by giving it a modern approach to new ways of supply chain and improving the existing products and supply chain channels.

**Table 6: Analysis of Variance (ANOVA) for Relational Behaviour**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.233	1	11.233	29.891	.000 <sup>b</sup>
	Residual	46.975	125	.376		
	Total	58.208	126			

a. Dependent Variable: Performance of Manufacturing Firms

b. Predictors: (Constant), Relational Behaviour

The regression coefficients results as shown in Table 7 revealed that the Beta (β) coefficient for relational behaviour was 0.518 which implies that a unit change in relational behaviour would lead to an increase in performance of manufacturing firms by up to 51.8%. The P-value for Relational behaviour was 0.000

which is less than the standard P-value of 0.05. This implies that there is a significant and positive relationship between relational behaviour and manufacturing firms. On this merit, we therefore reject the null hypothesis that there is no significant influence of relational behaviour on the performance of manufacturing firms in Kenya.

**Table 7: Regression Coefficients for Relational Behaviour**

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	1.515	.337		4.500	.000
	Relational Behaviour	.518	.095	.439	5.467	.000

a. Dependent Variable: Performance of Manufacturing Firms

***H02: Quality control and certification has no significant moderating effect on the relationship between relational behaviour and performance of manufacturing firms in Kenya***

The regression coefficients for the moderated model are as shown in Table 8. The revealed that the Beta coefficient for the interaction between relational behaviour and quality control and certification was - 0.029 at a significant level of 0.188. This implies that quality control and certification when interacted with relational behaviour had a negative and insignificant effect on the performance of the manufacturing firms. WE therefore fail to reject the null hypothesis that there is no significant moderating effect of quality control and certification on the relationship between relational behaviour and performance of manufacturing firms.

**Table 8: Regression Coefficients (Moderated)**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.046	.144		14.196	.000
Relational Behaviour*Moderator	-.029	.022	-.167	-1.323	.188

a. Dependent Variable: Performance of Manufacturing Firms

## CONCLUSIONS AND RECOMMENDATIONS

Based on the study findings, the study concluded that relational behaviour influences performance. Relational behaviour has significant relationship with performance of manufacturing firms in Kenya. The sub-constructs of relational behaviour that is stakeholder interactions, logistical flexibility, responsiveness to customer feedback influences performance positively. The study also concluded that quality control and certifications has no moderating influence on the relationship between relational behaviour and performance of manufacturing firms in Kenya.

The study recommended that the management of manufacturing firms in Kenya should put in place relational behaviour strategies as it leads to high performance. The firms should ensure they have stakeholder interactions, responsiveness to customer feedback and logistical flexibility in the companies. The study also recommends that future scholars and researchers should aim to test the relationship between relational behaviour and performance using different sub constructs apart from stakeholder interactions, responsiveness to customer feedback and logistical flexibility.

## Contribution of the Study to Theory and Existing Knowledge

The findings of the study can be linked to the partnership theory. In its basic nature, the partnership model depicts the buyer and supplier as partners with a common interest which is customer satisfaction. Partnership is a relationship based on mutual trust, openness, shared risks and rewards that enables an organisation gain competitive advantage leading in the company achieving a performance that's far much greater than the firm would have achieved when operating as single entities. This model requires efficient information exchange between the partners which is a critical element of any partnership.

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## Factors Determining adoption of block chain in the insurance industry: A case of Kenya.

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### Abstract

Blockchain is receiving increasing attention from academy and industry, since it is considered a breakthrough technology that could bring huge benefits to many different sectors. In 2017, Gartner positioned blockchain close to the peak of inflated expectations, acknowledging the enthusiasm for this technology. In this scenario, the risk to adopt it in the wake of enthusiasm, without objectively judging its actual added value is rather high. Insurance is one the sectors that, among others, started to carefully investigate the possibilities of blockchain. For this specific sector, however, the hype cycle shows that the technology is still in the innovation trigger phase, meaning that the spectrum of possible applications has not been fully explored yet. Insurers, as with many other companies not necessarily active only in the financial sector, are currently requested to make a hard decision, that is, whether to adopt blockchain or not, and they will only know if they were right down the years. This study seeks to establish the factors which determine successful adoption of block chain in the insurance industry. The study is descriptive in nature, with both qualitative and quantitative data. Stratified random sampling technique was used to select 16 companies out of the 52 insurance companies registered in Kenya, based on their domain of operation. The study identified several factors, which are the major determinants of the block chain adoption. They were categorized into four domains. Motivational aspect, Internal barriers, External barriers and Ecosystem barriers. Out of this research, it came out clearly that there is need for a framework on block chain adoption, putting into consideration the factors identified as the elements of the framework.

**Key words:** Block chain, Insurance industry, block chain adoption, determinants, framework.

### 1.0 Background Information.

Blockchain is a technology for a new generation of transactional applications that establishes trust, accountability and transparency while streamlining business processes (Indranil 2016). Think of it as an operating system for interactions. It has the potential to vastly reduce the cost and complexity of getting things done. It's essential for Blockchain technology to be developed following the open source model so a critical mass of organizations will coalesce around it—and reap its full benefits (McKinsey, 2016). Because of the open source rules, participants can trust that the technology will fulfill their needs and conform to industry standards—assuring interoperability between Blockchain applications. Also, by sharing the foundational layer, the participants can focus their individual efforts on industry specific applications, platforms, and hardware systems to support transactions. It's a completely novel architecture for business—a foundation for building a new generation of transactional applications that

establish trust and transparency while streamlining business processes. It has the potential to vastly reduce the cost and complexity of getting things done. Essentially, it could help bring to business processes the openness and hyper efficiency we have come to expect in the Internet Era (Indranil 2016). Transactions are grouped together into a block and the chain is multiple blocks, linked together. Blocks are numbered in ascending order, 0 is first/oldest. The number is the 'height' of the block. It only goes from newer to older block, a block only directly links to the one immediately before it.

Once the block is stored, it's read only, which is why it doesn't link to the ones after it, which would require you to update it. Blocks are created periodically, by a process called 'mining'. A block represents a set of events that have occurred over a particular time frame, usually, since the previous block. Blocks aren't identified by their height, but by their id. Block id is the 'hash' of the data in the block. A size number specify how much data is coming next. All are transactions. Metadata like version number of the block format, link to previous block that came immediately before it, the root of all the transaction in the block, Time stamp of when the block was created, etc. A block is identified by their id, the hash of the metadata. Blockchains solve specific problems, which databases cannot do yet. They are fully distributed, highly fault tolerant. It does not need centralized authority, providing 3rd party trust without trust, while reducing double spending and very low transaction costs.

In a survey carried out by deloitte in 2019, fifty percent of the respondents said that blockchain technology has become a critical priority for their organization, a 10 point increase over 2018. The countries surveyed in include Brazil, Canada, china, German, hongkong, Israel, Luxemburg, Singapore, Switzerland, United Arab Emirates, united states, United Kingdom. Germany has been using block chain technology for several years. In 2019, Germany released a national blockchain strategy, to regulate finance-related tokens which include securities, money, crypto assets, stable coins. These upcoming new rules could provide legal framework for the industries that require use of block chain technology (Sandner, 2019).

By use of blockchain in Germany, insurers have the potential to dramatically reduce operating costs by automating the manual tasks involved in requesting, exchanging and entering data in areas such as underwriting, claims and reinsurance. Automating these manual tasks on a blockchain platform will also speed processing, improve data quality, reduce fraud and provide real-time transparency into the status of transactions for all involved.

China is actively embracing blockchain, an underlying technology with a wide range of applications, and sees it as the new frontier of innovation in industries ranging from finance to manufacturing and energy. Industry experts and entrepreneurs believe that government support for blockchain will significantly drive the future development of the industry, and they say more efforts are needed to regulate the market and cultivate talent. (china daily November 2019).

In California, several companies have been drawn to, and offer flight-delay insurance, and options also currently exist for blockchain based crop insurance, weather insurance and medical insurance for gestational diabetes. Although most of these initiatives are European-based, Singapore also boasts new blockchain-based parametric insurance programs. (Laura et al, 2018). Use of block chain technology enables transactions to be conducted, recorded in sequence in the digital ledger and in 'blocks' that are then tied together into a blockchain. Since the system relies on references to other blocks that are cryptographically secure within the digital ledger, it is almost impossible to falsify. Most observers therefore believe the system to be immensely more trustworthy and transparent than traditional approaches to sharing data across a value chain or even within an enterprise.

Like other countries in the world, Kenya stands to benefit to a large extent by adopting block chain in insurance based transactions to increase transparency, reduce fraud, increase efficiency and customer confidence, thus positively affect product uptake and growth of the industry.

## **2.0 Problem Statement**

Regulation of the insurance industry has seen bankrupt companies continue to operate despite measures taken to improve the sector (Ndegea 2019). Some companies are facing a myriad of legal suits from service providers or claimants. Fraud in the sector has made the industry very unattractive to would-be entrants. As a result, people who would have brought extra knowledge and expertise in the field are shut off, condemning it to its doom. It also has a way of rising insurance premiums by up to 20 percent according to Rotich (2019). Trust in the industry is at its lowest since insurance started in Kenya in the early 20<sup>th</sup> Century. Claims are not being paid on time, service providers are not getting their invoices honored, agents are not receiving their commissions on time or at all (Rotich 2019).

Block chain technology has the capacity to minimize challenges faced by organizations in processing data. Blockchain, as a single source of truth, has the potential to increase efficiency and reduce the complexity of these processes (Valentina, 2018). It could result in disintermediation as it reduces the need of data reconciliation for insurance contracts and resolving disputes. Auditability is improved as it could provide regulators with real-time information on financial activities and fraud could be reduced by providing a full transaction history and asset provenance (Valentina, 2018).

This calls for a clear identification of all the factors which determine not only the uptake, but also the adoption of block chain technology in the insurance transactions, which has the potential of solving most of the problems listed above. This study seeks to identify such factors.

## **3.0 Research Objectives 3.1 General Objective**

The general Objective of this study was to identify the key factors which determine adoption of block chain in insurance industry in the Kenyan context.

## **3.2 Specific Objectives**

The following were the specific objectives of the study

- i. To establish the elements of block chain adoption.
- ii. To establish the challenges being encountered in adoption of block chain.
- iii. To establish the barriers in block chain adoption.
- iv. To establish the awareness of benefits of block chain technology in the insurance companies.

## **4.0 Literature Review**

Recently, blockchain and its relations with smart contracts has received increasing attention from media. According to Palychata (2016), blockchain is compared to inventions such as the steam or combustion engine, since it is potentially able to bring benefits to a variety of everyday activities and business processes.

Advantages of blockchain are various. A number of enthusiasts already proposed using this technology in various sectors and contexts, including: Government to record in a transparent way citizens' votes, or politicians' programs or to enable autonomous governance systems (Huckle 2016); Intellectual property to certify the proof of existence and authorship of a document (de la Rosa 2016); Internet to reduce censorships, by exploiting the immutability of data stored in the blockchain (Lee 2016); Finance to transfer money between parties without having to rely on banks (Treleaven, 2017);

Commerce to record goods, characteristics as well as their ownership, especially for luxury goods, thus reducing the market of counterfeit/stolen items (Kim 2016); Internet of Things (IoT) by exploiting smart contracts to automatically process data coming from sensors, in order to let intelligent machines interact with each other and autonomously take actions when specific situations occur (Hong, 2017);

Education, to store information on qualifications acquired by learners, e.g., to reduce job application frauds; in this context, multiple actors could write qualifications achieved by a person on the blockchain; human resources staff could then easily obtain information about when and where a given competency was obtained (Sharpless 2016).

Looking more specifically at application of blockchain technology in the insurance industry, a survey done by McKinsey & Company (2016) revealed Block chain's potential use cases for the insurance industry,

*“We see three ways in which blockchain can facilitate growth for insurers: improving customer engagement, enabling cost-efficient product offerings for emerging markets, and enabling the development of insurance products related to the Internet of Things. Fundamental to the potential that blockchain offers in these areas is its usage as a distributed and reliable platform for customer-controlled personal data, peer-to-peer (P2P) insurances, and smart contracts”*

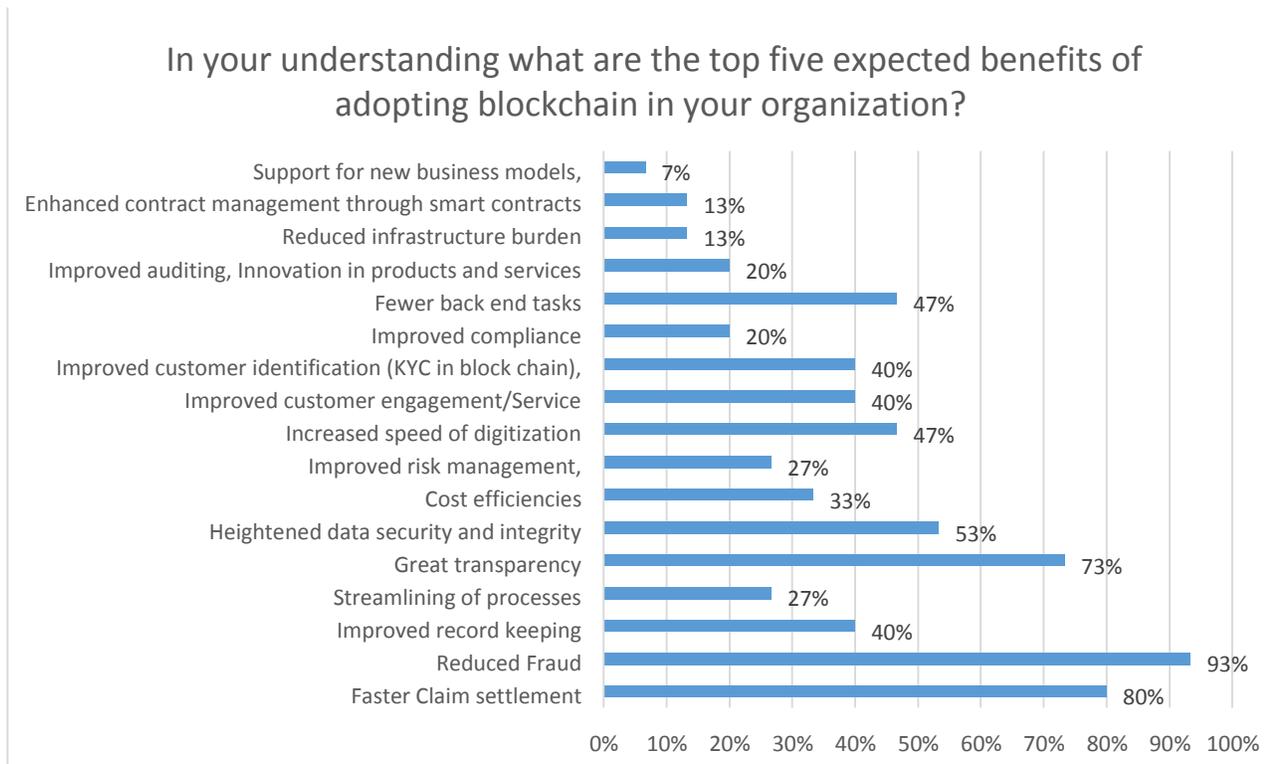
Despite of the enumerated benefits of block chain technology, there has been no specific use case in African countries to evaluate the uptake or the perception of block chain in the continent. From the available literature, there has been several reported use cases of block chain in other industries like banking, supply chain and medicine. This study therefore sought to establish the determinants of block chain adoption in the industry.

## **5.0 Research Methodology**

The study was descriptive. Stratified random sampling technique was used to select 16 companies out of the 52 insurance companies registered in Kenya, based on their domain of operation. A standard questionnaire was used to collect primary data from each of the selected insurance companies. Measures of frequency and percentages were recorded. The data was analyzed by use of computer statistical packages and data presented in tables and figures.

The questionnaire was administered to either the head of ICT/service innovation or the operations manager in each of the 16 sampled companies. The intention was to capture the technical and managerial perspectives of the block chain technology in the sampled companies.

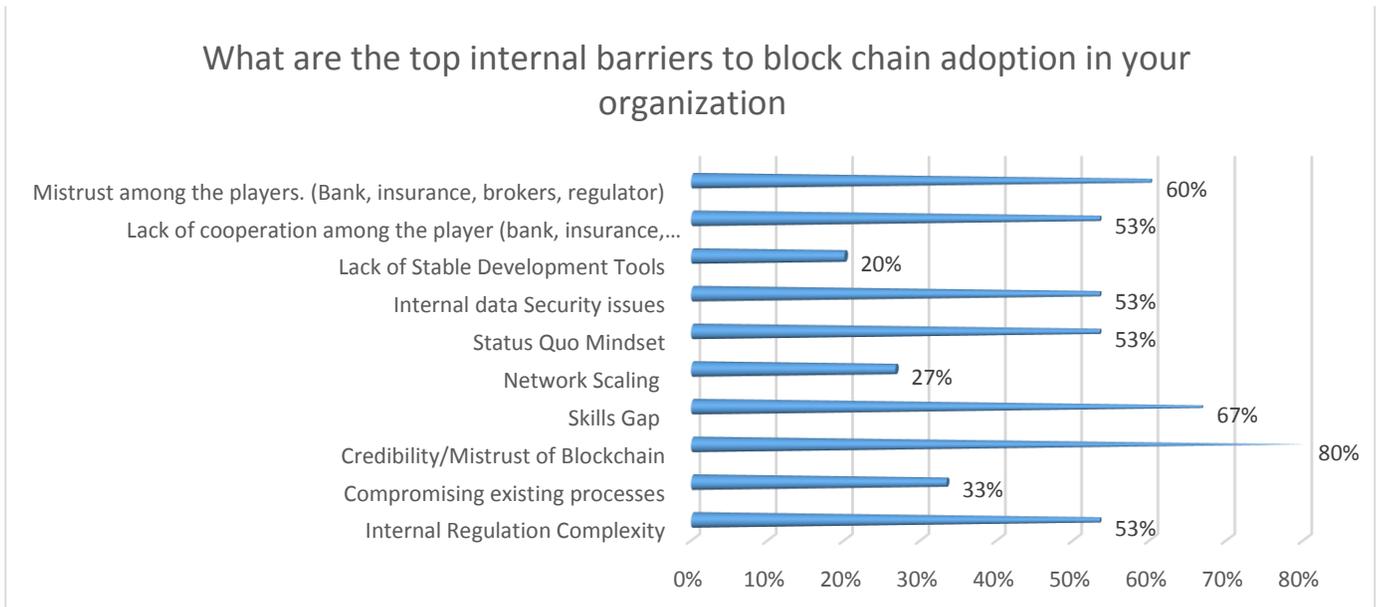
## 6.0 Data analysis



*Top six benefits of adopting block chain in business organizations.*

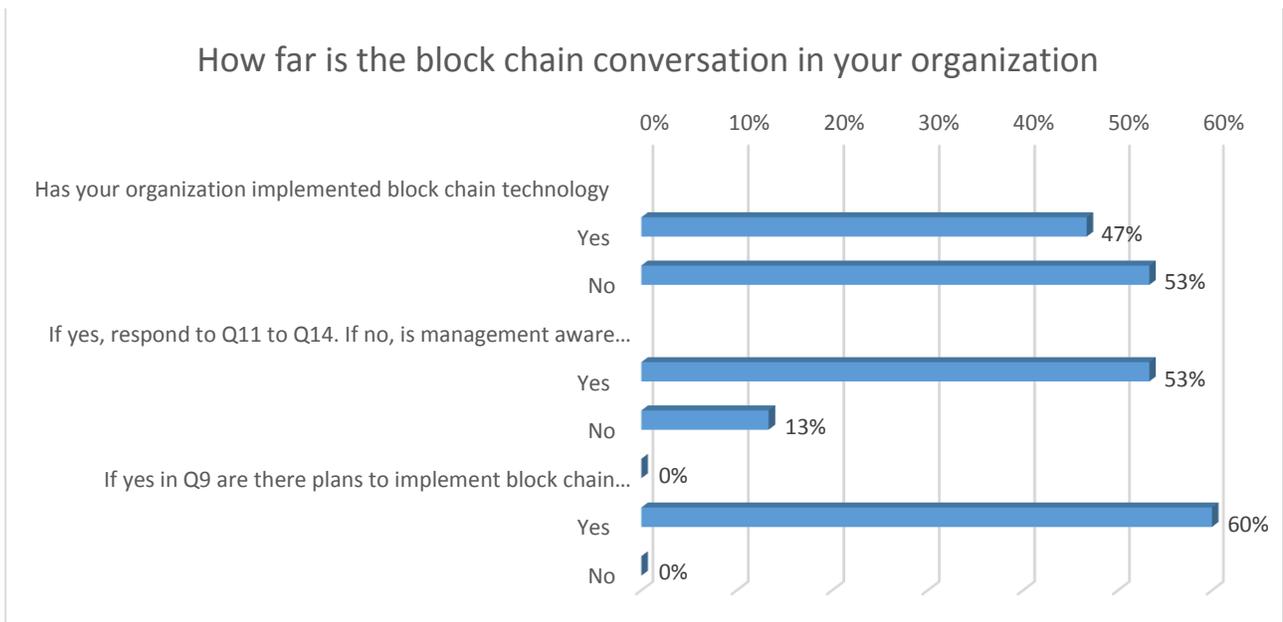
The top seven barriers to adoption of block chain in the insurance industry were identified to be:

- a) Credibility/ Mistrust of block chain 80%
- b) Skills gap 67%
- c) Mistrust among the players 60%
- d) Internal regulation complexity 53%
- e) Status quo mindset 53%
- f) Internal data security issues. 53%
- g) Lack of cooperation among the players 53%



*Top barriers to block chain adoption in insurance companies*

Out of the respondents, 47% have implemented block chain technology in one way or another while 53% have not as shown in figure 26. 60% of those organizations have plans to implement block chain

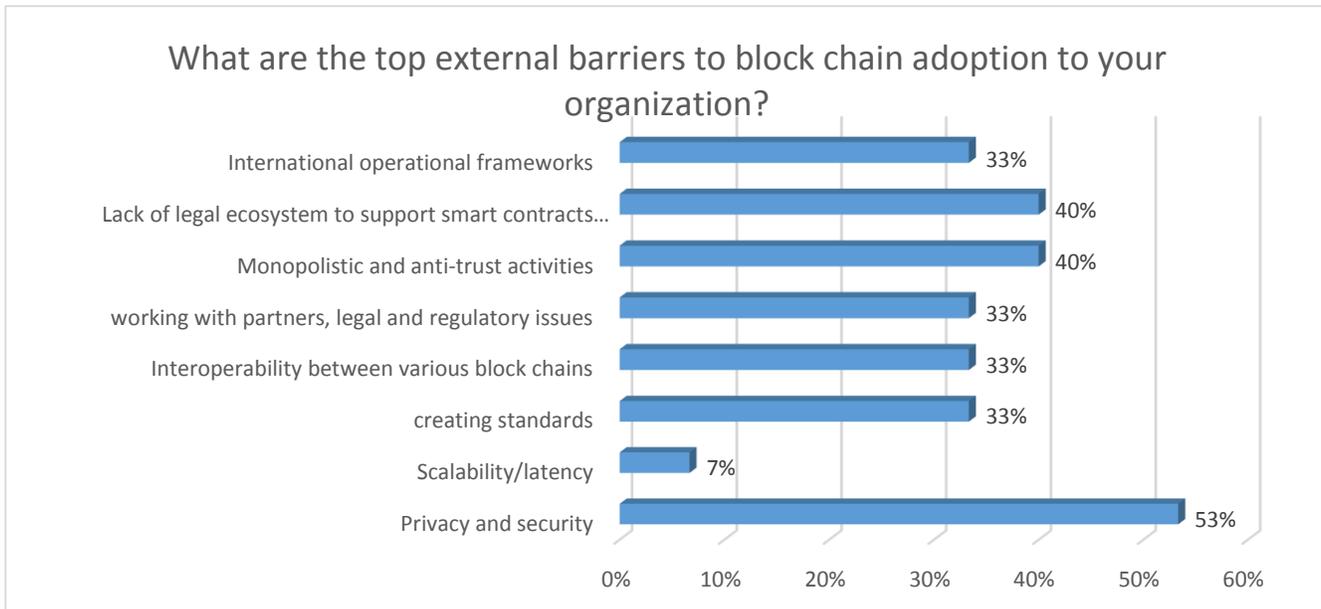


*Organizations which have implemented block chain technology*

The top three internal barrier to adoption of block chain as per the respondents are;

- a) Privacy and security concerns 53%
- b) Monopolistic and ant-trust activities 40%
- c) Lack of legal ecosystem to support smart contracts 40%

As shown below, scalability/latency is not a significant barrier to block chain adoption in insurance companies.

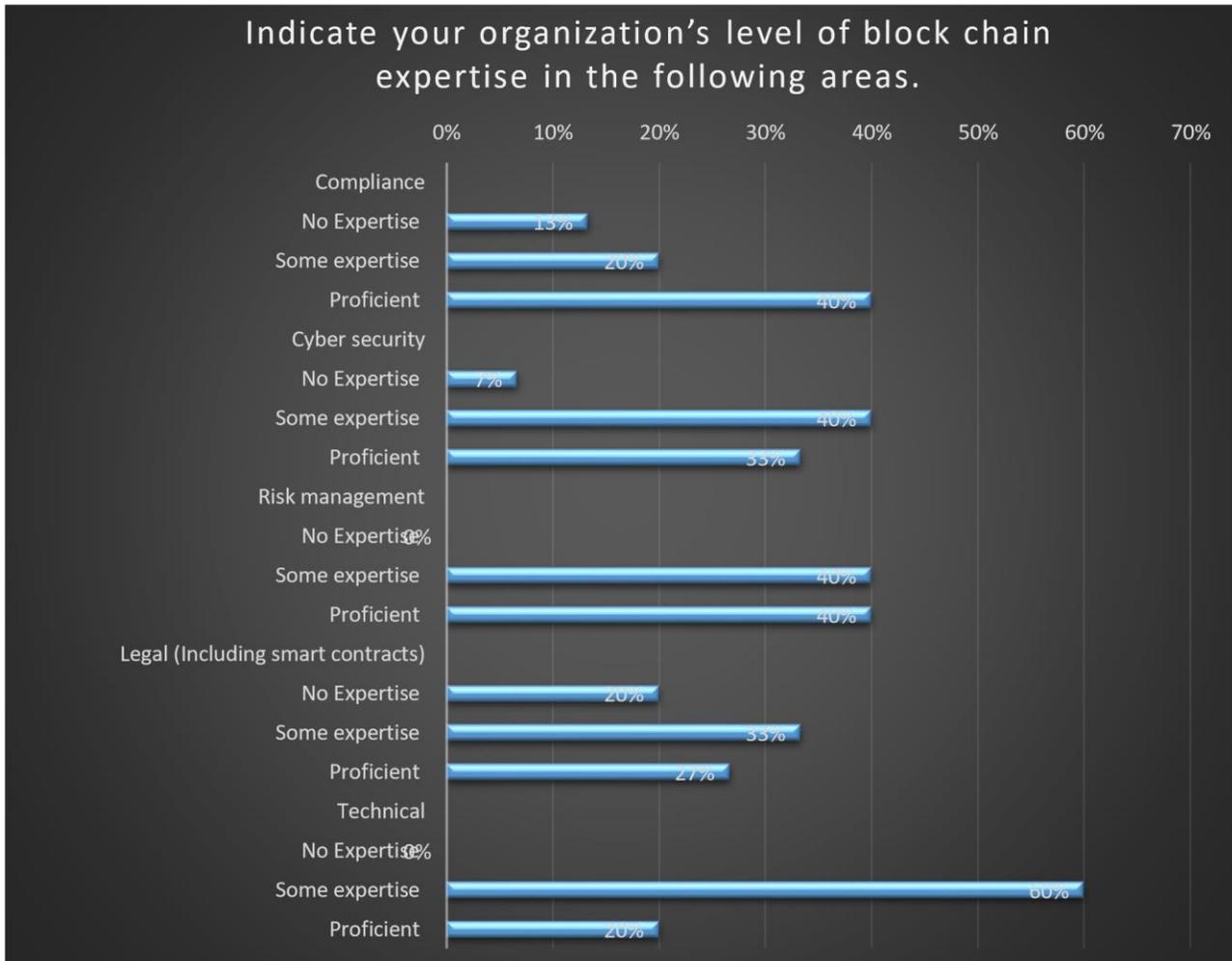


*Top external barriers to block chain adoption to insurance organizations.*

Some of the areas where expertise is lacking to support and implement block chain are a) Cyber security

b) Legal issues

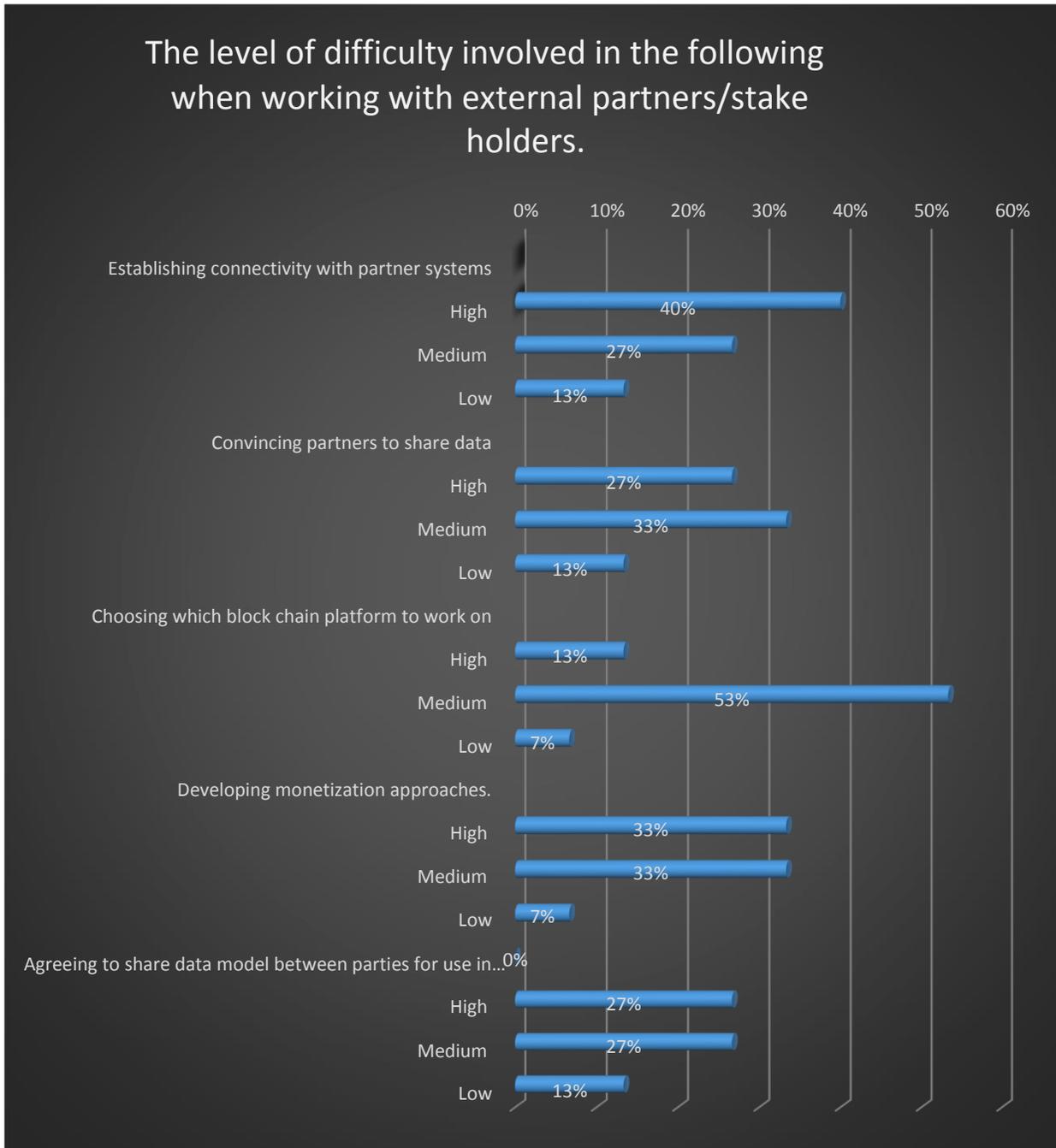
c) Technical proficiency



*Level of block chain expertise in various areas.*

The respondents, experience the following difficulties while working with external partners and stake holders. a) Establishing connectivity with partner systems

- b) Convincing partners to share data.
- c) Developing monetization approaches
- d) Agreeing to share data model between parties for use in the block chain
- e) Choosing which block chain to work on



*Difficulties experienced when working with external partner's/stake holders*

### 7.0 Findings

The study found out that ICT departments in the insurance companies are quite young, Ten year of existence. This means that most of the information has been kept in hard copies not soft copies. It was realized that the following types of products are offered by the insurance companies Social insurance, Guarantee insurance, Fire insurance, Marine insurance, Property insurance, Personal insurance and Life insurance. The most common products are fire, property, personal and life at 80%. This confirms

that insurance companies offer similar products and customers understand the importance of the products.

The study established the following benefits of using block chain technology in business performance; Faster claim settlement, reduced fraud, improved record keeping, streamlined processes and greater transparency among others. This confirms that in deed block chain has tangible benefits in the industry.

From the study, the following five benefits of using block chain technology were identified as key in improving performance of the business. Reduced fraud, faster claim settlements, great transparency, data security and integrity, increased speed of digitization, fewer back end tasks. Therefore, there are already perceived and realized benefits for using block chain.

The study established the following barriers to adoption of block chain in the insurance industry; credibility/mistrust of block chain, skills gaps, mistrust among players, internal regulations complexity, status quo mindset, internal data security issues, lack of corporation among players. This is an indicator of the elements in block chain which need to be addressed for the success of block chain adoption in the industry. The above listed barriers are a part of the determinants of block chain adoption.

The following three internal barriers to adoption of block chain were identified. Privacy and security concerns, monopolistic and anti-trust activities and lack of legal ecosystem to support smart contracts. The following external barriers to adoption of block chain technology by insurance companies were identified as follows; cyber security, legal issues and technical proficiency.

The study found out that the following difficulties were being faced by insurance companies while working with external partners and stake holders; establishing connectivity with partner systems, convincing partners to share data, developing monetary approaches, agreeing to share data model between parties for use in the block chain and choosing which block chain to work on.

## 8.0 Conclusion and recommendation

The determinants were classified into various categories, based on domains. Motivational aspect, identified as Perceived benefits which include; Reduced fraud, faster claim settlements, great transparency, data security and integrity, increased speed of digitization, fewer back end tasks.

The study established the following barriers to adoption of block chain in the insurance industry. Barriers are elements which need to be addressed for a successful adoption of block chain technology. They include; credibility/mistrust of block chain, skills gap, mistrust among players, internal regulations complexity, status quo mindset, internal data security issues, lack of corporation among players.

Internal barriers to adoption of block chain were identified as; Privacy and security concerns, monopolistic and anti-trust activities and lack of legal ecosystem to support smart contracts.

External barriers to adoption of block chain technology by insurance companies were identified as follows; cyber security, legal issues and technical proficiency.

Ecosystem barriers were also identified as n follows; establishing connectivity with partner systems, convincing partners to share data, developing monetary approaches, agreeing to share data model between parties for use in the block chain and choosing which block chain to work on.

In conclusion, the above aspects are therefore the determinants of adoption of block chain technology in the insurance industry.

Therefore, there is need for a framework on block chain adoption, which will put into consideration the factors identified in this study as the elements of the framework.

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**SUB-THEME 3: CATALYSING CHANGE FOR INCLUSION AND  
ACCESS TO EDUCATION DURING PANDEMICS**

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*Machakos University Cloud Computing Centre –Luban Workshop*

## Contribution of Education Technology to Continuation of Teaching and Learning during COVID-19 Disruption

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### Abstract

Covid-19 pandemic brought about unprecedented challenge to in person learning in secondary schools all over the world. This disruption affected between 1.2 - 1.5 billion learners. To ensure that access to secondary education continued, learning in secondary schools transitioned to e-learning. It was realized that continuing to deny learners opportunity to continue with their education would be catastrophic. It would lead to dropouts and other undesirable outputs. In this desktop study, the researchers sought to consolidate from various literature published in order to find out how education technology contributed to teaching and learning in secondary schools in developed and developing countries. Literature shows that immediately world health organization declared Covid-19 as pandemic, developed countries such as United Kingdom switched their learning systems from in person to digital. Literature also shows that during the period, there was very high demand for e-learning platforms in developing countries such as Bangladesh. Most of the developing countries did not possess a ready e-learning system to cater for majority of learners in secondary schools and therefore were not prepared for this disruption. After preparations they adopted e-learning through platforms such as radio and television. Literature highlights that during the adoption of e-learning systems in both developing and developed countries several challenges were experienced such as lack of infrastructure. The study recommended that developing countries should put in place e-learning systems in secondary schools to be used alongside in person learning so that whenever there is a challenge like what was and is being witnessed during Covid 19 disruption they can quickly switch to e-learning.

**Keywords:** *education technology, digital education, e-learning and covid-19, online learning, disruption*

### 1.0 Introduction

Emergence of Covid-19 in early 2021 contributed to massive disruption of face-to-face teaching and learning in secondary schools all over the world (UNESCO, 2020). In person learning could not go on as it was suspended to control the spread of the corona virus which was killing people in their thousands especially in countries like Italy (World Health Organization, 2020). This disruption affected between 1.2-1.5 billion learners all over the World.

Because of significance of secondary education to socio economic development of various countries, education authorities in most countries sought for a way out of the quagmire. Majority of the countries in the world have invested heavily in secondary education due to its importance and allowing teaching and learning to cease until the disease is eradicated could result in unprecedented losses. Therefore, there was need to have secondary education continue through some other reliable system (Cathy and Lalani, 2020).

There was need for a rapid education response and therefore there was a need to quickly switch to educational technology or provide remote learning, distance learning, online learning to help solve the problem brought about by COVID-19. According to Mwila and Mhagama (2020) education technology exists to help solve educational problems. COVID-19 disruption of teaching and learning was therefore a problem which educational technology could be used to solve so that teaching and learning in secondary schools could continue albeit remotely. Without some intervention the future

of these learners would be destroyed. Through education technology, teachers could continue to facilitate learning through various channels such as radio, television, social media such as face book, WhatsApp, and twitter among others. These channels would allow teachers to interact with learners who had now shifted to their homes (Starkey et. al., 2021).

Munoz-Najar (2021) explains that World Education Technology an organization working under United Nations worked with ministries of education in member countries to provide technological assistance to countries so that they could roll out virtual learning. It is not the first-time educational institutions were using educational technology to facilitate school activities. Educational technology which is defined as application of scientific processes in solving educational problems has been in existence for many years. It involves application of various media such as broadcast technology to solve education problems. At this juncture it is worthy to note that the use of educational technology in solving education problems had not been taken so passionately until this pandemic emerged. This shows that education technology can be very beneficial during normal and during crisis.

According to Zhang and Aikman (2007), information and technology which are the main enablers of education technology have been developing very quickly in recent years and have opened new directions in the area of education. The authors emphasize that education has to go with technological change to cope with the current world changes. Education has not been left behind it too has been impacted with information and communication technology.

The current study which is a desktop study seeks to find answers from literature on what role educational technology played during Covid-19 disruption. Specifically, the study seeks to find answers to questions such as how educational technology was deployed to support teachers' roles, how education technology was used to support learning and identify any challenges which were experienced. Lessons drawn from the study in form of recommendations should help educational actors to make educational technology more effective in future.

## **2. Contribution of Education Technology to Teaching and Learning**

The following section discusses ways in which education technology supported teaching and learning in secondary schools during Covid-19 pandemic. Onyango and Tangi (2020) indicate that the major role of a teacher is to facilitate learning. This is a process which is facilitated through effective communication which traditionally involves face to face interaction. Emergence of covid-19 which resulted in secondary schools being closed could not allow this face-to-face interaction to go on. So how was educational technology used to support teaching and learning during the closure of secondary schools?

There was partial and complete closure of schools, this led to the rise of e- learning. This means that schools shifted to online platform. Cathy and Lalani (2020) indicates that in countries such as South Korea, China, Singapore, USA, UK, France and Denmark secondary schools were closed immediately in March, 2020. Learning in secondary schools in these countries immediately shifted to online platform. Cathy and Lalani observe that prior to COVID-19 outbreak, most of the developed countries had invested heavily in educational technology. It is estimated that the investment in educational technology was worth \$18.66 billion by 2019.

It is further observed that during the onset of COVID-19, demand in e-learning was massive until the suppliers could not match the demand. In countries such as India, there was a huge demand for education technology. Learners requiring the platform to continue with their learning were so huge. In China about 250000 students were initially involved. In China online learning platforms such as Ten cent were extensively used to deliver learning materials to both teachers and students. In Singapore Lark, an online learning platform which is a collaborative suite began offering teachers and students

unlimited video conferencing time and auto translation. Ding talk, an online learning platform, also supported large scale learning. It tapped into Alibaba cloud technology to deploy more than 100000 new cloud servers in just a short period to support online learning in China. This was rapidly expanded within a short period to meet the demand (Munoz-Najar, 2021).

In USA secondary education is decentralized. In order to roll out online learning, the school districts formed partnerships in order to benefit from economies of scale. These partnerships were unique. In districts such as Los Angeles, various school districts came together and agreed on how they would use educational technology to continue with teaching and learning in their districts (Cathy and Lalani, 2020).

Similarly, Prestridge and Cervera (2021) explains further how technology supported teaching and learning by arguing that that through educational technology teachers were able to teach at a distance. Educational technology enabled a synchronous and asynchronous communication with classes and groups of learners. It also enabled teachers to access to learning materials and interactive collaborative materials.

This shows that education technology was able to play its role effectively by allowing students to participate in learning. It allowed teachers to engage learners in productive learning process. Education technology is supposed to connect teachers to learners if used remotely. This connection enables teachers to communicate with learners this allows interaction and hence learning. In some countries through technology learners collaborated. Learners also learnt to use digital equipment such as smart phones. They were able to use applications such as WhatsApp and Twitter to form their own study groups. This is good for their future as some of the competencies gained during this period could be used in future to establish small scale enterprises. This happened in countries such as Kazakhstan and others which deployed educational technology. In Kazakhstan, secondary school teachers were required to prepare content and disseminate it online. Media such as TV and social media solutions were used. Some countries which had partial closures used a blended program which involved face to face learning and some technology (Munoz-Najar, 2021).

It is also significant to note that during the crisis, some governments enhanced their support for teachers. In Nigeria, the government introduced coaching program for teachers. This enabled the teachers to support each other through collaborations and partnerships. In Estonia hotlines were established to support teachers who needed support. This was done through information technology foundation for education they were able to solve all problems related to use of technology in teaching (Baron et al., 2021).

Countries in Africa were also affected by COVID-19 disruption. After a call by UNESCO for African countries to ensure that learning in secondary schools was not disrupted by Covid-19 outbreak, Ministry of Education in Tanzania launched e-learning platform. This was done through media such as radio and Television. Programs were distributed to various public and private media in the country. This was done so as reach as many students as possible who were scattered all over the country. These programs were prepared by Tanzania Institute of Education (TIE). Speaking about the lessons a student in Tanzania had this to say: ` we have normal lessons from 7.45am to 2.00pm and have a break at 1.00am and 12 pm. All of this is done through online learning`. The programs involved all the subjects which are offered in secondary education curriculum. Some private schools in Tanzania developed their own programs and used the same support teaching and learning in their schools during the covid-19 disruption (UNESCO, 2020).

In Kenya, Kenya Institute of education also developed programs which were aired over radio and television. Parents were encouraged to ensure their children participated in this program especially

those students were due to sit for their final examinations. Private schools in Kenya also tapped into educational technology and used it to continue learning. This enabled the schools to complete the syllabus on time. Some of the private schools which used technology expect do well in forth coming national examinations as compared to their colleagues who never deployed this innovation (Njenga, 2020).

### **3.0 Challenges Experienced**

This section discusses challenges which were experienced. The first challenge which was experience is availability of infrastructure to support use of education technology. Schools that required computers to support the technology did not have adequate computers some even lacked a single computer to help them participate in the program. In some countries internet availability was a problem especially in rural areas and therefore learners in these areas could not fully participate in on line learning. In some areas where there was internet the signal was so weak and therefore very slow. This made it hard for teachers and students to participate. High cost of acquisition and maintenance of ICT equipment such TV screens, Ipads was a barrier that constrained adoption of education technology during COVID-19 education crisis. Another problem was lack of stable electricity in some areas during the period, irregular power supply made the situation dire (Baron et al., 2021).

Readiness was another problem. Transition from in person learning to virtual learning was a night mare in some countries. In fact, it was a shock to many teachers and learners. This was experienced in many ways for example in some countries, teachers lacked ICT skills, others could not produce content to be aired and some could not operate the equipment used due to technological illiteracy while on the other hand there was no adequate time to procure ICT devices for effective use of technology during the crisis. This made it the situation difficult for teachers and learners (Ngwacho, 2021; Njenga, 2020).

### **4.0 Conclusion**

This section presents information about the conclusion of the study. The study sought to find out from literature on how education technology contributed to teaching and learning during COVID 19- Pandemic. Literature shows that education technology contributed to continuation of teaching and learning in secondary schools as it enabled the teachers to access their secondary school students through various channels such as tv, radio among others. This enabled the teachers to engage learners through online chats, live discussions. Teachers were able to give assignments through these channels and even mark the assignments and give feedback. Demand for e learning resources increased rapidly this is good for the future of teaching and learning in secondary schools.

In some countries the crisis led to enhanced partnerships between school districts in USA in building teacher capacity this is good for the teaching profession. The crisis enabled teachers and students to learn to use ICT resources such as phones in learning this has contributed to adoption of ICT in self-learning. This has made majority of the learners to be independent and learn on their own. In a long run, it will reduce overdependence on teachers by secondary school students all over the world if it is effectively blended (Baron et al., 2021).

Availability infrastructure is a major factor which also affected the utilization of education technology during COVID 19 crisis. This is to say that with the absence of software and hardware teachers and learners could not take part effectively in online teaching and learning. The study shows that there was a digital inequality between developing and developed countries. Schools in developed countries switched immediately while those ones in developing countries could not due to numerous challenges related to infrastructure.

### **5.0 Recommendations**

Based on the conclusions, this study recommends that there is need to gradually grow infrastructure that supports education technology such as internet connectivity, electricity, acquisition of necessary hardware and software. Governments in developing countries need to acquire hard ware and software to support education technology. There is need to invest more in technology especially in improving teacher effectiveness. There is need to equip teachers with necessary skills so that they can comfortably use technology. This will enable teachers to access right materials and come up with innovative ways of engaging learners during the use of educational technology, for example, during live discussions. There is need for countries to join initiatives such as technology for teaching this will benefit their teachers. COVID-19 crisis in education called for full adoption of education technology in secondary schools, this could not work effectively due to some of the challenges mentioned above. Most of the programs were more centralized; Tanzania and Kenya are good examples. The radio and TV programs aired by some local radio and TV channels followed a certain schedule. Teachers and learners had to learn how to divide their time. There is need to decentralize these programs so that flexibility can be achieved. There is need to adopt blended teaching and learning where face to face teaching is used alongside technology and this would prepare schools for other crises such as COVID -19. There is need for researchers in educational technology to come up with systems which will incorporate instructional design principles and principles of teaching such as respect for diverse talents rather than treating learners uniformly.

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## Covid-19 Pandemic and Implementation of World Bank Supported Education Initiatives in East Africa

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### Abstract

In early 2020, COVID-19 was confirmed as a global pandemic by World Health Organization. Countries rushed to introduce lockdown and quarantine measures so as to minimise infections and deaths. Secondary schools were equally closed; affecting about 1.5 billion secondary school students globally. East African countries similarly followed this trajectory. This was done in the midst of the ongoing implementation of various World Bank initiatives- aimed at keeping and retaining vulnerable students in secondary schools; providing pathways to girls' secondary school education – especially those who had dropped out due to early pregnancy and marriage. Cursory studies had earlier indicated that school closure, necessitated by COVID-19, greatly affected the implementation of this initiative in East African countries of Tanzania, Kenya and Uganda. This study- based on literature review, examined how World Bank initiatives in these countries was impacted by COVID-19 pandemic. The synthesis of the findings showed that the closure of schools in these countries, together with other socio-economic disruption brought about by COVID-19 had a devastating effect on the World Bank initiatives. It was also reviewed that the pandemic has had a knock-on effect on the girl child; Girls were exposed more to some of the social cultural challenges they had escaped from such as Female Genital Mutilation and Early Marriages. Either too, policy makers were worried that this devastation clawed back on the gains that the region had made in as far as improving retention and completion rates in secondary education is concerned. On the basis of these revelations, this study recommends that World Bank group should carry out a needs assessment to better understand how the initiatives carried out in secondary schools were disrupted and thereafter come up with socially accepted strategies of implementing its initiative in these countries.

**Key words:** *COVID-19 Pandemic, Implementation, World Bank, Education Initiatives*

### Introduction

According to scholarly evidence, COVID-19 pandemic started in the Chinese city of Wuhan, Hubei province. The first credible reports indicating the number of the affected people was revealed in December, 2019 (WHO, 2020a). From that time- henceforth, this pandemic has been spreading all over the world at an alarming rate- leading to a global closure of various social and economic sectors. Either too, educational institutions were closed in order to arrest this situation. Statistics show that more than one hundred and ninety (190) countries worldwide closed school and colleges (UNESCO, 2020a). This move did not leave out institutions of learning in Africa, and East Africa in particular, which equally suffered from this pandemic.

Scholarly writings show the divesting nature of COVID-19 pandemic to the education sectors. For example, the study done by “*A save the children survey*” indicates that 8 out of 10 students in 37 surveyed countries showed that they have learned very little or not at all since the closure of schools to the time when they were re-opened. Furthermore, it was reported that almost three quarters of the world's students were unable to access distance teaching (Witter, 2021 & Jaramillo, 2020). Moreover, girls were reported to have been greatly impacted by this closure. This is because women and girls are always vulnerable to any unfolding in any unpredictable social underpinnings.

Furthermore, empirical literature shows that the educational impact that girls faced, during and after COVID-19 school closures is greater -as compared to the boys. Particularly, girls from marginalized families across the globe were and are still greatly affected (Jaramillo, 2020). This was reported as drawback to the many achievements attained in equity and equality measures of school enrolments and attainments. For example, prior to the COVID-19 pandemic, the global rate of enrolment for girls in basic education had greatly increased. This increase reduced the gender gap in access to education. However, COVID-19 pandemic- which resulted into the closure of schools, backtracked these achievements and thus has put all progress at risk (Witter, 2021). Equally, other pandemics like Ebola have the same effect on educational practices and process. For example, in 2014 to 2015, over 10,000 schools closed in Guinea, Sierra Leone, and Liberia during Ebola outbreak. During this crisis, girls were severely impacted. For example, girls in Guinea had a completion rate of basic education of 0.9% while that for boys was 2.7%; and in Sierra Leone, girls' completion rate was 1.8% against 4.0% for boys (Witter, 2021).

Malala Fund's report revealed that the closure of schools because of COVID-19 pandemic had long effects for girls. It was estimated that more than 20 million secondary school-aged girls could drop out after the pandemic has passed. Malala Fund's report uses insight from the Ebola epidemic of 2014-2015 in understanding the short and long-term effects of COVID-19 for girls. Following the Ebola epidemic and school closures in Sierra Leone, Guinea and Liberia, enrolment rates for girls dropped because of household responsibilities, child labour and teenage pregnancy (Malala, 2020).

In East Africa, the closure of institutions of learning such as schools is said to have interrupted educational initiatives supported by various donors- including the World Bank. For example, World Bank had initiated several intervention measures to enhance learners' achievement in secondary schools in East African countries of Tanzania, Kenya and Uganda before the onset of COVID-19. When COVID-19 was declared as a pandemic by World Health Organization, most countries in the region rushed to declare lockdown and quarantines so as to minimise infections and deaths. Secondary schools were quickly closed (WHO, 2020a). These schools were in the process of implementing various World Bank initiatives on such as Secondary Schools' Improvement Project whose aim was to retain vulnerable students in secondary schools; provide path way to secondary school education for girls who had dropped out from school due to early pregnancy and other social cultural issues. However, due to disruption brought about by COVID-19, cursory studies indicated that vulnerable learners, especially girls, in secondary level of education were directly affected; Lack of school attendance exposed them to some social cultural challenges they had escaped from such as Female Genital Mutilation and Early Marriages. This paper reviews how COVID-19 Pandemic affected the implementation of World Bank supported education initiatives in East Africa countries (WHO, 2020a). The review is based on three countries, Tanzania, Kenya, and Uganda. Based on the analysis, conclusion and recommendation for policy and practice are given.

### **Impact of COVID-19 Pandemic on World Bank' Educational Initiatives for Girls in East African countries**

The available literature shows the impact of COVID-19 on social-economic activities in Tanzania, Kenya, and Uganda. Most particularly, the educational process and practices was greatly affected; Students and learners in the region were /are being impacted by school closures and the experience of COVID-19. Particularly, girls and other vulnerable people are facing heightened challenges and disruptions in accessing quality education and opportunities for a hopeful future. Lack of access to internet, technology, and stable electricity are just some of the challenges that this group of learners are facing in the region.

According to the 2020 Global Education Monitoring Report, responses to the COVID-19 crisis have not paid enough attention to inclusion of all learners, with only 40% of low-income countries supporting learners at risk of exclusion, including those with disabilities. The United Nations International Children's Emergency Fund (UNICEF), estimates that 20 percent of girls enrolled in secondary school in the region are at significant risk of dropping out for good, while the World Report on Education estimated that half of all secondary school girls will not return when classrooms reopen to full operation.

In Tanzania, the first COVID-19 infection was reported on 16<sup>th</sup> March, 2020, and on 17<sup>th</sup> March, 2020 the government announced the closure of all schools and colleges for unknown time (WHO, 2020b). This closure, though done in good faith, is reported to have impacted many educational activities- including the World Bank' Secondary Education Quality Improvement Program (SEQUIP). Most particularly, this programme was aimed at making secondary education for girls to be better, safer, and more accessible. The SEQUIP introduced three measures: (i) encouraging awareness to the community on the risks for girls, (ii) reducing the risks of gender-based violence on the way to school and (iii) supporting girl students who become pregnant to be recognized and have right to Alternative Education Pathways (AEPs) - for them to obtain ordinary secondary school certificate and continue with advanced secondary education (The World Bank, 2019). Statistics show that out of the 60,000 secondary school students who drop out 5,500 leave due to pregnancy. The WB programme advocates for pregnant girls to be readmitted in the educational cycle after giving birth if they wish through Alternative Education Pathways. The AEP provided alternative education to the girls who drop out ordinary secondary school to accomplish the secondary education cycle (United Nations, 2020).

However, the plan has been impacted by the COVID-19 pandemic. During this period, school girls were subjected to social-cultural practices like female genital mutilation and child marriage and early pregnancy which have a greater impact on school attendance and enrolment (Milišić, 2020). School closures also made girls in the region at risk of getting married and early pregnant which reduced their likelihood of continuing with their education by the time schools were reopened (UNESCO, 2020b). Moreover, girls with disabilities faced barriers due to the absence of supportive equipments that would allow them to follow online sessions; online learning for students with disabilities required some accessibility features, such as audio narration, sign language video to the deaf students, and simplified text. As argued by Jaramillo, (2020), students from poor families are at an advantageous side when it comes to using new innovations in the teaching and learning process. This scenario was also evident in other East African countries.

In Kenya, learning institutions including secondary schools were abruptly closed on March 15, 2020 (Njenga, 2020). The closure of schools interrupted the implementation of secondary education improvement project supported by the World Bank. The project started in 2018 and it is expected to end in 2023. This project aimed at reducing the challenge of shortage of teachers and improving retention. These distractions have an effect on the service planned to learners, teachers, learning institutions and other educational stakeholders (MoE, 2020). Through this initiative the Government of Kenya has provided remote teaching support using the internet and television and has encouraged academic institutions to adapt teaching material to create a more accessible online learning environment (Ngwacho, 2020). This plan targets both vulnerable students and teachers and aims to capitalize on existing radio infrastructure to enhance the possibility of community-based learning (Global Partnership, 2020).

According to scholarly writings in the country, the COVID-19 pandemic in Kenya has disrupted learning for more than 18 million learners- a situation which is said to be affecting and/or threatening the achievement of sustainable development goal No.4 on access to quality, equitable and inclusive education. Moreover, the school closures are also reported to be obstructing Kenya's Vision 2030

National Development Goals which is aimed at achieving quality education for all (Ngwacho, 2020). Additionally, the school closure also affected students from low-income families, especially girls and other vulnerable students. Students had to stay a whole day at home, some of the girls claimed were harassed by their parents and guardians. Also, they missed distance learning lessons because they were given household chores and childcare responsibilities. Odhiambo, (2020) asserts that school closures harmed girls across the world; Girls faced barriers to accomplish their studies, because schools protected girls from being abused.

Educational strategies used in Kenya during school closure, was also applied in Sierra Leone during the Ebola epidemic. The government announced the use of distance learning during school closure, but these side-lined students in rural areas who did not have access to radio/ television and other ICT facilities like internet (Jaramillo, 2020). This group was/is at greater risk of social exclusion compared to boys (Odhiambo, 2020). The closure of schools exposed them to the risk of sexual violence, female genital mutilation, pregnancies and early marriages, and extra restrictions from social expectations such as household responsibilities (UNESCO, 2020b & Jelimo, 2020).

In Uganda, the government announced closure of 51,000 schools from March 20, 2020 to mitigate the spread of COVID-19 (Tumwesige, 2020). The closure affected 15 million students in different levels of education including secondary schools. The WB has been supporting \$ 150 million for Ugandan Secondary Education Expansion Project (USEEP) which aimed at constructing 116 lower secondary day schools and additional classrooms in 61 secondary schools (Kulubya, 2020). The USEEP also aimed at equipping safe and conducive learning environments which is supportive to personal growth and increases retention for both girls and boys. It also includes special measures to reduce the occurrence of early pregnancies to girls and to assist young mothers to re-join lower secondary education (Kulubya, 2020). Schools protect girls from domestic violence, sexual abuse and exploitative work (Tumwesige, 2020).

### **Conclusion**

The distress of the COVID-19 pandemic on education has been unparalleled. It has pushed the attainment of international education goals and largely affected those aimed at aiding girl's education. From the findings, this paper concludes that, the COVID-19 pandemic had a lot of impact on implementing the WB supported educational initiatives in East African countries. The distance approach which was offered did not engage them fully as it could be done on face-to-face teaching. This approach caused girls to engage and to be forced to early marriages, child pregnancies and to be responsible for household activities which caused them to abandon studies all together. The pandemic had a devastating effect on the practice and process of education as it clawed back on the gains that region had made such as improving retention and completion rates, all aimed at addressing equity and equality measures. It is now the responsibility of governments and the cooperating partners such as the World Bank cooperate in setting up new principles of ensuring that all students especially girls, who have dropped out schooling during the COVID-19 school closure re-gain their future education dreams. Educational officials and stakeholders should also continue finding tangible ways of meeting this goal-taking into consideration the “new norm” created by the COVID-19 pandemic.

### **Recommendations**

The study recommended that there is a need for the World Bank to evaluate their initiatives and to find out how COVID-19 affected their programs. The evaluation report will help in finding possible strategies of implementing the educational interventions in East African countries during school re-open. Since it is evidenced that girls are the most affected by school closure, there is an opportunity to set up a learning structure that could create a room for girls to accomplish their studies. Moreover, through societal dialogue, the World Bank should apply functionalism theory of education strategy in

making sure that the introduced initiatives for secondary school girls are implemented and attained their educational goals as planned. This will make girls to become a functioning part of the society.

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## Use of Animation in Simplifying the Learning of Abstract Concepts of History and Government in Secondary Schools in Kenya

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### Abstract

Students' diverse learning abilities render the need to develop various learning materials for effective learning. Existing literature has shown the increasing use of real-life and documentary videos and teaching aids to complement classroom teaching. While there are studies on effectiveness of documentary videos in existing literature, relatively little is reported on use of animation videos in teaching History and Government in comparison to traditional written text in terms of their impact on learning outcomes in secondary schools in Kenya. In response to this, this study sought to examine the role of animation in simplifying the teaching of abstract concepts of History and Government in Secondary Schools in Kenya and the impact that animation has had on comprehension and learner retention of war-related concepts. The study adopted a qualitative research model that relied on document analysis, observation and oral interviews to collect data. A sample of 179 History and Government learners was engaged and divided into two groups. One group was exposed to animated videos based on content taught in three subtopics while the other did not watch these videos. Thereafter, a written and oral examination was administered to both groups. The group that had watched animated content performed better than the latter. The second group later watched animated content and was examined. Its performance became better than the first group. These results imply that that animated video can effectively complement text materials. It is recommended that the KICD in collaboration with the TSC should further improve existing learning materials by developing animated content based on the Kenyan syllabus and make the content freely available online.

**Key words:** *animation, learning, comprehend, abstract, recall, secondary school, history*

### Introduction

History and Government is an important discipline because it plays a key role in the development of society. Knowledge of the past is critical to the understanding of the present and to planning for the future. It is through the study of the subject that the youth of a nation acquire knowledge about the past and the present so as to develop positive attitudes about the future. Thus, learners are able to recognize the relationship between the events of today and the world of tomorrow.

The Kenyan secondary school History syllabus addresses key themes such as the social, economic and political organizations of African societies during the colonial period, European colonization, world wars, the rise of African nationalism, developments in trade, transport and communication, industry, agriculture and urbanization. It also covers the issues of morality, responsible citizenship, good governance, national integration, conflict resolution and international cooperation.

While some of the concepts taught in the secondary school history syllabus in Kenya are easy for the learner to comprehend, others are abstract. These are mainly themes in world history which learners have not had encountered before, chief among these are; the first and second world war and the cold war (KNEC report, 2016). Failure of learners to comprehend the content in these two topics hinder achievement of the eighth and ninth objectives of the history syllabus, which are; to promote an understanding and appreciation of intra-national and international consciousness and relationships and; derive through the study of History and Government an interest in further learning.

Traditional methods of teaching the aforementioned topics have been used but failure in internal and external examinations has been reported by teachers of history. Textbooks and charts have not brought the reality of war and while documentaries have tried to capture the war as it was, some are too detailed and very lengthy for use in class. This created the need to apply other effective methods of teaching content on war especially those that would elicit learner interest and stir the desire for further learning. This gap was filled by the use of animation in teaching content on war.

With the advancement in educational technology, the delivery of still images has evolved into animation. Animations can be used as a delivery media where learning can be conducted as occurring through technology and assisted through technology (Goldsworthy, 1999). Animation refers to computerized simulation of processes using images to form a synthetic motion picture. In the context of learning, Cooper, (1998) points out that the use of the pictorial form of communication leads humans to improved comprehension and retention. Animation appeals to the power of the human visual system (Rieber, 1990). Animation assists learners to visualize a dynamic process, which, otherwise may be difficult to visualize. Animation might thereby reduce the cognitive load (Rieber, 1990). According to CGPundit (2018) the first purpose of animation in academics is to fulfil a cognitive function. In this role, animations are intended to support students' cognitive processes that ultimately result in them understanding the subject matter. Animation can be used to make very exciting and fun animations into which education and training can easily be incorporated. CGPundit (2018) further argues that instructors can also use animation to demonstrate things and concepts visually exactly how they want to since they have control of every aspect of the animation. It can be used to show how things come together and work together. In science for example, the computer animation might be used to show how our solar system works, and in math, a computer animation might show a student how one can algebraically manipulate specific equation. Other subjects such as English, foreign language, music, and art can also be thought by using animation.

Secondly, as an affective learning tool that attracts attention, engages the learner, and sustains motivation aspect. Young people are fascinated by animation and animated stories and they enjoy the opportunity to create their own. The creative potential of animation is enormous, and integrating animation activities into the school curriculum offers the possibility of tapping this potential to meet a range of educational objectives.

According to Bai, H. (2018), the use of technology in education also affects learning and teaching environments. It has been suggested by Szabo, M. & Poohkay, B. (1996) that with the use of animation in education, there is a significant increase in the attitudes and academic achievements of the students in a positive way. Betrancourt, M. & Tversky, B. (2000) further add that it has been shown that animations as technological tools used in education have contributed a lot to the students in terms of security, speeding and slowing time, examining very rare events, simplifying complicated systems, being useful and cheap and motivation as well as providing a significant increase in students' attitudes and academic achievements towards the courses in positive manner.

It is in the background of poor comprehension of war-related concepts among history learners in secondary schools in Kenya that that this study sought to examine the role of animation in simplifying the teaching of abstract concepts of History and Government in Secondary Schools in Kenya and the impact that animation has had on comprehension and learner retention of war-related concepts.

### **Theoretical Framework**

Animation is situated as a tool in aid of visualization and the development of mental models. In this perspective, the use of animations in facilitating learning is informed by learning theories: Behaviorism, Cognitivism, and Situated Learning (Gregorius, 2010). The main design guidelines for use of

animations in learning according to Meyer (2005) are grounded in the cognitive theory of multimedia learning (CTML). To the authors' knowledge, there are no other comprehensive theories of multimedia design. Despite the rapid changes in the instructional technology adopted in medical education, CTML is a useful framework because it has extensive empirical support and builds on other established theories, such as dual coding theory (Paivio, 1986) and cognitive load theory, (Sweller, 1998) to help explain and predict a variety of learning outcomes. According to dual coding theory, images and words are processed in separate, limited capacity channels of working memory before becoming integrated into a single, coherent mental model, which is an organised conceptual framework of the subject matter at hand (Meyer, 2005 and Paivio, 1986). Verbal and pictorial components provide unique contributions to mental model formation: words contribute theory-based information, such as explanations of complex relations, and images contribute similarity-based information, such as exemplars or other basic visual representations. (Bartholome' & Bromme, 2009) The generative process of combining these theory-based and similarity-based elements to construct a detailed mental model helps learners solve related problems and anticipate future events in that context (Martindale, 1993 & Park O and Gittelman, 1995). Thus, animations that use words and images appropriately are potentially ideal tools for aiding student learning. Also linked to CTML, cognitive load theory incorporates learners' cognitive capacity for forming mental models into the designing of instructional materials, such as animations (Sweller, 1998 & 2005). Lowe (1995) adds that an effective animation contains sequences of motion frames and presents the essential attributes of a concept in a manner that facilitates learning. According to Sweller (2005) animations that accomplish this goal are designed with the learner's cognitive capacity in mind and aim to optimise the balance among three types of cognitive demand: essential processing; extraneous processing, and generative processing.

This thought is also supported by Meyer (2010.) Each type of processing imposes a different type of load for the learner, and each needs to be addressed in a specific manner to facilitate learning. Essential processing, which imposes intrinsic load, is the cognitive processing inherently required by the nature of the task to mentally represent the lesson content. Extraneous processing, which imposes extraneous load, involves inefficient mental activities in which learners engage when faced with irrelevant or ineffective learning situations (e.g., distracting sound effects and images that are separated from their verbal descriptions). Generative processing, which imposes germane load, occurs when the learner creates a coherent mental model of the subject at hand. Meyer (2010) adds that this type of processing, although effortful, is necessary for the learner to understand the topic as well as the overall learning domain. The instructional design of animations should attempt to manage essential processing, minimise extraneous processing and facilitate generative processing.

### **Literature Review**

There are several instructional opportunities that can be explored with the change in the representation form from static graphics to graphical computer simulations. Animation is one of those components (Rieber, 1990). In several studies involving scientific subject areas, Mayer (2001) has pointed to the importance of animation. Animation facilitates descriptive and procedural learning (Rieber, 1990; Lih-Juan ChanLin, 2000; Mayer, 2001). Animation is an important component in designing interactive multimedia which creates a visual interest and makes scientific learning more appealing and enjoyable for learners (Lih-Juan ChanLin, 2000). Furthermore, animation is one such component which can be part of computer-based instruction and which cannot be combined with any other media (Rieber, 1990).

Animation adds two unique components as compared to the static graphic – motion and trajectory (Klien, 1987). Animated visuals explain the visual and spatial information when these two components are used effectively. The pace of animations, when controlled by the learners, allows the users to view the motion and replay as many times as desired. This series of actions allows students to explore the

different strings of actions (Klein, 1985). Through computer-based instruction, a student constantly creates, manipulates, and interacts within a dynamic conversation of his own creation. S/he constructs mental models (Klein, 1985). Other information delivery media have important similarities and distinctions that may make a difference for the learner. Animations are created symbols which differentiate the real-life events but create an opportunity for the learner to interact and move from being a passive information receiver to an active interactor (Klein, 1985) Animation and simulation features have been used in engineering (Wozny, 1978), physics (Disessa, 1982) and mathematics (Hooper, 1982; Wegman, 1974). These have made effective contribution to instruction by conveying the information through the help of its interactivity and special effects (Hellet, 1999). There are many variables which can affect learning with the aid of animations. Practice and rehearsal is one of them (Bruning, Schraw & Ronning, 1998). “Wyzt’s Playground,” a multimedia tool, was created for animation research in fourth grade mathematics. This tool emulates and simulates the real-life scenario of building a playground, and creates an environment that engages the students in active learning (Johnson & Neil-Jones, 1999). This study used interactive videodiscs to discover the nature and proportion of the different learning activities exhibited by group 12–13-year-old student to ascertain that the repeated use of disc improved their problem solving 16 skills. The study found that well designed applications could enhance learning (Blissett & Atkins, 1993). Reports by Hamel & Ryan-Jones (1997) reviewed the use of state of the art graphic and animation for instructional material, and pointed out that animation uses interactive graphics, with hints on viewing strategies and presents procedures that enhance visual learning.

### **Methodology**

The study employed a qualitative research model that relied on document analysis, observation and oral interviews to collect data. The study engaged 179 History and Government learners at Karoti Girls High School and was carried out between May and July 2019. The learners were divided in two groups; the first one with 41 learners in one class while the second group had 138 learners in three classes. Both groups were taught three war-related subtopics; the first world war, the second world war and the cold war during the normal classroom lessons. However, upon completion of the subtopics, the first group (of 41 learners) was exposed to animation videos whose content was based on the core ideas of the aforementioned subtopics while the second group did not watch the animated content.

Two days later, both groups were subjected to a Continuous Assessment Test (CAT) of 50 marks whose test items were based on the three subtopics taught. A day after the CAT was administered, learners from both groups were randomly picked and asked questions that tested their comprehension and ability to recall and explain content from the three sub-topics taught to their fellow learners in class. The teacher recorded the observations noted as different learners explained content asked to the class as required by the teacher. The CATs were marked and results analysed. The second group then watched animations of the content taught and was given a second CAT. Learners were also asked questions orally from the three subtopics.

### **Results**

Results of the CAT revealed that on the one hand, 68% of the learners in the first group (that had watched animations of content taught) scored above 50% and more than half of them were able to coherently respond to questions asked orally in class by the teacher on the content taught. On the other hand, only 53% of the learners in the second group scored above 50% in the CAT and only a third were able to respond coherently to questions asked orally without requiring the assistance of the teacher. Results of the second CAT that was administered to the second group revealed that 69% of the learners scored above 50% while more than half of them were able to coherently respond to questions asked orally in class.

### Conclusion

Results of the study can be interpreted to mean that watching animated videos of the content taught in the first world war, second world war and the cold war improved learners' ability to comprehend and recall. This is in line with the suggestion by Szabo & Poohkay (1996) that with the use of animation in education, there is a significant increase in the attitudes and academic achievements of the students in a positive way. The use of visual elements combined with sound complemented the explanations given in class by the teacher and this explains the different scores of the two groups in the CAT and oral tasks given. These results are therefore proof that animation appeals to the power of the human visual system (Rieber, 1990) and that animation assists learners to visualize a dynamic process, which, otherwise may be difficult to visualize.

### Recommendation

In order to ease understanding of abstract content not just in History and Government but in other subjects too, the Teachers Service Commission should liaise with the Kenya Institute of Curriculum Development to create animated content. This is because part of the animated content available online may not be relevant in the Kenyan curriculum and the teacher therefore has to spend a lot of time customizing it for his learners. Further, this content should be made freely available on the KICD or TSC website so that teachers and learners can download it when it is needed because currently, all videos produced by the KICD are only available at a cost. Accessibility of animated content will improve learner competency and improve teacher preparedness for effective curriculum implementation.

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## Challenges University Students face in eLearning as a result of the covid19 pandemic

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### Abstract

The emergence of Covid-19 pandemic in early 2020 has had adverse effects all over the world, not just health wise, but in agriculture, transport and even education. The partial and total lockdown in many counties across the world has brought many economies to near stagnation. In Kenya, like in many countries the world over, all learning institutions were shut down as a precautionary measure to curb the spread of covid19. eLearning was introduced in most universities to sustain the education sector and ensure that learners go on with their studies in a safe environment. The aim of the current research was to investigate the challenges university students face in eLearning as a result of the covid19 pandemic with a focus of highlighting the hindrances towards adoption of the same within the universities. The study used a qualitative research design. Purposive sampling was used to get students involved in eLearning in five universities across the country. The data collected was analyzed using thematic and narrative analyses. Applied research was carried out during this study so as to highlight the challenges university students face in eLearning around the world and recommend the best practices for adoption of the same in learning institutions.

**Key Words:** *Covid-19, Pandemic, eLearning, challenges*

### 1. INTRODUCTION

The nature of life causes emerging challenges to in the world. Fighting in quite a number of places which leads to lack of peace and displacement of populations due to war and conflict, climate change, poverty and disease are some of the issues that world populations grapple with in their day to day lives. Since March 2020 to date, the whole world has been dealing with the abrupt emergence of Corona virus disease, Covid-19. Coronavirus disease -2019 (COVID-19) is an illness caused by a novel corona virus (<https://www.medscape.com/answers/2500114-197401/what-is-covid-19>). COVID-19 was first identified amid an outbreak of respiratory illness in Wuhan City, Hubei Province, China. The WHO declared the COVID-19 outbreak a global health emergency on March 11, 2020, and later a global pandemic. According to Robinson (2020), a **pandemic** is a disease outbreak that spreads across countries or continents. It affects more people and takes more lives than an epidemic. The declaration by the WHO in March of 2020 brought abrupt changes to many spheres of life all over the world. In the education sector, there came an abrupt closure of institutions of learning in many countries all over the world, Kenya included, in order to curb the spread of Covid-19. After eight months of closure, the Government of Kenya (GoK) began a phased opening of institutions of learning which were required to adopt a blended mode of teaching/learning. This meant that teaching would be done online as well as face to face. The adoption of online classes brought with it a new mode of delivery in teaching and learning.

In Kenyan universities online learning/teaching was introduced and the government, through the Ministry of Education and software companies came up with several e-learning platforms. Most universities sought to use of a Learning Management System (LMS), a software application that is used to plan, manage, and deliver eLearning content. It is used widely in the eLearning industry and acts as a distribution vehicle of course content or training resources for different learning and development programs. Platforms such as Kennet, Kusoma, Musomi, Google meet and Zoom have also been embraced by various universities to ensure that learning is not disrupted indefinitely and that it takes place in a

safe environment. This meant that lecturers and students had to adopt to a new way of giving and receiving knowledge.

## **2. JUSTIFICATION**

The spread of COVID-19 has forced millions of students and lecturers to move their communication online. Learning institutions were closed until further notice and forced to observe social distance so as to adapt to a new lifestyle. Many institutions in Kenya were not Prepared for online learning but with predictions such as of (Donovan et al., 2019) that there will be a rapid increase in such courses over the next few years, universities have had to improve their Information Technology (IT) facilities to cater for the same. During the first phase of the lockdown, Kenyan universities embarked on upgrading their internet facilities to enable a shift to online learning within the shortest time. Although technology evolution now allows many things, the shift to e-learning has not gone as smoothly as it would have been expected. Facing the drawbacks of digital learning may be discouraging and frustrating both for lecturers and students. The current study was, therefore, necessitated by the new lifestyle imposed by Covid-19 so as to investigate the challenges university students face in eLearning around the world and recommend the best practices for adoption of the same in learning institutions.

## **3. METHODOLOGY**

The research was carried out in December 2020- February 2021. A survey was conducted amongst university students from five different universities in Kenya who were recruited using purposive sampling via Telegram, WhatsApp and email. The study used questionnaires and interviews as data collection instruments from students and lecturers in these institutions of learning. Observations were also conducted at highly populated areas on these campuses, including around lecture halls, around office areas, around the library and recreation areas where wifi facilities could be accessed. These observations were conducted during lecture hours, including in-between lectures and during meal times, when students would most likely be engaged in eLearning and interacting with others to complete tasks posted on the eLearning platforms. A variety of different interactions between other students and technology were recorded, including those texting, chatting or emailing on the phone, those browsing or googling on their tablets/laptops, and those who did not have such devices to get online. The research population consisted of 100 students and 50 members of staff ,10 from each university. Ten students, who did not form part of the sample of 100, were interviewed to corroborate the information in the questionnaires. Also, five lecturers who were not part of the sample of 50, were interviewed to corroborate the information in the questionnaires. The ages of the students ranged from 20 to 27 years and they were from different parts and towns of Kenya while the members of staff in the sample ranged between the ages of 28 to 50.

The study was guided by Users and Gratification Theory (U & GT). According to Littlejohn and Foss (2008), U&GT is among the greatest prevalent theories of mass communication. The theory concentrates on the consumer rather than the message; the audience is presumed to be active and goal directed. They choose media to satisfy their own needs, so media is only used depending on how the needs are met and how they gratify these needs. Fawkes and Gregory further added to the (U & GT) by saying that “the level of gratification depends on the level of the need or interest of the individual (Fawkes & Gregory,2001 p120). eLearning users choose to use online platforms depending on the needs they have and how they wish to gratify these needs. This theory was therefore suitable for this study since it was used to explain the findings from the respondents on the challenges university students face in eLearning as a result of the covid19 pandemic with a focus to highlight the hindrances towards adoption of the same within the universities.

## **4. FINDINGS, RESULTS AND DISCUSSION**

### **4.1. Summary of Findings from University Students**

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The researcher sought to find out the percentages of the respondents who had the basic requirements for effective eLearning. These included smartphones, laptops, desktops, electricity, study room, WIFI. The findings were summarized in table 1 below:

<b>Basic requirements for eLearning</b>	<b>Percentage</b>
1. Students who have smartphones	33%
2. Those who have laptops	23%
4. Students who have electricity at home	24%
5. Students who have a study room at home /room for listening to a lecture	10%
6. Ability to attend on-line lectures while at home	10%

## Effect of Covid-19 on SN Learners' Access to Training in TVETs

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### Abstract

Education is vital as it gives students opportunities for growth, development and hope for a brighter future. This is in line with Sustainable Development Goal number four which states that: Quality Education seeks to ensure inclusive and equitable quality education and promoting lifelong learning opportunities for all. During the Covid-19 pandemic schools and higher education institutions closed as directed by the government. The closure put learners with special needs (Especially the visually and hearing impaired) at more vulnerability thus increasing pre-existing education disparities by reducing the opportunities for many of the most vulnerable children who experience various challenges. Institutions of higher learning including the Technical and Vocational Education Training Institutes (TVETs) replaced face-to-face lectures with online learning during Covid-19 pandemic thus affecting learning and education of those with special needs. Further, closure of schools has other effects on the provision of essential services in education to children with special needs (Visually and Hearing impaired) including access to digital education and students' sense of belonging to schools; these are important for inclusion in education. This paper centered on access and inclusive education for all which is in line with SDG 4. The paper further examined the schools re-opening issue by giving the World Health Organization Covid-19 guidelines and strategies aimed at ensuring that the pandemic does not hinder inclusion of children with special needs (Visually and Hearing impaired) in education system in case of future lockdowns.

**Key words:** *Special needs learners, Visually impaired, Hearing impaired, Covid-19, Access, Inclusion*

### Introduction

Education enables upward socioeconomic mobility and is a key to escaping poverty. Over the past decade, major progress was made towards increasing access to education and school enrollment rates at all levels, particularly for girls. Nevertheless, about 260 million children were still out of school in 2018 — nearly one fifth of the global population in that age group. In 2020, as the COVID-19 pandemic spread across the globe, a majority of countries announced the temporary closure of schools, impacting more than 91 per cent of students worldwide. By April 2020, close to 1.6 billion children and youth were out of school.

Never before have so many children have been out of school at the same time, disrupting learning and upending lives, especially the most vulnerable and marginalized. The global pandemic has far-reaching consequences that may jeopardize hard won gains made in improving global education.

To protect the well-being of children and ensure they have access to continued learning, UNESCO in March 2020 launched the COVID-19 Global Education Coalition, a multi-sector partnership between the UN family, civil society organizations, media and IT partners to design and deploy innovative solutions (Unesco, 2020) Together they help countries tackle content and connectivity gaps, and facilitate inclusive learning opportunities for children and youth during this period of sudden and unprecedented educational disruption. Specifically, the Global Education Coalition aims to:-Help countries in mobilizing resources and implementing innovative and context-appropriate solutions to provide education remotely, leveraging hi-tech, low-tech and no-tech approaches; Seek equitable solutions and universal access.

Special education covers a range of needs, from children who could use a little help with reading to children with visual or hearing impairments, to children with multiple disabilities. In developed countries, Special education students have Individual Education Plans (IEPs), which are legal contracts between schools and parents that set goals for the child and outline the special education services to be provided. The COVID-19 pandemic is having a disproportionate impact on learners with disabilities who were already experiencing social and educational disadvantage. As many as half of the estimated 65 million primary and lower secondary-school age children with disabilities in developing countries were already out of school before COVID-19 according to GLAD. ‘They face a lack of accessible public health information, significant barriers to implement basic hygiene measures, and inaccessible health facilities’, said United Nations Secretary-General, António Guterres. Girls and women with disabilities in particular face greater risks such as domestic violence.

Persons with disabilities are less likely than others to complete education, and more likely to be excluded altogether from schooling (UNICEF, 2020). Because of COVID-19, most States have temporarily closed education institutions<sup>27</sup> affecting all students, including students with disabilities. To reduce the impact of disruption in education, some States are adopting remote learning practices. In these cases, however, students with disabilities are facing barriers on account of the absence of required equipment, access to internet, accessible materials and support necessary to permit them to follow online school programs. As a result, many students with disabilities are being left behind, particularly students with intellectual disabilities. Furthermore, students with disabilities are also negatively affected by other dimensions of school closures, including access to school meals and opportunities to engage in play and sports with their peers. What are some promising practices? The United States of America issued a guidance document on the federal legislation applicable, the Individual with Disabilities (USA department of education, 2020). Ecuador issued recommendations for teachers on supporting the education of children who need to remain isolated at home. According to UK department of Education (2020), the United Kingdom of Great Britain and Northern Ireland disseminated information and established systems to support parents and caregivers to guide them on how to face competing responsibilities while at home and to better support the educational process of children with disabilities.<sup>30</sup> These States and other stakeholders took key actions; provide clear guidance to education and school authorities on the scope of their obligations and the variety of available resources when providing education outside schools; Ensure access to Internet for remote learning and ensure that software is accessible to persons with disabilities, including through the provision of assistive devices and reasonable accommodation; Provide guidance, training and support for teachers on inclusive education through remote learning; Establish close coordination with parents and caregivers for early education of children with disabilities; Provide guidance and distance support for parents and caregivers to assist in setting up equipment and to support the education program of their children with disabilities; Develop accessible and adapted materials for students with disabilities, to support remote learning and Develop accessible educational audio-visual materials to disseminate through different media (e.g. online on demand, televised educational programs, etc.)

On March 15, 2020, the Kenyan government abruptly closed all schools and colleges nationwide in response to COVID-19, disrupting nearly 17 million learners countrywide. The closure of institutions not only affected learners and teachers but it also brought forth numerous economic and social issues, including interrupted and loss of learning, education exclusion, homelessness, nutrition and economic crisis, childcare challenges and increase in teenage pregnancy cases, financial cost implication to households, and sexual exploitation among others. The effects have been more severe for the underprivileged children and their households from the urban poor communities (Jelimo, 2020). With the government adopting a remote and digital mode of learning the learning gap has increased and most learners especially the SN learner’s being excluded from online education due to challenges of access to internet and reliable electricity.

To keep the learners engaged, and mitigate loss of essential learning time, the government of Kenya through the Kenya Institute of Curriculum Development (KICD) stepped up measures to facilitate learning through different platforms such as the Kenya Education Cloud, TV, radio, ed-tech apps, and mobile phones. These modes of learning though effective may only benefit a few students who have access at home to computers, smart phones, and the appropriate technology. For the vast majority of students, learning was interrupted due to lack of access to electricity, internet connectivity, and digital technology. This may further widen the education inequality gap, in equity, access and quality of education (Anderson, 2020)

The Government of Kenya recognizes the importance of special needs education as a crucial subsector for accelerating the attainment of Education for All (EFA) and the Sustainable Development Goals (SDGs). The sustainable development Goal 4 on inclusive and equitable quality education and promotion of life-long learning opportunities for all focuses on eliminating gender disparities in education and ensuring equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities. In addition, the proposal calls for building and upgrading education facilities that are child, disability and gender sensitive and also provide safe, non-violent, inclusive and effective learning environments for all. COVID-19 pandemic has triggered many changes in education the major one being learning remotely from home. While most students have had routines interrupted, the children perhaps most affected by that disruption are special education students. It is in the light of these literature, that this papery sought to determine the effect of NN SN learner's knowledge and skills in online learning; access and identify strategies used by the government to ensure online learning for SN learner's in TVET institution, Kenya.

### **Research Methodology**

This paper reviewed both theoretical and empirical studies with the main objective of bringing to the limelight the Effect of Covid-19 on SN Learners' Access to Training in TVETS in Africa and what African nations ought to do in order to address the challenges of the access of SN learners to online learning in the African continent. Global Literature on Effect of Covid-19 on SN Learners' Access to Training in TVETS was further explored.

### **Challenges of access to digital learning**

1. Lack of electricity in some homes and Slow internet connectivity
2. Lack of support materials e.g smart phones and even Learners without digital devices slow in catching up
3. Power cut outs especially in rural areas
4. No personal aids to guide the SN students
5. Lack of essential aids e.g hearing aids, braille machine
6. Lack of translators /transcriber gadgets for those with low vision
7. Financial constraint to purchase data
8. No internet in rural areas
9. The SN students could not follow the online lessons
10. Majority could not attend online classes due to various challenges
11. Many were unwilling to adapt to the digital education

### **Strategies for inclusion in digital learning: ~**

1. Kenya Technical Training College (KTTC) and National ODEL in TVET have currently adopted short online courses through virtual trainings to ensure trainers are mentored on the use of digital platforms. However, there is need that the mentoring programmes should be extended to the students more so the SN students.

2. Online and Blended approach kind of learning are slowly being embraced in Kenya for it is the future.
3. Ministry of Education was allocated 6.5 billion so as to hire 10,000 teachers and 1,000 ICT interns to support digital running and to also improve the schools' infrastructure to enable social distancing.
4. The government of Kenya through the Kenya Institute of Curriculum Development (KICD) stepped up measures to facilitate learning through different platforms such as the Kenya Education Cloud, TV, radio, ed-tech apps, and mobile phones.

### Recommendations

#### The government and policy makers should plan to:

1. Support ODEL by having a pedagogical structure for both learners and trainers to ensure learner's awareness of the challenges of online learning.
2. Provide SN learners with opportunities to realize their potential by providing them with special technologies such as adaptive computing technology by using digital devices to bypass challenging tasks. Provide Screen reader applications such as JAWS along with specially designed braille keyboards to allow visually challenged students to use the computer
3. Reduce costs i.e., high cost of internet access and expensive technology. Electricity to run the devices is also expensive; therefore, the government could collaborate with private partners to help offer financial aid to low- income areas so that they can afford the technology.
4. Properly designed software and hardware to allow students with special needs to get modern education and acquire any given information online
5. Allocate budgetary resources to Open Distance E- Learning (ODEL) for the purpose of planning for TVET institutions

### Conclusions

Covid - 19 has clearly exposed that, digital gaps exist, that there is a huge problem of access of SN learners to the online platform. The solution to this involves collaboration with various stakeholders to ensure digital accessibility, digital literacy and awareness for the SN learner's

There's need for counties in conjunction with the national government to come up strongly in identifying and supporting the SN students. Further, need for empowering and supporting the SN learner's together with parents on the importance of digital learning. That, blended kind of teaching and learning is good if it can be embraced by the students. Digital learning has denied the Special needs (low vision, hearing impaired, etc) learner's access to education as ODEL offers unlimited access to education. Finally, online education is a sustainable way to go if properly planned as it will help overcome barriers posed by pandemics such like covid-19.

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The impact of school closures in Kenya goes beyond education UK's Coronavirus (COVID-19): support for victims of domestic abuse <https://www.gov.uk/government/publications/coronavirus-covid-19-and-domestic-abuse/coronavirus-covid-19-support-for-victims-of-domestic-abuse#disability-specialist-services> 36 Penal Reform International, Global Prison Trends 2020, at <https://cdn.penalreform.org/wp-content/uploads/2020/04/Global-Prison-Trends2020-Penal-Reform-International.pdf>

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## Universal Design for Learning: Promoting Inclusive Education in an Empathic Manner

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### Abstract:

Access to quality education is deemed a basic human right around the world. To this end, universal primary education is available in many countries around the world. To bolster countries' efforts in their quest to support this noble aspiration, the United Nations Sustainable Development Goal 4 whose stated aim is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”<sup>2</sup>. Notwithstanding such noble efforts, learners with disabilities unfortunately find themselves facing discrimination, prejudice and exclusion from mainstream educational opportunities, or find themselves at the receiving end of arguably lower quality standards of education if granted such access. Whereas there are specific challenges depending on the type and degree of disability, a significant number of learners could perform in terms of literacy through empathic attitudes and interventions by teachers, coupled with improvements in learning environments, content delivery and more effective modes of engagement. This position paper explores the efficacy of Universal Design for Learning (UDL) as a novel approach to Inclusive Education in Kenya, and in so doing seeks to promote this more empathic and inclusive pedagogic and didactic ethos towards teaching and learning.

**Keywords:** *Attitudinal Barriers; Disability; Discrimination; Empathy; Exclusion; Inclusive Education; Literacy; Universal Design for Learning (UDL)*

### 1.0 Preamble

Disability remains a primary cause of educational disadvantage and exclusion – it accounts for the largest single group of learners of all ages, both boys and girls who remain out of school. UNICEF (2017) report indicates that children with disabilities are ten times less likely to attend school than those without. Even when they do attend school, they are more likely to drop out early and typically a lower level of schooling than that of their peers.

In all countries of the world, people with disabilities have lower literacy rates than people without disabilities (Singal, 2015; UIS, 2018; United Nations, 2018). Significant differences exist based on the nature of the disability resulting in higher levels of illiteracy among children with visual impairments and those with multiple or mental disorders when compared to children with motor disabilities (Singal, 2015).

When they do attend school, children with disabilities consistently score lower in mathematics and reading tests (Wodon *et al.*, 2018; World Bank, 2019). Additionally, girls with disabilities are penalised even further due to disadvantages occasioned by their gender (UNESCO, 2018). Generally speaking, disability tends to compound social inequalities. Studies in the United States of America have shown that students with disabilities achieve better academic outcomes and social integration when studying in a mainstream environment than students studying in segregated or specialised classes (Alquraini & Gut, 2012).

Every child has the right to education regardless of disability, race, language, religion, gender or poverty. When all children regardless of their differences are educated together, everyone benefits and

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<sup>2</sup> <https://sdg4education2030.org/the-goal>

this is the cornerstone of inclusive education. Inclusive education values diversity and the unique contributions each student brings to the classroom. Classrooms around the world from pre-school to the university need to be more inclusive to ensure that all learners are exposed to high quality education. Every learner needs to feel welcomed, supported, and safe although this is easier said than done.

The model of teaching/learning of separating learners into specialized institutions which is currently favored in so many schools does not enable each child to receive quality education that would make them productive members of the society. Inclusive education involves interrogating ways in which schools, programmes, classrooms and lessons are designed so that all children can participate and learn. It is about finding different ways of teaching so that classrooms actively involve all children. Further, separating children with special learning needs from mainstream institutions only serves to entrench psychosocial prejudices, stigma and discrimination.

## **2.0 Historical and Legal Trends of Inclusion**

Inclusive Education is a product of several social and political movements that emerged in the middle of the Twentieth Century. In the United States, the civil rights movement of the 1950s and 1960s intensified awareness that many individuals were still being excluded from social institutions, including schools. By the late 1960s and 70s movements such as the disability rights movement arose in order to combat other forms of exclusion such as those due to gender, ethnicity, sexual orientation or disability. One significant outcome of these movements was the passage and implementation of laws and policies designed to ensure opportunities for all including access to education

Many countries around the world have passed laws and policies implementing inclusion. Inclusive education has also been mandated by international and non-governmental organizations. These include the Salamanca statement of the United Nations (1994) and the UNESCO *Dakar World Declaration on Education for All* (2000). The increase in the number of children diagnosed with disabilities has led to the emphasis in inclusive education. The rise in numbers can be attributed to an increased focus on assessments and early detection, development of new assessment technologies and a lowering of diagnostic thresholds. Education and training for children and adults with disabilities has therefore become an important initiative in most countries of the world and this has led to major educational reforms especially with emphasis to inclusive education (Fergusson, 2008).

In Kenya, the Ministry of Education (MoE) launched the sector policy for learners and trainees with disabilities in May 2018. This sector policy succeeds the *Special Needs Education Policy Framework* of 2009 (MoE, 2009). The previous policy had some gaps and this necessitated a review. Some of the gaps included that it came before the promulgation of the constitution and thus required to be aligned with Kenya's 2010 Constitution and other national and policy frameworks. It had also focused on twenty-two categories of disabilities that was too broad and thus required a revision to eleven categories. Further, it lacked implementation guidelines meaning that the implementers were unable to implement the policy that the current sector policy has addressed. Perhaps, the most significant focus of the current sector policy is the recognition that Kenya needs to move towards inclusive education instead of segregated education. Inclusive Education is an overarching principle in this sector policy, advocating for the right of every learner with disability to be enrolled in a regular classroom together with his/her peers without disabilities. However, the shift to Inclusive Education according to the sector policy, recognized other education delivery models such as special institutions of learning, special units in regular institutions of learning and home-based education for learners with severe disabilities. Consequently, Kenya recognizes the need to specifically maintain special schools while striving to transition towards Inclusive Education.

If embraced, Inclusive Education is both a means of ensuring access to educational opportunities for all children and a way to combat discriminatory attitudes and to socialize diverse generations to be more accommodating and tolerant towards a wider spectrum of human diversity.

### **3.0 Issues and Constraints to Inclusion**

According to UN (2016), the barriers to an Inclusive Education setting are multifaceted ranging from attitudinal, environmental, institutional and information barriers. In Kenya, attitudinal barriers take the form of prejudice, discrimination and stigma towards persons with disabilities. In terms of environmental barriers all schools are not physically accessible to persons with disabilities and the curriculum is not responsive to learners with disabilities. There also lies the misconception about the roles of special schools and special education. Often times, inclusive education is perceived as a threat to the existence of special schools. It is seen as merely putting a child with a disability in a regular classroom without support and resources.

Management of inclusive classrooms pose a great challenge to teachers and this could probably explain the favor of educating children in specialized institutions. The teacher is faced with the dilemma of creating environments where students can accomplish their best learning. Students in an inclusive classroom have differing capabilities, learning styles, ways of expressing themselves and modes of interacting with physical and social environments. They can have differences in their ability to focus and pay attention, sit still, make sense and respond to social cues and regulate themselves in response to stimuli.

Teachers, as facilitators of learning, must create and maintain order, structure and safety all of which are necessary for a successful learning environment. Classrooms involve routines and patterns of interactions. All learners must be included in building a classroom community where every learner feels a sense of belonging with their learning, development and social needs met. The teacher must ensure effective classroom management because learners must learn how to regulate their behavior to minimize the risk of stigmatization and exclusion. This helps the teacher to implement academic and social curricular in order to help every learner maximize their potential. To achieve all this, the teacher has to cultivate a culture of inclusion where everyone in the classroom becomes like a member of a well-functioning team. This calls for an integration of many different practices that work together to reinforce inclusivity (M'Rithaa, 2011).

### **4.0 Integration of Universal Design for Learning in Inclusive Education**

The concept of *Universal Design for Learning* (UDL) originated in architectural practice and was designed to provide accessible environments for entire populations (Nelson, 2014). Although this concept was initially developed to ensure accessibility of people with disabilities to physical structures, these principles have been applied to other areas of pedagogy and didactics. In education the term was adopted as a set of principles, strategies, and actions that aim to make education accessible and functional for all people. It is important to emphasize that universal learning design comes to the area of Special Education since it visualizes individuals in a unique way and proposes to think about their peculiarities.

There are many ways to adapt pedagogical techniques, curricula and other aspects of teaching/learning to meet the varied needs and abilities of students. UDL can make learning accessible to a wide range of learners. It can be applied to how teaching/learning resources are prepared as well as on how teachers plan and execute the curricular. Further, it can also involve building an individualized approach into the way curriculum is constructed and lessons taught.

Lessons and learning activities can be designed to provide multiple ways for students with disabilities or different learning modalities to access learning material and learn. This type of curricular planning and presentation is similar to designing an elevator so that people can use it whether using wheel chairs, walkers or walking unassisted. Similarly, UDL makes academic and social aspects of school arguably more accessible to all learners – especially those living in majority world contexts such as Africa where accessibility is a major challenge to inclusion (M'Rithaa, 2011).

## 5.0 Principles of Universal Design for Learning

The overall goal of UDL is to use a variety of teaching methods to remove any barriers to learning and give all students equal opportunities to succeed. It is about building in flexibility that can be adjusted for every student's strengths and needs (Meyer, Rose & Gordon, 2014). UDL ultimately benefits all learners.

This approach to teaching does not specifically target learners who learn and think differently. However, it can be especially helpful for the learners with these issues — including those who have not been formally diagnosed. UDL provides that same kind of flexibility in the classroom. By applying UDL principles, teachers can effectively instruct a diverse group of learners. They do this by building in flexibility in the ways learners can access information and, in the ways, students can demonstrate their knowledge.

UDL is a framework for developing lesson plans and assessments that is based on three main principles. The first principle is providing multiple means of engagement, the second is providing multiple means of representation and the third is the provision of multiple means of action and expression— these principles are elaborated in Sections 5.1-5.3 (Meyer *et al.*, 2014). According to Nelson (2014), the concept of UDL is informed by neuroscience, which argues that each individual learns in a certain way and through different stimuli. It is therefore a continuous process to think about teaching planning. Although UDL has been designed to meet the demand of the entire population and its various characteristics, it is important to reflect on its influence in the area of Special Education.

**5.1 *Principle of Engagement:*** UDL encourages teachers to look for multiple ways to motivate students. Letting kids make choices and giving them assignments that feel relevant to their lives are some examples of how teachers can sustain students' interest. Other common strategies include making skill building feel like a game and creating opportunities for students to get up and move around the classroom (Meyer *et al.*, 2014).

**5.2 *Principle of Representation:*** UDL recommends offering information in more than one format. For example, textbooks are primarily visual. But providing text, audio, video and hands-on learning gives all kids a chance to access the material in whichever way is best suited to their learning strengths. (UDL enables teachers to practice inclusion because the greater the possibilities of presenting new knowledge, the greater the possibilities of learning it (*ibid*).

**5.3 *Principle of Action and Expression:*** UDL proposes giving learners more than one way to creatively interact with the material and to show what they have learned. For example, students might get to choose between taking a pencil-and-paper test, giving an oral presentation or doing a group project (*ibid*).

## 6.0 Conclusion

Educational systems need to focus on educational needs of all learners regardless of disability, gender, race or religion. This can be done by developing curricular and pedagogy that addresses the diverse needs of all learners. The Universal Design for Learning approach is critical in incorporating inclusion into pedagogy and didactics at every level of formal schooling – from pre-school then primary school all through to higher and tertiary levels of education. Though progress has been made, much work remains before this effort achieves its full potential, particularly within the present challenges and imperatives of Open, Distant and e-Learning (ODEL) occasioned by the COVID-19 global pandemic. Consequently, the authors recommend that UDL be incorporated into education-specific courses, as well as generally as a module offered across all disciplines and course offerings so as to proffer the benefits of an inclusive educational ethos to as many learner/students as possible.

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## Design Courses and the ‘New Normal’: ePortfolios as a pedagogic innovation in advancing university education

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### Abstract

Portfolios are crucial for practitioners in the creative industry. Practitioners in the field of art and design use portfolios as a means to show their skills to prospective clients or audiences. Portfolios may either be created in the form of physical artifacts or digital versions depending on the artist/designer’s specialised area and preferred medium. Portfolios cannot be taken out of art and design disciplines. A portfolio is the evidence of the designer’s work and skills. In most design schools every course requires the creation of a portfolio, which sometimes becomes challenging to manage for design educators and even students at the end of the term. The study aimed at exploring the use of emerging technologies in higher education institutions (HEIs) – specifically in a University of Technology (UoT) – as part of design education to facilitate the creation of ePortfolios. Participants were level 300 Advertising and Media (AD&M) option students who take a core course in photography. Flipped classroom, pedagogical approach and design methods were used to introduce students to the course. In a sandpit session, they were introduced to Google sites and Edmodo to create their ePortfolios and conversations between students and educators respectively. Results showed that Google sites had an affordance that facilitated the creation of ePortfolios and Edmodo was a useful tool for collaboration, communication, discussion and appraisal of students’ work in a virtual classroom. It is anticipated that ePortfolios will be beneficial for future virtual exhibitions, reflective learning, sharing, assessment, collaborations, monitoring and evaluation that can make learners work. Suggestions are that other HEIs could reflect on the ePortfolios pedagogies and integrate it as part of learning activities in the era of the COVID-19 global pandemic – which arguably, is the ‘new normal’.

**Keywords:** *Afrika; Conventional Framework (CF); Bloom’s Digital Taxonomy (BDT); COVID-19; Design Education; ePortfolio; Emerging Technologies; Flipped Classroom; Inclusive Education; Higher Education Institution (HEIs); Resilience*

### 1. Introduction

Communication Design practices continue to evolve due to the emergence of technology. The advent of technology necessitated a call for action in design schools to improve instructional approaches that can accommodate trends of the 21<sup>st</sup> century practitioners and learners. In the 21<sup>st</sup> century, communication design students in higher education institutions are exposed to one or more types of emerging technologies and social media tools. These are made up of online media tools for peer-to-peer communication and learning. Some of the commonest social media tools include *Facebook*, *WhatsApp*, *Viber*, *Instagram* and the likes (Rahimi *et al.*, 2015:235-237). These social media tools provide students and educators with a wide range of opportunities to engage in conversations in real time for collaboration and communication.

However, the use of these tools to facilitate teaching and learning in the process of conversation with emerging technology have not been fully explored in most educational settings within the research context. Educators usually focus on teaching technology as opposed to teaching with technology. For instance, in design departments within the study context, most art and design educators usually focus on teaching students how to use technology to complete their design projects. Occasionally learners are

encouraged to use social media for communication among peers and submission of exercises. The focus has not been on how we can teach with emerging technologies (e.g. Web 2.0 or social media) to support teaching and learning.

This gap in design education provides an opportunity to explore pedagogical approaches that can accommodate emerging technologies in design programmes to facilitate active teaching and learning. In specialised disciplines within the Communication Design domain, such as graphic design, and photography, designing software enables designers to come up with the needed artifact to satisfy or meet the needs of an identified audience. As such students are familiar with using technology for their studio-based exercises. Therefore, it is feasible to transform the learning environment using emerging technologies, which is adaptable by students to promote affective learning.

This paper is based on a pilot study where we explored the process of teaching with technology within the Communication Design programme in a UoT in Afrika<sup>3</sup>. The design experimentation was undertaken with students in the *Advertising and Media* (AD&M) option of the Communication Design programme, but focusing on the photography course. Communication Design courses are most often practice oriented. The output of the design exercises in the programme is usually submitted as creative portfolios, which complement written essays that form part of the learners' collective assessment process. The concept of teaching with technology was piloted with the photography course. Participants were tasked to create their ePortfolios as part of student reflective learning and assessment.

Due to the integration of digital technology in the design courses, there is a need to explore how to digitise portfolios and integrate it into the broader Communication Design programme. The enquiry sought to answer the following questions. *What are the emerging technologies that can aid communication design students to create ePortfolios? What are the relevant technologies that can assist educators to create virtual classroom environments to facilitate teaching and learning? What are the pedagogical approaches and technology that can enable design students achieve High Order Thinking Skills?* In this case, we describe the processes involved in the study, design activity in creating ePortfolios and reflections on teaching with emerging technologies. Advantages of ePortfolios as opposed to paper-based portfolios and other case examples are discussed. Findings of the study are discussed reflecting upon Diana Laurillard *Conversational Framework* (CF) and *Bloom's Digital Taxonomy* (BDT), which acknowledge that teaching occurs as a conversation. Focusing on High Order Thinking skills (HOTs) of BDT, technology served as an enabler in the process of teaching and learning in the research case.

## 2. Background

### 2.1 Emerging technologies in design education

In design schools where the focus is on creative arts, courses such as photography, typography, illustrations, sound design, and graphic design are usually offered in these institutions, which require the creation of a portfolio for assessment (Powell, 2013:86). The emergence of technology has offered designers with limitless possibilities on realising some of the creative ideas they have conceptualised and bringing them into reality in design schools (Rowley *et al.*, 2014:39). However, technology in this case is an enabler to augment design pedagogical approaches in making it easy to ideate and easily design solutions to emerging problems.

The introduction to social media in education has moved teaching and learning solely from directive learning (teacher centred-pedagogy) to learner-centred (andragogy) and self-directed/motivated learning (heutagogy) (Cochrane & Antonczak, 2014:359-360). Technology has increased collaboration and communication in academic circles and among professionals in the

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<sup>3</sup> Afrika: an epistemological stance seeking to co-create an authentic narrative of the continent from its own unique context, perspective and aspirations.

industry due to the emergence of Web 2.0 for social media activities (Cochrane & Antonczak, 2014:359-360). The popularity of Web 2.0 tools and the services have provided students with “just in time” and “at your fingertips” learning opportunities that can support a wide range of teaching and learning activities (Rahimi *et al.*, 2015:235).

Communication Design (graphic design) and other related design disciplines have transformed incrementally due to the emergence of technologies. Communication Design discipline has migrated from paper-based designing, through desktop computer based courses, into engagement with the rise of mobile computing and design formats that foster interactivity (Cochrane *et al.*, 2014:34). In the educational setting, programmes such as *Adobe Creative Suite, Indesign, Flash, Maya, Cinema 4D, Edius Pro* and so on, have affordances that enable designers to bring their imaginary concepts into reality. These professional tools and the familiarity with ICTs give designers the ability to work with social media and other cloud based tools for learning. These tools can also help designers create their portfolios. The effectiveness of working with technology will be possible, provided the learning environment is designed to accommodate student learning through active participation using available technologies (Cochrane *et al.*, 2014:36).

Emerging technologies offer a wide range of tools that can support pedagogical approaches to promote active teaching and learning. Some of the pedagogies include flipped classroom, blended learning, rhizomatic learning, and so on. Although these benefits are enormous, in some UoTs in developing world context, these technologies have not been fully explored in design disciplines for course outcomes such as ePortfolios. The goal of this study is to explore ePortfolios as a pedagogic innovation where students will use their artifacts as documentary evidence of their learning as a way of promoting active teaching and learning (Rowley & Bennett, 2016:1-2). In view of the many benefits of ePortfolios in design education, the study was purposed to *firstly identify relevant emerging technologies that can enable design students create ePortfolios. Secondly, to identify relevant technologies that can assist educators create virtual classroom environments for communication, collaboration and appraise student ePortfolios. Thirdly, to explore available pedagogical approaches and technology that can enable design students achieve High Order Thinking Skills (HOTS).*

### 3. Portfolio Design

Portfolios are a collection of students', teachers' or people's work that demonstrates one's skills or performance over time and serves as an evidence of their learning or skills (Ng *et al.* 2013:355-356). Portfolios present more detailed information than a standard resume (Shaidullina *et al.*, 2015:375). Portfolios have been kept by artists for hundreds of years but today it has become part of modern education since the 1980s (Davis, 2015:1). Portfolios are not only applied in design courses but students in other disciplines such as engineering, architecture, nursing and many more, to encourage reflective learning (Green *et al.*, 2014:4-5). Portfolios may be organised in two major ways that may either adopt a positivist, and / or a constructivist approach (Davis, 2015:1-2).

The process may either be combined to achieve learning outcomes as desired by educators in a particular course and to understand media literacies (Perk & Galantino, 2013:39). It is necessary for educators to determine what type of portfolio it is that one is building. Educators need to decide whether the portfolios for *showcasing* or a *process* portfolio that ought to consider how students will store their portfolios during and after the course (Bryant & Chittum, 2013:189-190). Portfolios may be designed to meet particular audiences for employment or for educational purposes. However, when considering

portfolios for educational purposes it may be developed using the *positivist* or the *constructivist* approach.

**3.1 Portfolio for learning (positivist approach):** It is usually done over a short-term period. It is typically assessed summative at the end of the term; that is typically a showcase portfolio. In this process students will submit their portfolios at the end of the term for assessment (Davis, 2015:1-2).

**3.2 Portfolios as learning (constructivist approach):** In this case, it is usually a process portfolio. In this format, the use of portfolios as learning, typically has an extended time frame and can be done overtime (*ibid*). It aims for formative assessment and students will reflect on their learning which gives them ownership of the process. It mirrors the construction of student learning overtime in their studies (O'Toole, 2013:6; Davis, 2015:1-2).

#### 4. Traditional Portfolios versus ePortfolios

Portfolios come in two major formats, the traditional (paper or sample of physical artifact) and the electronic (digital versions of artifacts) formats also known as ePortfolios (Newhouse, 2014:475-476). The paper portfolios could be perceived as two-dimensional and the e-versions will be 3-dimensional (Fox *et al.*, 2009:7). In some situations the two formats could be combined. In such situations, the electronic versions are stored on a DVD or on a pen drive and presented together as one piece of work which is applicable, especially in the field of designing (Lorenzo & Ittelson, 2005:1-5).

**4.1 Components of a Traditional Portfolio:** These may be made up of only tangible physical evidence of the creator's works, such as artworks in print media formats, hardcopy paper CVs, publications, pictures and any other related works which might be presented in a file or in a physical artist portfolio (Fox *et al.*, 2009:3). Traditional portfolios include the reflections and learning activities of the creator, both at school and co-curricular activities. In design schools these portfolios help educators and learners assess outcomes of their learning. These portfolios are later extended to the industry after school, as a tool to showcase the artist's work for employment.

**4.2 Components of Electronic Portfolio (ePortfolios):** This version is an electronic portfolio which is mainly in digital formats and might be presented usually in the form of a website format (Buente *et al.*, 2015:170). A typical ePortfolio will be an electronic evidence of the owner that will be made up of blogs, text, images, audio recordings (podcasts), video recordings (vodcasts), multimedia, links to other websites (webcasts) in the form of hyperlinks and other digital forms (Green *et al.*, 2014:4-5). ePortfolios have now become a movement that is being explored in many universities in other parts of the world to promote active teaching and learning (Eynon *et al.*, 2014:95-96).

**4.3 Advantages of ePortfolios:** ePortfolios have several benefits for educators, students and the general public. Studies on ePortfolio implementation in academic circles such as the creative arts have proven to be successful in enhancing students' learning (Rowley *et al.*, 2014:36-37). ePortfolios have been used successfully as an alternative tool to collect, reflect and select student learning in diverse academic disciplines and co-curricular activities on campuses (Kehoe & Goudzwaard, 2015:343). ePortfolios potentially can expand student learning in various forms of media, enhance media literacies and encourage reliable intellectual work (O'Keefe & Donnelly, 2013: 2-3). It allows students to link different parts of their learning, both in class (formal) and other co-curricular activities (informal). ePortfolios enable active learning rather than passive learning since students continuously engage with their learning (Bryant & Chittum, 2013:189).

Also, ePortfolios provide a system for schools to assess and organise student learning (Buyarski & Landis, 2014:49). ePortfolios make it possible to connect with other students and educators in other universities

(Latta & Vaughan, 2015:16-17). Students and educators alike are able to share pedagogical and learning styles in their various fields of discipline and it has been proven to enhance assessment and feedback (O’Keeffe & Donnelly, 2013:2). In a word, the use of ePortfolios is not about technology only but rather a set of principles about pedagogy where the technology serves as an enabler to these set of principles (Barrett, 2009: para 6).

## **5. Cases of ePortfolio integration**

### **5.1 Cases: University of Hawai’i at Mānoa Francis**

The University of Hawai’i at Mānoa Francis integrated ePortfolios into their communication BA curriculum for assessment. ePortfolios were integrated into their curriculum incrementally starting from 2010 and assessment was done in 2013. They noted that integrating ePortfolios in capstone courses can facilitate relational connections with their major courses. ePortfolios can provide more consistent learning experiences that integrate real life work and experiences in the classroom (Buente *et al.*, 2015:169-176).

### **5.2 Case 2: Efolio Minnesota**

In Minnesota, ePortfolios have been extended to the public domain. The idea was practicalised through local, federal government and higher education. It was dubbed eFolio Minnesota which was a statewide ePortfolio system. The system provided every resident of the community an opportunity for a free storage capacity (3Mb) of a lifetime ePortfolio (<http://www.efoliominnesota.com/>). eFolio Minnesota was being used by educators, students and workers (Lorenzo & Ittelson, 2005:7).

### **5.3 Case 3: University of Cape Town- eMarketing Course**

In a case study conducted at the University of Cape Town, South Africa, postgraduate students in an eMarketing course used ePortfolios as a way of marketing themselves as a *brand* in the course. Students indicated that it was a useful tool to share with potential employees and create an online presence and spaces for interactions. The authors in this case, noted that ePortfolios have multiple aspects that learners need to be aware of. ePortfolios goes beyond online space, personal brand and assessment regime in the eMarketing course. ePortfolios can foster relationships and as such it not only serves as a means to deploy technology, it also makes pedagogy and students visible (Pallit & Houslay, 2014:4-13).

Additionally, in a report by *New Media Consortium* (NMC) 2015, ePortfolios were introduced in some schools among first year students in Ireland. Researchers from this study reported that the integration of ePortfolios in schools improved student learning (Johnson *et al.*, 2015:7). It is evident from these case examples that ePortfolios have great potential and could be integrated in different educational settings. ePortfolios can promote reflective learning that can meet career goals among students and practitioners across many disciplines.

## **6. Research Gap in a Design Programme**

Students and lecturers in art and design schools often use portfolios as the main source of reflecting on students’ performance at the end of the term. At the end of each design cycle in a typical studio-based course, students produce portfolios for evaluation and for their professional practice (Buente *et al.*, 2015, 172-173). A typical portfolio of a communication design student is a collection of their works that may range from print media to electronic media (Newhouse, 2014:476-477). These works are created by students that are often exhibited at mid-term and end-of-term and it forms part of their continuous assessment. Sometimes creating these artifacts are expensive for students to manage since printing is costly and not very sustainable (Ng *et al.*, 2013:360).

After exhibiting some of these works, it becomes problematic for students and lecturers to store them within the university environment for future studies. At the moment there is no instant digital feedback

session, avenue for digital exhibition, or virtual storage system in place within most of these practical oriented courses in the selected UoT. Thus, in this investigation, we explored teaching with emerging technologies that could facilitate development and conversations around ePortfolios as a reflective (active) teaching and learning activity.

### **7. Educational context- ePortfolios in an Advertising and media course**

The context of this research is situated within the Communication Design programme in the selected UoT. The Communication programme in the selected UoT has three major options: AD&M, Film and Video, Animation and Visual Communication. The study is being piloted, at this stage. Hence, we focused on AD&M students with a focus on the course, photography. In our observation as educators in our contexts, it is evident that designers cannot do without portfolios. Students and educators create portfolios which might be physical artifacts or digital formats which are usually stored on pen drives, hard drives, CD/ DVDs, to show to potential audiences or for assessment. Presentation of these portfolios has been in more traditional formats as opposed to electronic portfolios. Physical (paper-based) portfolios have been quite cumbersome for educators and students alike to manage hence the need for this investigation. Although the study is in its early stages, it is perceived as an opportunity to integrate ePortfolios into Communication Design programmes in future.

### **8. Research approach**

The methodological approach for the inquiry was based on qualitative research procedures that draw on Action Design Research (ADR) methods. Design Research (DR) process involves research through the design process (Glanville, 2015:13-16). ADR methods are a combination of DR and AR procedures (DR+ AD = ADR). Since the study was conducted based on our real context as design educators and practitioners, we adopted some aspects of Action Design Research approach (ADR) for the study because ADR is problem driven and generates knowledge through an iterative design process (Reuver *et al.*, 2015:1-2). Our practice as design educators informed the data collection process in an iterative manner, as applied in design research to test the concept of integrating technology in a real educational context (Kennedy *et al.*, 2017). However, concepts in the CF were integrated as part of the teaching process using design methods to meet HOTS as part of learning outcomes in AD&M courses. A summary of the teaching process is illustrated in an emerging conceptual framework as Figure 1. Figure 1 is a combination of selected concepts in the CF, BDT and the Double Diamond (DD) design process situated in the ADR approach.



Figure 1: Framing ePortfolio integration in the design process (source: 1<sup>st</sup> author's construct)

**8.1 Participants and ePortfolio activities:** Design students were purposively selected to participate in this inquiry in order to meet the stipulated milestones of the research (Wahyuni, 2012:73; Creswell, 2014:239). The participants were mainly from level 300 of the AD&M option. Since the study is being piloted at this stage it was not extended to cover all students in the Communication Design programme due the large class sizes. AD&M design classes have the smallest number of design students, which was manageable for the research case. Most of the design students are familiar with designing with technology using software such as *Adobe Creative Suite*, *Dreamweaver*, *Flash*, and other related design software due to the nature of the design programme. They all own laptops, mobile devices and are familiar with social media tools. Hence the *Bring Your Own Device* (BYOD) concept was used and students brought their own devices to the course. Their familiarity with these tools made it easier for them to create ePortfolios as part of their reflective learning process.

**8.2 Design ethics:** The inquiry was conducted with design ethos that informed the research process. It was conducted in a collaborative process with participants and lecturers (facilitator) both in face-to-face and virtual classroom environments. Participants signed consent forms and they were not forced to participate in the study, as it was actually part of their AD&M course activities for the term and therefore, they willingly participated. Participants were assured that information will be managed with confidentiality and reporting of data will be done with anonymity except in cases where they gave

permission for their names to be used (Collins, 2010:86-87). However, participants' works have been shown in this paper, because they all gave permission for their works to be used as such.

### 9. Design Action with Emerging Technologies

Designers normally use some form of technology to design and develop their artifacts. In the photography course the goal for the term was for the students to develop an ePortfolio as part of their assessment for the term. This process required the use of technologies that students were familiar with but, in a different way. On the design action, the study began by briefing students on the outline for the term and highlighting the essence of developing an ePortfolio for assessment, learning and professional practice. Expected outcomes for the term were made known to students that included creating virtual exhibitions as part of their assessment for the term. The flipped classroom pedagogical approach was applied to the photography course (see Figure 1 & 2). Students were then given the necessary learning materials in order to personalise their learning and meet the set objectives for the term (Abeysekera & Dawson, 2015:1-3).



Figure 2: Participants at work in a face-to-face/ sandpit sessions

#### 9.1 Integrating emerging technologies in AD & M Course

Integrating technologies into a course requires that educators select appropriate technologies that have the affordances to meet the specific outcomes in the AD&M course. *Google sites* and *Edmodo* were selected for the exercise, since it had the affordances that could facilitate the development of ePortfolios. Workshops were organised in the form of “*Sandpit sessions*” for technology integration. Sandpit sessions are considered as playful learning environments that foster creativity. It can be organised either in the classroom or outside the classroom (Jarrett *et al.*, 2010:221-222). In this context, *Edmodo* (Figure 2a) was suitable to create a virtual classroom space for collaboration and communication. *Google sites* were deemed suitable for participants to create ePortfolios (see Figure 2b). These tools provided students with new spaces to showcase themselves and their artworks in new ways (Brown, 2015:335). Participants using these tools for creative works could develop higher metacognitive abilities through creating ePortfolios in the selected design course.



Figure 3a & b: Logos of selected emerging technology tools (source: Google images)

### 10. Results from ePortfolio Integration

Creating ePortfolios with design students generated interesting feedback. Data obtained were both visual and textual. These were based on responses obtained from students, on the exercises in

*Edmodo* and during face-to-face sessions that were valuable sources of data. Information obtained was categorised based on the emerging themes from participants. Reflections were based on learning experiences as participants were observed while they work on their ePortfolios. The findings evolved through the process of organising, and analysing participants' feedback; appraisal of ePortfolios and finally making sense and comparisons out of the entire process. Students' ePortfolios served as the basis for reflections and appraisal of their works. The data was grouped through the process of higher order concepts to a more abstract level in order to find interrelated themes in their ePortfolio design (Collins, 2010:150). Findings from the process showed that the students understood the concept of ePortfolios and perceived it as creative artifacts. As beginners, they created authentic ePortfolios that had basic aesthetic appeal expected in a creative piece of artifact. Participants enjoyed using the selected technologies to facilitate their learning in a more reflective process. Samples of the ePortfolios created by AD&M students are presented as Figures 4 and 5. Additional ePortfolios from other members in the class have been documented in the form of hyperlinks accessible online by simply double clicking the links to sample ePortfolios of ADM students such as the ones provided below:

*Class page – link to design student ePortfolios:*

- <https://sites.google.com/view/isaacopoku/home>
- <https://sites.google.com/view/danielkofiaboagye/home>
- <https://sites.google.com/view/davidedusah/home>

*Group page – link to Edmodo virtual classroom:*

- <https://www.edmodo.com/home#/>

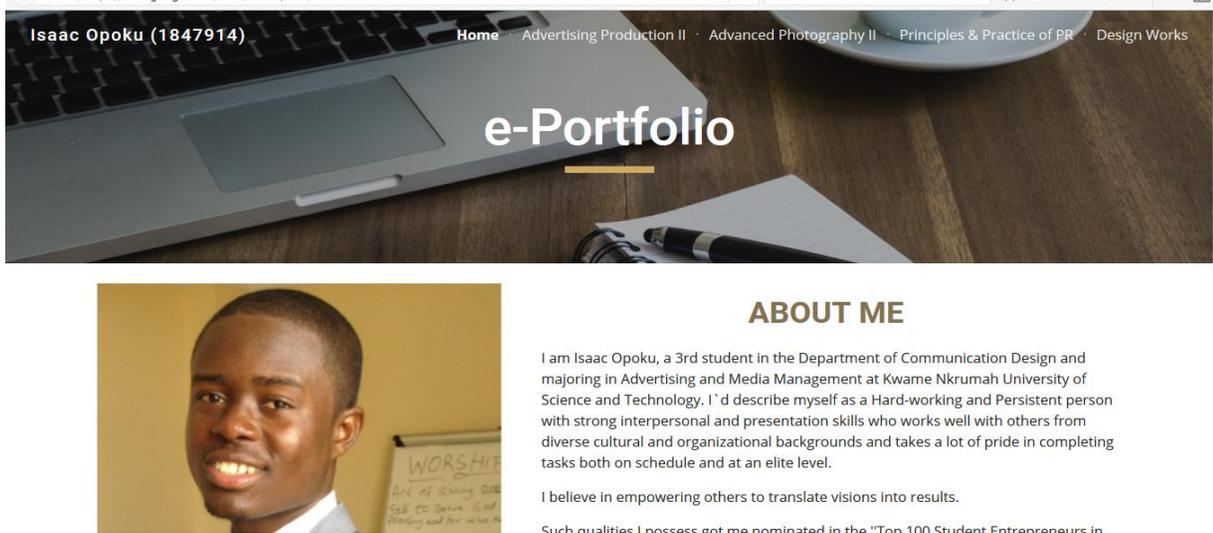


Figure 4: Sample A - ePortfolio of AD&M student

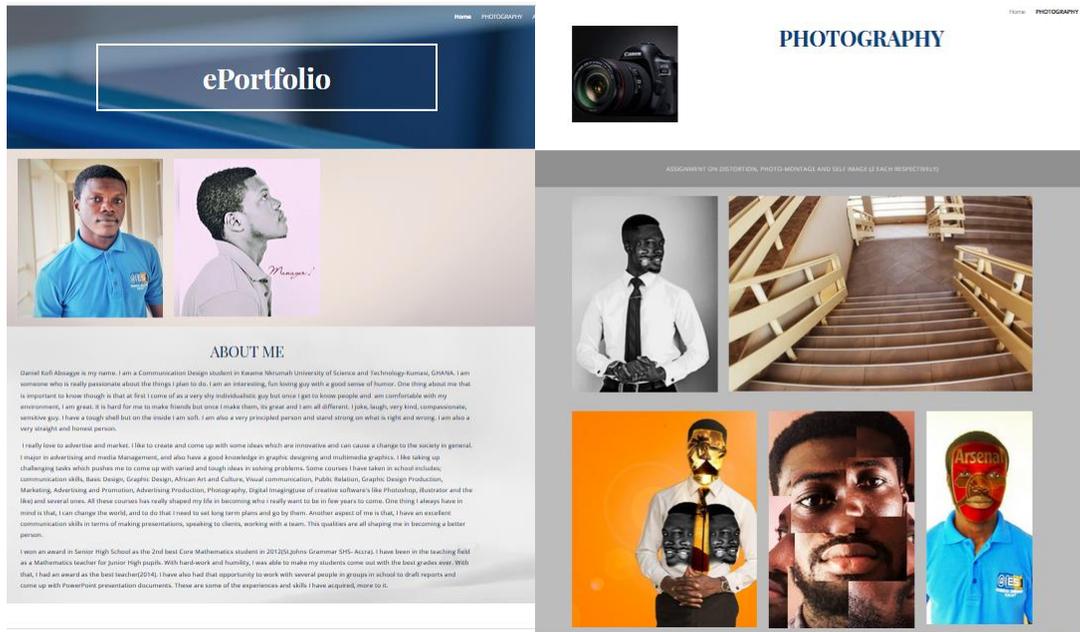


Figure 5: Sample B -ePortfolio of AD&M student

### 11. Participants’ Reflections their ePortfolios

Students showed enthusiasm in the use of these emerging technologies as observed during the sandpit sessions. They indicated that it was a very smart way of creating their ePortfolios and storing their works in virtual environments for collaborations and communications. Some indicated that they had lost a lot of work in the past due to the absence of a system to compile their works and store in the clouds. Also, participants indicated that they were very excited that they could actually create paperless portfolios in a more organised way. They acknowledged that using *Google* sites was quite easy. A few of the comments obtained from the participants are presented as extracts in subsequent lines:

*“Using Google sites today is really cool, it seems to be a smart tool and If I had known how to use this in my early years in school, I would have saved most of my works in the clouds by creating my ePortfolio” – Designer A.*

*“Using an ePortfolio as a means of documenting our works is very good. Because we are in an era where almost everything is done online; job application, interviews and many other things too. Integrating ePortfolio as part of our learning, gives us the chance to upload our works online for people to view and make comments concerning our works. We pick up these pieces of ideas and make sure to incorporate them in our next work. We tend to see other peoples work as well and derive some inspiration from them. ePortfolios are a good way to reflect on our learning and practice as designers. We are able to get online exposure without suffering to look for someone to aid you. When you have an ePortfolio online, not only those who are familiar with your works will comment, unknown experts or people with*

*good and appreciable knowledge of what we do can also pass comments which will help you enhance your knowledge for professional practice” – Designer B.*

*“ePortfolios [are] fun! It is exciting to know I have a personal website that I can manage. With ePortfolios, I have control to design and manage the content of my website, and also it is an easier means to share my work” – Designer C.*

*“Wow, wow, wow, this is one of the best education initiatives so far, students can interact anytime, anywhere and on any day. At least we do not have to carry loads of assignments to class whereas it can simply be compiled as ePortfolios and presented on this virtual classroom platform. As an advertiser, a platform like this is best for idea sharing both internationally and locally. God bless the creator ☺ I'm excited already to be part of this experience” – Designer D.*

The extracts presented above based on participants' opinion is a good indication that ePortfolios has a potential in design courses. ePortfolios can be integrated into the communication design programme to promote active teaching and learning.

## 12. Discussion

Teaching in general and in design transpires through the process of conversation to co-construct knowledge in various forms for different purposes. Conversation for the purpose of teaching/ learning occurred between the design educator, AD&M learners and other design students (Figure 6). Here in a conversation, ideas were exchanged from educators, learners that were later extended to other learners. Based on these concepts, the AD&M courses were taught in the process of conversation through an iterative design process to integrate ePortfolios. Integrating ePortfolios as part of the AD&M course was entirely a new concept and as such was done incrementally.

Learners were introduced to the ideas and theories around ePortfolios using flipped classroom pedagogies. They were then provided with learning materials such as videos (vodcast) and PowerPoint presentations to argument their learning process that formed the basis of creating their ePortfolios. Since teaching and learning happens as a conversation, two frameworks that aligned to the concepts of the investigation were selected. These are the Diana Laurillard CF and BDT. They were adopted as an adjustable lens to discuss the outcome of the study. CF is focused on the process of teaching between teachers, learners and other learners (peers). The framework as Laurillard describes it has four main basic components: *i) students concepts and ii) students specific actions, iii) teachers concepts, and iv) teachers constructed learning environment* (Schneider & Mgaved, 2007:1). On the other hand, BDT highlights the cognitive abilities of the learners. BDT is classified into two major parts: Low Order Thinking skills (LOTs) that involves *remembering, understanding and applying*; and High Order Thinking Skills (HOTs), which involves *analysing, evaluating and creating* (Tarling & Ng'ambi, 2016:559-560).

However, in this research case the inquiry revolved around HOTs. Thus, participants were expected to come up with ePortfolios as an outcome of their learning out of the teaching process of conversation. In reflecting upon the investigation using the CF, participants were given information in the form of theories and ideas (*teachers' ideas*). Participating design students then processed these theories/ideas (*learners ideas*) to understand what ideas have been put forward by their lecturer. Learners processed these concepts/ ideas as obtained from their lecturer. Next, the lecturer sends

feedback to learners in the process of conversation, which occurs in an iterative manner between lecturer, learner and other learners (Figure 6).

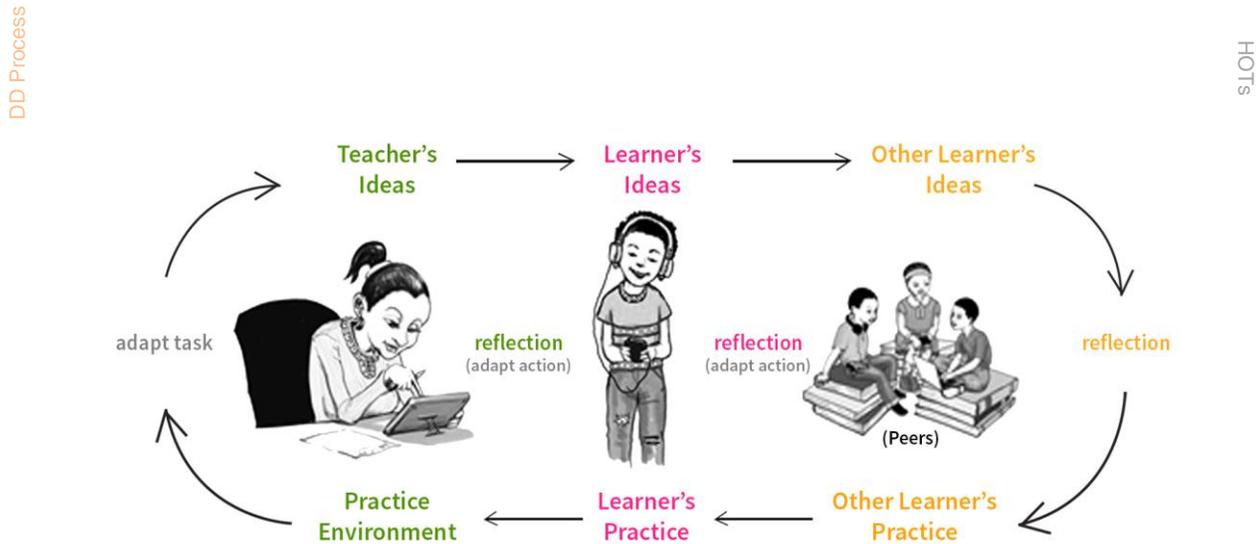


Figure 6: Metaphor of the CF (source: 1<sup>st</sup> author's construct)  
(Metaphor framework was informed by Diana Laurillard CF, BDT& DD)

After students had come up with tangible results in the form of ePortfolios, feedback was then given to the lecturer that formed part of the teacher's constructed environment (*Learners/ other learners practice*). The students' works were reflected upon by the lecturer, providing constant feedback to participants that informed the next process of instruction (See Figure 1& 6). Students extended these ideas on ePortfolios to their peers both in class and outside the classroom that encouraged rhizomatic learning through social media (Cochrane *et al.*, 2014:39). Rhizomatic learning is the process where independent and peer-to-peer learning occurs through active experimentation with technology (Mackness & Bell, 2015:31).

Emerging technologies such as Edmodo were used for active communication and collaboration with lecturers, learners and other peers in the virtual AD&M classroom environment. On the other hand, *Google* site was a useful tool in creating ePortfolios that served as a tangible product for their learning process. Propositions are that HOTS of the BDT have been met to an appreciable level through the creation of ePortfolios. The results of the study have proven that ePortfolios can add value to design courses. ePortfolios can be integrated as a viable tool that can promote reflective teaching and learning in UoT offering Art and Design programmes in Afrika.

### 13. Lessons Learned from ePortfolio Integration

The introduction of ePortfolio concepts using technology was adaptable because the 'Bring Your Own Device' (BYOD) strategy was employed. BYOD encouraged students to easily participate since they had their own devices that adds flexibility and context to their learning (Cochrane *et al.*, 2014:39). Also, participants were familiar with their devices, social media, which facilitated the introduction of *Google* sites that are easily adaptable to ePortfolios design and *Edmodo* for communication and collaboration. Finally there were challenges with accessing constant connectivity and electricity. However, this

challenge was overcome at a point since most students already charged their mobile devices and had some data for connectivity. However, for an effective teaching and learning to take place using emerging technologies, there should be constant power supply and interconnectivity for educators and students in the context of the study.

#### 14. Conclusion

Design as a discipline will continue to require the use of portfolios as an outcome of the design process. The integration of ePortfolios in communication design courses can potentially provide learning experiences with technology since outcomes for course assessment are usually designed artifacts. Creating ePortfolios with design principles will add aesthetic value to the designers' creative abilities and can help them gain employment. The study focused on level 300 AD&M students in the Communication Design programme. It is proposed that future research is required to integrate the ePortfolio concept as part of the annual students' industrial attachment programme as learning and for assessment. Future research could focus on virtual supervision of industrial attachment programmes and other learning activities using tools such as *Zoom, Microsoft Teams, Skype, Adobe Connect, Google Hangout, Google Meet, Facebook* and other emerging technologies with the relevant affordances for the exercise. Also, further research needs to be conducted into how ePortfolios can inform assessment; how active learning and teaching can be achieved using ePortfolios; what emerging technologies will be suitable to transform learning spaces in design education for communication and collaboration; *How technologies such as Quick Response (QR) codes could be explored to integrate paper-based artifacts into ePortfolios; and what best practices are available using QR codes in ePortfolio design?*

In summation, it is proposed that the selected UoT could explore the concept of ePortfolios as part of the pedagogical approach to encourage reflective learning in all courses. The use of these approaches can potentially bring visibility to the university. It can also create networks with students and educators in other universities. Future projections are that ePortfolios can be further extended to include students, lecturers and administrative staff in the selected UoT for both storage, learning and communicative purposes. A holistic, integrated approach is required to digitise artifacts in order to operate a sustainable ePortfolios system at all levels in higher education institutions. The efficacy of such ePortfolio systems is arguably prescient given the highly disruptive nature of the COVID-19 global pandemic and its implications on the future of design pedagogy in Afrika and beyond.

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## Innovative approaches for promoting resilience, inclusion and access to education amidst COVID-19 Pandemics in Kenya

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### Abstract

Education has the potency to not only initiate but sustain change for development of an individual and the society at large. As such, education needs to be accessible and inclusive to all members of society regardless of their social and economic status. Education that is accessible to all, has the potency to usher in unending returns and benefit to individuals and society at large. Kenya has recently commenced implementation of competence-based education curriculum which is geared towards empowering her citizens with innovative skills and competencies for development of self and society. Nevertheless the outbreak of COVID-19 pandemic, education in Kenya has been in an awkward and precarious situation in terms of access and inclusion by all learners in the country. Numerous initiatives have been adopted by governments to mitigate the spread of the pandemic as an immediate solution to the pandemic. This paper explores various innovative approaches that educational institutions, communities and the government can institute in order to increase access and promote inclusion of all members from different societal backgrounds and essentially build resilience and promote retention and completion amidst Pandemics which have become more of a norm than exception. The proposed approaches will revolve around individuals, communities and society to identify and customise good practices that can be able to sustain resilient against COVID-19 and other related pandemics.

**Key words:** *access, education, inclusion, innovation, pandemics, resilience.*

### Introduction and background to the study

Education is a major human right and the foundation for every society. In 1948, Discrimination in education was solved by recognising education as a basic human right (UNESCO 1960). It was stated what governments must do to enhance equality of treatment in education? (UNESCO GEM Report II, 2020). According to GEM report, 2020, 17% equivalent to 258 million of children globally of learners have not had the opportunity to access education despite the fact that education has the opportunity and potential to transform lives. Education is both a fundamental human right in that it aids in realisation of other human rights. Education is seen to be primary driver on aspects of progress across all seventeen Sustainable Development Goal and a global common good (UN Policy Brief, 2020). To date, education has continued to be seen as an important instrument in driving progress towards sustainable development (commonwealth-educationhub.net). The Sustainable Development Goal 4 adopted as one of the 17 SDGs addresses education in as far as inclusive and equitable quality education is concerned as well as promotion of lifelong opportunities for all. In this regard, member states are obliged to develop mechanisms that will enhance access to quality education to all, irrespective of position, gender, race, colour, physical and economic abilities in times of normalcy as well as in adverse conditions.

Due to COVID-19 pandemic the largest disruption of education in history has been witnessed. COVID-19 has affected education systems and has become a real challenge to children, parents, sponsors as well as government. 94% of learners worldwide were affected by the pandemic by mid-April 2020, representing almost 1.58 billion children and youth, from pre-primary to higher education, in about 200 countries (UN Policy Brief, 2020). This resulted in a near universal impact on learners and teachers

around the world, from learning establishments. In Kenya, the extended school closure due to COVID 19 has been significantly affected the education system. The pandemic has deeply aggravated school system and social inequalities in the country (Njenga, 2020). To contain the spread of COVID-19 virus, the Kenyan government closed all learning institutions countrywide on March 15<sup>th</sup> 2020. Data from Ministry of Education (MoE), Kenya, shows the pandemic affected both the basic and tertiary institutions resulting in the closure of about 30,000 primary and secondary schools being closed indefinitely to mitigate the impact of COVID-19. This closure of schools was unexpected and affected about 18 million learners and over 310,000 teachers countrywide threatening the education gains made in the last few years and the implementation of a new the new education system and the Competency Based Curriculum (CBC). Major effort to counter the effects the school closings have had to be put in place to mitigate the effects of this closure such as to learning loss, increased dropouts, and higher inequality (MOE, 2020). Even before COVID 19 crisis, learners especially those from low-income families, children with disabilities, children in marginalized communities, children from refugee camps and internally displaced places and children in conflict areas had lower education and social outcomes as compared to their peers and were already facing barriers to participating in education and learning (UNICEF, Europe & Central Asia 2020).

It is clear that the right to safe, quality, inclusive and equitable education has to continue even times of emergency. The results of long and prolonged school closure will be felt in future as many of the children and youth may be unable to attend school and more likely never to return, especially girls and those from low-income households. 1.6 million learners depend on Government supported school meals program. Girls in public upper primary schools benefit from the government by accessing sanitary towels through the Government's sanitary towels programme. Such learners may be affected by the school closures due to COVID 19 (MOE,2020). To Mitigate lasting repercussions to learners, families and the society in both social and economic terms, the government and communities need to rise to this situation. The government should address drivers of social exclusion such as low income, ill health, social capital housing unemployment, and local networks.

The paper presents some innovative approaches that may be used to initiate, promote and sustain resilience in education at individual and community sphere in the wake of COVID-19 pandemic and other pandemics that continue to bedevil education and society. Indeed, extraordinary times necessitate extraordinarily innovations and ingenious ways to promote resilience to avoid massive decimation of our education systems and humanity. It is self-evident that knowledge passed down through education has the wherewithal to outsmart any challenge that faces humanity. Africa and indeed, Kenya has had its fair share of COVID-19 pandemic where schools have remained closed, curriculum left uncompleted and time lost to graduate students from one level to another and young boys and girls dropping out of school to help parents look for food while young girls are married off early due to economic hardships brought about by COVID-19 pandemic among other pandemics. Due to limited resources, many countries in Africa have low testing rates which undermine continental efforts in the war against the pandemic (Soy, 2020). This suggests that innovative and inclusive approaches in matters education need to be seriously rethought to help anticipate pandemics, take appropriate actions to mitigate the pandemic to reduce its severity, develop systems to manage the pandemic and ensure that there are adequate activities or programmes to retain the condition to a level that is acceptable to community.

Education is a value laden enterprise that has the potency to not only provide sustainable solutions but also resilience against the challenges posed by unending pandemics human history. Globally, prosperity, modernity, civilization and peace in every nation is anchored on the quality of content in innovative knowledge, values and skills contained in her education. Education content has the potency to change mindsets and negative attitudes that stand in the way to achieve development in embracing innovative ideas that can enable individuals and communities to promote healthy living and enable longevity of

life. Education can enable individual and communities to explore and adapt innovative traits within their means to promote resilience against COVID-19. Education has the transformative content that can initiate and sustaining a paradigm shift to empower individual, communities and societies to bounce back when faced by catastrophes and calamities. Education promotes training and research that midwives innovative knowledge, values and skills that are potent tools for humanity to fight diseases and pestilences to safeguard gains made from development and modernity. Education that is loaded with accurate scientific content on COVID-19 has the potency to outdo false information, fallacies and conspiracy theories that have led to increase resistance and hesitancy to vaccines against COVID-19 (Geopoll, 2021). Human beings by nature are creatures who enjoy the benefits of education for survival in face of pandemics. Indeed, from the cradle of humanity, every pandemic that accosted humanity has been outsmarted through education that promotes resilience and tenacity to ensure livelihood and sustainability. Education on the what/why and how brings forth innovative knowledge and resilience which are quintessential tools in the war against pandemics. Education that is inclusive, accessible has the potency to promote values, skills and knowledge that can be used as weapons to combat pandemics that accost humanity.

The Kenya government like other global governments underscores the need for innovative Education to promote and sustain development of her citizen and communities by empowering them to acquire essential knowledge, skills and values for self and national development. Education is a tool for prosperity of individuals communities and nation at large.

### **Statement of the problem**

The potency of education to provide innovative solutions that promote resilience in any society to overcome any pandemic cannot be gainsaid. COVID-19 experience has taught individuals and communities about hard lessons on resilience and adaptability to not only endure deep but enduring humanitarian crisis that threatens lives and livelihood across the globe. COVID-19 has caused untold suffering to global education community, Kenya included. COVID-19 experience in education sector has taught individuals and communities hard lessons on the need to put in place systems and programmes that can enable education systems, organizations or businesses to withstand any form of disturbance, undergo changes and yet be able to retain the same functions, structure and identity in the face of ongoing disturbances or pandemics. Lockdowns, prolonged institutions and county closures, containment measures put in place to slow down the spread of the virus have had immediate and long-term ramifications to education as a social institution in Kenya; where inclusion, access, retention and completion have adversely been affected. Based on the understanding that COVID-19 has taken a huge toll of disturbances on education there is need to continuously explore and landscape inclusive, innovative, proactive and reactive strategies that can be used to promote resilience to safeguard access, retention and completion of education by learners amid vagaries of COVID-19 and other pandemics. The paper proposes innovative approaches that could be deployed in education systems to enhance resilience, access and inclusion in education even during a pandemic.

### **Study objectives**

The study sought to;

1. Landscape innovative strategies to promote and sustain resilience among educational stakeholder in Kenya
2. Explore innovative ways to promote access, inclusion, retention, completion in education amid COVID-19 in Kenya
3. Explore innovative strategies to promote individual and community resilience amid COVID-19

### Significance of the study

This paper landscapes proactive and reactive innovative strategies to promote resilience, access and inclusion in education during COVID-19 and other related pandemics that continue to devour gains made in sustaining and promoting access, inclusion and completion in education. The innovative findings, conclusions and recommendations suggested in this paper can be used to initiate and sustain resilience among stakeholders in education industry to outsmart novel COVID-19 pandemic and others.

### Related literature review

The reviewed literature is organized thematically on three broad areas on access, inclusion and finally innovative approaches that can be devised to prepare, mitigate, adopt or adapt any form of disaster and bounce back despite all odds.

### Access to Education

Universal access to education is basically the mechanisms in which educational institutions strive to ensure that students have equal and equitable opportunities to take full advantage of their education (www.edglossary.org; 2021). At Independence, many African countries saw Education as the means to help eradicate poverty, ignorance and disease (Kenya). To date, education has continued to be seen as an important instrument in driving progress towards sustainable development (commonwealth-educationhub.net).

Kenya like other nations of the world acknowledges that Education is vital to her socioeconomic development and the right to education is enshrined in her constitution and supported by various legislations. The Constitution of Kenya (2010) article (43.1.f) obligates the government to ensure that “every person has the right to education” while article (53.1.b) obligates the government to ensure that “every child has the right to free and compulsory education”. Further the constitution avers that “a person with any disability is entitled to access educational institutions...” (Article 54.1.b) and the state is obligated to put in place “affirmative action’s programs to ensure that youth access relevant education and training” (Article 55). In addition article 56 obligates the government to ensure that “marginalized groups re provided with special opportunities in education”. The Children’s Act (2001) equally reiterates the above clauses by stressing that “every child shall be entitled to education the provision of which shall be the responsibility of the government and the parent” (Article 7.1). Hence, the need to explore innovative ways of promoting resilience in education amidst COVID-19 to empower individuals and communities in the war against COVID-19.

Despite above interventions, Education system is still bedevilled by widening inequalities in access. Gender disparity in the education sector has been exacerbated by the outbreak of Covid-19. A UNESCO (2020) report by the Institute for Statistics, points out that large gender gaps exist in access, learning achievement and continuation in education in many settings. The prolonged closures of schools during COVID-19 pandemic and associated economic challenges has led to a sharp rise in teenage pregnancies as well as early marriages. Globally statistics point out that 1 in 4 women are married off as children thus having a negative impact on gender equality in learning and teaching. Though teenage pregnancies have always been there in Kenya, the issue has shown a steady and a dangerous rise during COVID-19 period (Ajayi & Mwoka, 2020; Moraa 2020) thus contributing to high levels of school dropout levels. This will affect learning as the young girls take up a dual responsibility at a very early age which will affect academic performance.

These statistics should be of great concern to education planners who should be challenged to think creatively and innovatively to address this disparity and ensure education for all is a reality.

COVID-19 pandemic has amplified in a significant manner the pre-existing inequalities of the gender digital divide in education. Several studies on use of internet (Diogo, et al., 2020; Melhem *et al*, 2014; UNESCO, 2020) have established the continuing digital divide in access and use of information communication technologies thus limiting access to education by women and girls particularly in developing countries and hence deter women's absorption and adoption of ICTs to access information and knowledge" (p.22). They continue to add that in some cultures such centers are often not open for women. To ensure equality of access to education for all despite the various unfavourable environment, socioeconomic and cultural conditions, governments must work out ways to control these.

The outbreak of COVID-19 pandemic and resultant use of online teaching and learning has contributed to a great challenge in access to education due to a number of factors such as poverty, socio-cultural factors as well as ignorance. In Kenya, a study by Azizi Afrique Foundation (2020) to access continuity of learning as well as the vulnerability of learners in poor households across Bungoma, Turkana and Tana River Counties, Kenya established that ownership of gadgets for remote learning was a great impediment. Only 20% and 8% owned a radio and a TV respectively. Access to education to special needs learners is amplified during periods of adverse conditions. The situation is aggravated due to the diversity of users with special needs who normally encounter a variety of challenges to access education but in times of a pandemic like COVID-19 the situation becomes worse.

### **Inclusion in Education**

Inclusion is a term that means a process or act of including someone or something as part of a group or list (Cambridge Dictionary) and becomes part of it. In the education arena it is education that incorporates everyone with non-disabled and disabled children learning together in mainstream schools. Inclusion in education focus on including all children with/out disabilities so as to promote greater social change. Initially inclusion in education was focused on including children with disabilities but it has changed and become much broader in its interpretation. The main focus now, is greater social change and restructuring of schools to accommodate all forms of diversity. All learners need to be included in education, both boys and girls regardless of their linguistics and ethnic diversities. Other groups of learners include those from rural populations, the marginalised, learners with disabilities for instance those with difficulties in learning. An 'inclusive and equitable' education is at the core of the SDG 4, that aids to achieve "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Inclusion can enable every child, youth and adult to learn and fulfil their potential as it is the foundation of good quality education. The global community targets achieving right to quality education for all adolescents and children by 2030. Issues such as location, poverty, disability, gender, age, ethnicity, indigeneity, or displacement status, incarceration, language, religion, migration beliefs and attitudes should not be reason of exclusion of any learner from quality and relevant education (UNESCO GEM report, 2020).

The COVID-19 crisis has put SDG 4 and other international goals on education into jeopardy more than ever before. Beside the already existing exclusion factors, the pandemic has added another form of exclusion in relation to accessibility of distance learning opportunities, as it is seen to affect the new categories of the population. The COVID 19 crisis has sliced opportunities for many of the most vulnerable youth, children and adults – those living in poor or rural areas, persons with disabilities, girls, refugees and forcibly displaced persons – to continue their learning and aggravated the pre-existing education disparities. Learning losses as result of this crisis threaten to extend beyond this generation and erase decades of progress (UN Policy Brief, 2020).

### Online learning and challenges

Though the Kenya Institute of Curriculum Development (KICD), has tried to engage learners and mitigate loss of essential learning time, by stepping up key measures needed to facilitate teaching and learning processes through different platforms such as radio, ed-tech apps, the Kenya Education Cloud, TV, and mobile phones access and inclusion has continued to be a big issue. The Kenya Education Cloud is the home of interactive digital content, radio lessons on demand, textbooks for all levels, to serve learners and teachers, and online courses on curriculum implementation and use integration of ICT in learning for teachers (MoE Sessional Paper, 2019). All these are effective modes of learning but only a few students who have access to computers and smart phones at home, appropriate technology may benefit from them. Learners from most rural communities who lack electricity and smartphones and those with low literacy levels and limited education resources may not benefit much from E-learning as those from urban areas. Therefore, online learning may result in the exclusion of many rural and marginalized children in remote villages including those in refugee camps as well as those living with various disabilities including learners who have poor digital skills and the least access to the hardware and connectivity required for distance learning solutions implemented during school closures. Most of these children are among the most vulnerable and may lose learning due to the school closures (UN Policy Brief, 2020). Despite the high advocacy for learning solutions loaded on radio amidst the COVID-19 Pandemic, ownership of radio in arid and semiarid areas in Kenya is below 30%, which is a major challenge for learners in continuing with learning. In addition, TV ownership in arid and semiarid areas is less than 10%, 15% for smartphones while 18% of the households do not even own a mobile phone. This points to further learning vulnerability for learners in arid contexts in the wake of the pandemic. All this suggests, learners in arid and semi-arid areas are likely be left behind by those in other areas unless deliberate measures are not put in place to accelerate inclusive learning (Zizi Afrique, 2020).

Online learning and radio learning cannot replace classroom learning as it is only intended to supplement knowledge that children already have and therefore, learners who are already behind cannot benefit effectively from these modes of learning (Kathula, 2020). This may further create a wider gap in relation to education inequality, inclusivity in education, equity and access in education (Njenga, 2020). This paper focus on measures the government and other stakeholders can put in place to not only mitigate a pandemic but to prepare in advance, put measures in place, adopt or adapt to the disturbance and eventually come out stronger than before.

### Study Methodology

The study used descriptive survey design to conduct incisive landscaping of available peer reviewed published articles, abstracts, policy documents and other relevant references. This is critical to document proactive and reactive innovative strategies to promote education and educational stakeholders in Kenya in the era of COVID-19 to safeguard gains in access, inclusion, retention and completion in education. The centrality of education to resilience among stakeholders and government is quintessential in times of crisis and pandemics.

### The concept of resilience

Pandemics by their nature, scope, ferocity and aggressive nature require resilience that is inclusive in terms of individual and communities to explore opportunities available to fight the pandemic. In figure

1, in order to ensure proactive resilience, preventive measures such as advocacy, sensitization and induction for capacity building on issues related to COVID-19 prevention. In addition, use of personal protection equipments (PPE) such as face masks and other recommended protection equipments for members of school community and fraternity need to be used. There is need to mark all places in the school to promote social distancing. Social distancing needs to be observed in transport vehicles that ferry students to and from school. In all school facilities everyone needs to observe safety measures to immunize human contact. Regular temperature taking needs to be done. Schools and communities need to come up with innovative policies guidelines on prevention of COVID-19 and socialize members of their fraternities to observe them. Regular monitoring and evaluation (M/E). Schools can sensitize parents in the immediate communities to observe safety measure at home.

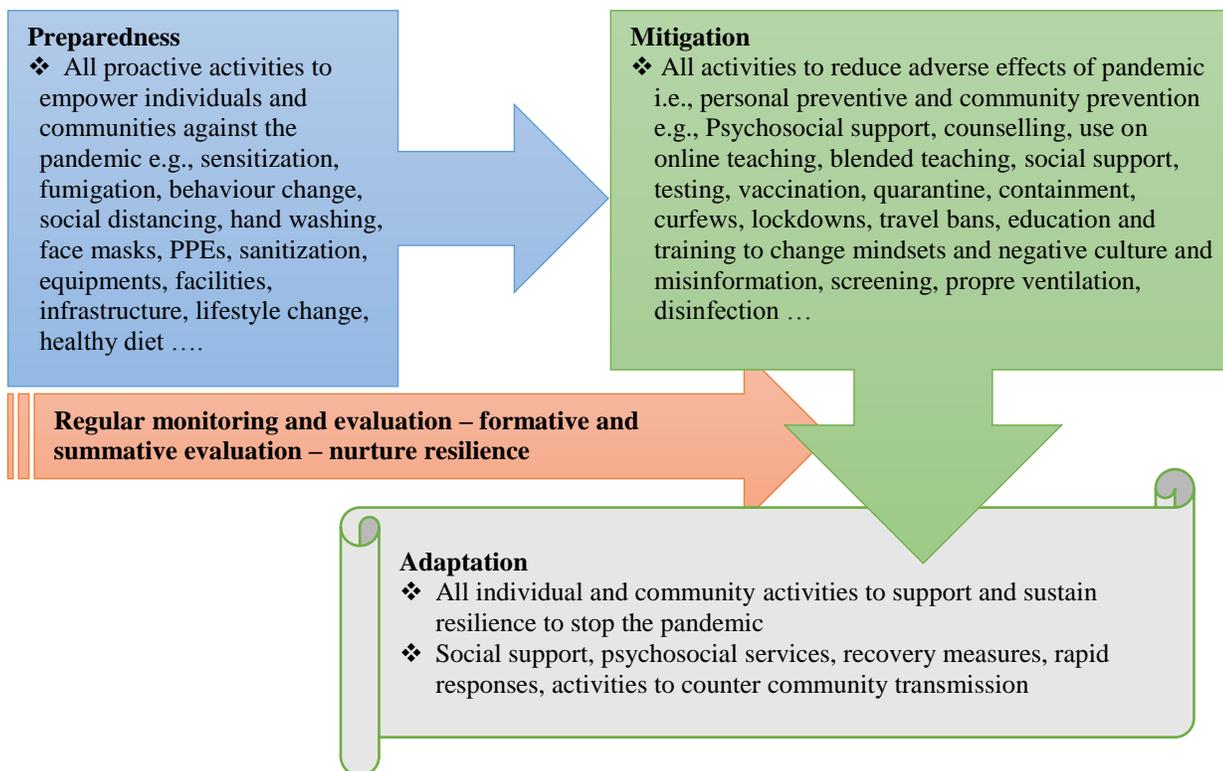


Figure 1. Strategies that Education can use to enhance resilience to individual and communities

The war against a pandemic ought to be inclusive and everyone is equally predisposed to the virus. This implies that each of us in every community is predisposed to COVID-19 infection, hence a need to empower each with innovative preventive education about the virus to prevent, slow down or stop infections altogether. Occasional resurgence of highly transmissible variants of the virus in deadly waves has indicated that occasional closures, containment measures and partial lockdowns in some regions are inevitable to slow down the aggressive spread of the virus. These and other proactive measures can be instituted where need arises to secure gains in the war against aggressive variants of COVID-19.

Pandemics like COVID-19 that are smart and tricky require extraordinary measures aka abnormal treatment where all arsenals need to be mobilized on target. The government being the overall custodian of national interests and protection of all can mobilize and marshal different players in society to create multiple battle fronts to educate and train individual and communities on various initiatives to outsmart

the virus. This is critical because the pandemic has taken community transmission where every section of community and society is a battle zone to combat this invisible enemy and every innovation counts.

The government can prevail and mobilize different types of mass media channels to disseminate preventive and promotive public health education content through electronic and print media in different languages to promote inclusion and access to preventive knowledge and skills that can be used in various community settings to prevent the spread of the virus. The media can use media creativity and innovation to create various innovative products loaded with health content on the virus and preventive strategies that can be used to educate and train members of public on finer details of the evolving virus.

The government at national and county level can proactively guide communities and institutions to proactively identify preventive measures and opportunities that can be adapted to protect the spread of the contagious virus. Innovative measures can use the available resources, safe spaces to adapt to scientific preventive measures guidelines by ministry of health.

### **Findings on innovative models and approaches in promoting resilience Stakeholders' engagement**

Wide stakeholder's engagement at all levels and at all steps of planning cycle in education is critical to promote resilience, access and inclusion in education amidst COVID 19 pandemics especially in times of uncertainty. All stakeholders, students, teachers and parents and local communities have to be involved in the planning and execution of education goals. Local communities need to be empowered to make their own choices about education, nurturing local contexts and building an innovative school practices. Scenario planning may be necessary for the next one or so depending on the evolution of the pandemic planning, revising plans regularly and early mobilizing human resources as situations evolves become key. In uncertain times, ensuring strategies and plans are well understood by users, stakeholders and beneficiaries is of utmost importance. There is need to ensure continuous monitoring on how proposed measure are implemented and perceived by students, teachers and parents and education community. As a community-based initiative caregiver will be given a voice to be heard and knowledge management platforms will be developed where innovative ideas, success stories, lessons learnt are captured for dissemination. Use of existing initiatives such as 'nyumba kumi' will ensure that scarce resources will be shared among members within these households and reduce the gaps in education. Heads of neighbourhoods to be empowered and motivated to monitor progress. Resources distribution will be easier and issues of congestion dealt with. Meetings will either be in open spaces within the neighbourhood and where learning facilities are provided to ensure equality of access to education for all despite the various unfavourable environment, socioeconomic and cultural conditions. The government of Kenya need to expand the existing remote learning opportunities for learning continuity for all students in basic education in primary and secondary school through the Stakeholder Engagement Plan (SEP) in order to support access and delivery of online content to all students, (MOE, 2020).

### **Support for parents**

To promote resilience, access and inclusion to education it is necessary to support parents in the engagement of their children in schooling. Studies have revealed that parents, have found themselves involved in supporting learning during the pandemic shut-down irrespective of their level of education. Learners from less developed households face several challenges such as poor living conditions, economic stress, and low education levels of parents, including lack of digital skills, which makes it difficult to benefit from digital content even when they can access it. According to UN Policy Brief, (2020), children from lower socio-economic backgrounds are more likely to lack parental support

during school closure, access to quiet room, and other reading opportunities. A stable environment and learning support needed to adapt to these new modes of instruction was reported to be lacking in most of these learners. This implies parents require alternative support structures such as community-based teachers to mediate the literacy gap for those households without a literate adult. (Zizi Afrique, 2020). Digital literacy should be declared our motto right from ECD level of education up to university. Children should be introduced to tablets early enough and teachers provided with laptops as tools of their work. The slogan should be “One Child One Tablet “.

### **Innovative community approaches to promote resilience**

COVID-19 had taken aggressive community transmission where the novel variant is spreading fast. This unprecedented nature of spread requires communities to adapt various innovative strategies to promote resilience. Education has the wherewithal to ignite broad and collective innovative community approach to promote resilience against pandemic using resources and ideas available. Education can break negative mindsets and barriers that prevent either prevent ability, agility and resolve to adapt to preventive paradigms that accommodate change to prevent the spread of the COVID-19 pandemic. Studies have observed that agility and flexibility to adapt bold, decisive action to embrace out-of-box solutions because unprecedented times call for unprecedented actions (Research report, 2020). This is critical since voracity of COVID-19 is self-evident due to its rapidly mutating tendencies. The resilience of the community may be enhanced when the subsystems, infrastructures, economy, civil society and other social service providers to mobilize the community to prevent and combat rapid spread of the pandemic (Carison et al., 2012). Education and awareness campaigns on behaviour change communication needs to sensitize communities that when containment measures are eased that the virus has not sopped but it's a temporary reprieve to open the economy; so individual and communities need to proactive preventive measures every time everywhere.

### **Innovative measures that school communities can use to enhance resilience**

Education is one of formal social institution in human society and schools are social institutions through which schools socialize socializees to acquire values, knowledge and skills that can enhance individual and collective resilience to avert pandemics. Since COVID-19 has taken community transmission which leaves us with us with not safe places then schools have to assume their social responsibility to inculcate proactive and reactive measures to combat the pandemic by including the content on education about the virus. Schools need to use up-to-date scientific knowledge about the ABC of novel virus to teach and train learners on the what/why/how so that can enhance their individual and collective resilience. Pathways and opportunities that schools can use include school assemblies, parades, integration and mainstreaming of COVID-19 content in teaching content in all subjects in various languages that are used in curriculum. Schools can also use local dialects and languages to sensitize local communities in and around the school peripheries. Schools need to use teachers and fellow students to provide psychosocial support to each other and share experiences to learn collaboratively on handwashing, social distancing, screening, testing, using empty spaces in schools and neighborhoods keep safe. School can train pupils on how to improvise masks, handwashing soaps and other resources that can help to preventive rapid spread of the virus. Inclusive strategies to combat the virus need to involve everyone including persons living with disabilities. Teachers can use transparent masts to enable learners with hearing challenges to benefits from teaching and learning. Schools need to train and teach pupils how to grow and prepare to eat health promoting foods to boost immunity of the body to fight any infections.

### **Accelerated learning**

Accelerated learning modes such as simplifying the planned curriculum to accelerate learning can promote resilience, access and inclusion to education amidst COVID 19 pandemics and support recovery when learning loss is likely to have occurred for entire cohorts. Sierra Leone used a simplified and accelerated curriculum to cover two academic years in one year following the Ebola pandemic. This experience of Sierra Leone suggests that accelerated learning can help get students back on track, facilitate quality catch-up with a simplified curriculum of select core components to cover thoroughly in the time available. Therefore, accelerated curriculum can help recover lost learning time. (Carvalho et al, 2020). Zizi Afrique jointly with the Ministry of education, Kenya and county-based community organizations has been implementing the Accelerated Learning Program (ALP) in Bungoma, Tana River and Turkana since 2018 targeting learners lagging behind in foundational literacy and numeracy skills, selected from grades 3 to 5 aimed at equipping them with skills to ‘read with understanding’ and ‘reason with numbers. Zizi Afrique found out that in only 30 days, more than half of the learners acquire the desired level of proficiency in foundational literacy and numeracy (Zizi Afrique, 2020).

### **Innovative psychosocial support**

In order to promote resilience, access and inclusion to education amidst COVID-19 pandemics, all learners, teachers and parents require psychosocial support. The government need to plan and develop flexible national education systems, to give teachers and caregivers the right support to deliver distance learning and maintain adequate funding even to the vulnerable children to ensure none is left behind. By conducting mentorship and psychosocial counselling service programs for the psychologically and socially affected members of the school community as well as strengthening of guidance and counselling departments and programmes in schools through building the capacity of teachers and instructors in life skills, guiding and counselling to efficiently respond to variations in social behaviour, the Ministry of Education will make education more inclusive. MoE plans to enhance collaboration with Department of Children Services to promote safety and protection of children to increase awareness of reporting protocols for incidences of child abuse and neglect (Kathula, 2020). To support student’s transition back to school, ensure safe school environments, and provide remedial learning activities, teachers have to be equipped and trained with the right skills to facilitate remote learning (Carvalho et al, 2020). The government, through the Stakeholder Engagement Plan (SEP), 2020, intends to train teachers in interactive remote learning pedagogies. It entails supporting capacity building of teachers in online and distance learning pedagogies to ensure teachers play a role of supporting remote learning. Teacher training interventions builds on the existing trainings for teachers for the digital learning programme (Digi school) conducted by Ministry of ICT, Information and Communication Technology Authority (ICTA) and TSC where over 92,000 teachers in early grades were trained.

### **Open access**

Another approach to promote resilience, access and inclusion to education is to enhance open access to education resources. To enhance open access the government needs, enhance learners and educators have accessibility to open education resources, do away with online and copyright restrictions tied to online learning resources and other materials. Publishers and authors, in some countries like New Zealand and Australian, came up with exceptional measures that aided libraries to provide educational content and allow for virtual public readings of their materials from classroom settings and libraries.

### **Innovative planning with active stakeholders’ engagement during COVID-19**

All stakeholders, students, teachers and parents and local communities have to be involved in the planning and execution of education goals. Local communities need to be empowered to make their

own choices about education, nurturing local contexts and building an innovative school practices to combat COVID-19 and related pandemics. Scenario planning may be necessary for the next one or so depending on the evolution of the pandemic planning, revising plans regularly and early mobilizing human resources as situations evolves is key. In uncertain times, ensuring strategies and plans are well understood by users, stakeholders and beneficiaries is of utmost importance. There is need to ensure continuous monitoring on how proposed measures are implemented and perceived by students, teachers and parents and local community

The innovative collaborative model planning model in figure 2 can be effective with involve of all stakeholder in any local community where the school is located. Collaborative efforts of the community with synergize community and individual resilience towards fighting the pandemic. The collaborative approach in community education is inclusive and participatory which makes effective in promoting resilience amidst pandemics.

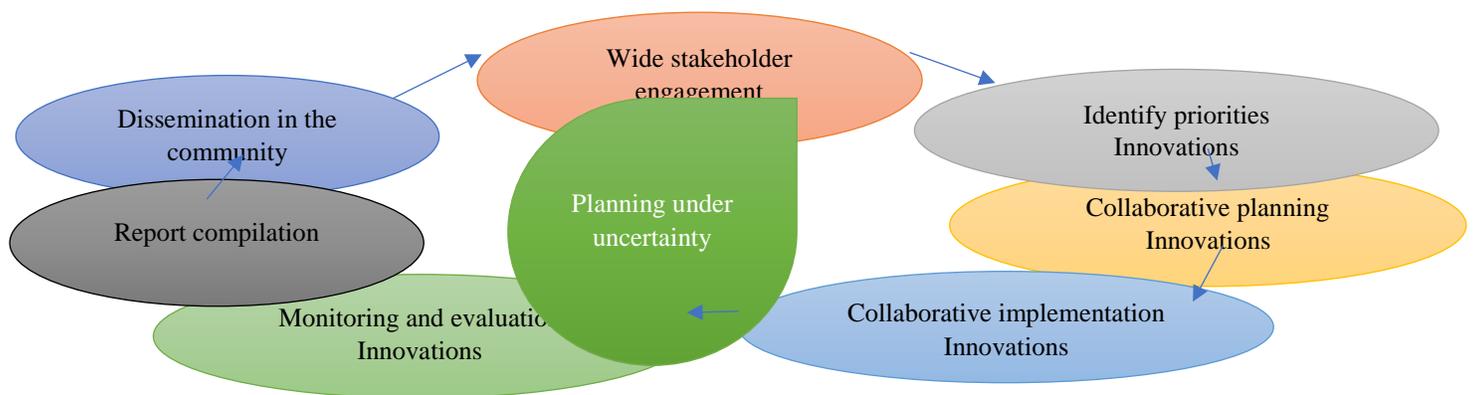


Figure 2 shows innovative collaborative planning model in the context of uncertainty

Studies have demonstrated that education that promotes curiosity and mindsets that are open and willing to explore new opportunities and pathways among individuals and communities to solutions enable innovative answers and solutions that promote the best course of action that may address local challenges and problems created by the pandemic (Research report, 2020).

## Conclusion

The review has come up with a variety of innovative individual, whole school and community approaches and strategies to initiate, promote and sustain resiliency amid COVID-19 and related pandemics through Education. Education has the wherewithal and transformative preventive and curative measures to avert excess of COVID-19 and other pandemics. Education had the content, skills and pedagogy to avert pandemics by empowering individuals and communities on how to survive and live amidst challenges posed by novel COVID-19 and related pandemics. The onus is on governments as the custodians of lives of her citizens to mobilize human, capital resources to ensure sustainable resilience is in place among individual and communities to social good and survival of humanity, which education loaded with innovative content on COVID-19 and related pandemic is quintessential.

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## Appraisal of Educational Strategies Supporting Vulnerable Children During Covid 19 Disruptions in Public Secondary Schools in Kenya: A Case of Nakuru County

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### Abstract

Following the disruption of classroom learning due to COVID-19 pandemic, many vulnerable students suffered tragic loss in various dimensions. With no physical schooling going on, these children missed out on safe learning environment, lacked assurance for regular meals, and endured considerable levels of stress and abuse at home amidst deteriorating economic conditions. Despite government's commitment to provide seamless transition to virtual learning, most vulnerable learners lacked equitable accesses to learning due to the existing digital divide and low electricity connection in the rural areas. This study aimed at appraising the education strategies for supporting vulnerable children during COVID-19 disruptions in public secondary schools in Kenya, with specific focus on Nakuru County. The study's objectives were to evaluate the impact of distribution of online resources, addressing socio-emotional needs, and parental engagement on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County. The study used descriptive survey design. The target population was 4510 individuals, comprising of 294 principals and 4216 secondary school teachers in Nakuru County. Yamane formula was used to compute a sample of 374 respondents. Stratified random sampling was used to select 2 principals and 32 teachers from each of the 11 zones in the county, summing up to 22 principals and 352 teachers. Self-designed questionnaires of 5 point likert scales were used to collect data from the respondents. Data was analyzed using descriptive statistics by obtaining frequency counts and percentages, and inferentially using t-test. The findings revealed that distribution of online resources and parental engagement considerably enhanced equitable learning of vulnerable learners during the pandemic. The study recommended that the ministry of education establishes a free complimentary platform where children who could not afford internet connection or have access to radio could receive learning resources during pandemics.

**Keywords:** *Education Systems, Vulnerable Children, Online Resources, Equitable Learning, Parental Support, Socio-emotional Support*

### INTRODUCTION

Education is a basic need for every child and it is in the interest of the society that all children get equal access to quality learning. As emphasized in the Convention on the Rights of the Child (CRC), it is a right of every child, regardless of their nationality, gender, disability, age or family background, to receive quality education (CRC, 1990). The occurrence of Corona Virus Disease 2019 (COVID-19) affected many learners in different ways including jeopardizing learning opportunities for the most vulnerable and disadvantaged children.

The United Kingdom (UK) Parliament (2008) categorizes vulnerable children as those in need, children in care and those on the periphery of care, whose development or health is likely to be impaired without the provision of social care services, including children from poor backgrounds whose parents may need care. Research indicates that vulnerable children, especially learners with special needs bore the biggest brunt of the devastating Corona Virus Disease – 2019 (COVID-19).

According to Lee (2020) in Hong Kong, children and young people with mental health needs were the most affected by the pandemic since they could no longer have access to resources available in a typical school setting. The onset of COVID-19 pandemic created one of the greatest disruptions of world education systems in modern history. A survey by Young Minds (2021) in the United Kingdom established that the pandemic had made the conditions of vulnerable children worse. The survey that involved 2011 children with history of mental health established that nearly 70% of the respondents felt that their situation had become worse after reopening of schools, compared to nearly 60 percent who reported to have had poor mental health before reopening of schools following the COVID-19 disruptions.

As the crisis escalated, education systems were so severely affected that over 1.6 billion learners in the world had their learning abruptly halted. Millions of teachers and school staff were equally impacted by the disruption of teaching and learning processes. Nearly two thirds of learners across the world are still suffering the effects of the disruption with schools in over 29 countries remaining partially or fully closed (UNESCO, 2021). While learning of the most vulnerable children in Kenya has been improving over the past decade following achievement of several millennium development goals, one issue that still needs to be addressed is education disparity. In a study carried out by UNICEF and Kenya National Bureau of Statistics (KNBS), some of the highest indicators of child poverty, which influences children's schooling, are the educational attainment of head of the family and living in the rural areas (UNICEF & KNBS, 2017).

### **Problem Statement**

Following the closure of schools in Kenya due to COVID-19 pandemic, many vulnerable children suffered a tragic loss in various dimensions. With no physical schooling going on, these children missed out on safe learning environment, lacked assurance for regular meals, and endured considerable levels of stress and abuse at home amidst deteriorating economic conditions. Despite the government's optimism on school preparedness to transition from classroom to virtual learning, many vulnerable students have had no equitable access to education due to the existing digital divide. Educators usually provide a safe place for vulnerable children through focusing on their socio-emotional wellbeing and collaborating with parents. With schools closed, vulnerable students were, other than learning exclusion faced with various negative consequences, including food insecurity, abuse, and anxiety among others. Little has been done to evaluate the efforts applied by education stakeholders to ensure equitable access to education and general wellbeing of vulnerable children during the pandemic. Thus, it was important to assess the capacity of education systems put in place to support vulnerable students during COVID-19 disruptions.

### **Objectives of the Study**

The study objectives were:

1. To evaluate the impact of distribution of online resources on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County
2. To assess the impact of addressing socio-emotional needs on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County
3. To determine the impact of parental engagement on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County

### **Research Hypothesis:**

H<sub>01</sub>: There is no significant difference between the means of teachers and principals' perception on the impact of distribution of online resources on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County.

**H0<sub>2</sub>:** There is no significance difference between the means of teachers and principals' perception on the impact of addressing socio-emotional needs on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County

**H0<sub>3</sub>:** There is no significant difference between the means of teachers and principals' perception on the impact of parental engagement on supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County

### **LITERATURE REVIEW**

As COVID-19 crisis escalated, education systems were so severely affected that over 1.6 billion learners across the world had their learning abruptly halted. More than one hundred million teachers and school staff were equally impacted by the disruption of the learning institutions. Nearly two thirds of learners across the world are still suffering the effects of the disruption with schools in over 29 countries remaining partially or fully closed (UNESCO, 2021). According to UNICEF (2020), learning of children was still in crisis even before COVID-19 pandemic, which only escalated the inequities that have more acutely affected learners in poorer countries. The report indicated that one third of the school going children around the world could not access remote learning following the closure of schools.

Despite the alternative remote learning, and introduction of necessary tools for learning at home, such as technology, skill gaps and limited support among educators have made it difficult for inclusive learning. The school closures negatively affected instructional and learning time, subsequently impeding learning performance of students with desperate needs (García & Weiss, 2020). While the most privileged children and educators have managed to adapt to the changes associated with the pandemic, majority of children including the most vulnerable have had to endure one of the most challenging learning experiences (Espino-Diaz, Fernandez-Caminero, Hernandez-Lloret, Gonzalez & Alvarez-Castillo, 2020).

Prolonged closure of schools due to pandemic can be detrimental to various aspects of child development, including cognitive, physical, psychosocial and mental health (Cluver, Lachman, Sherr, Wessels & McDonald, 2020). Following the profound challenges facing children due to the pandemic related disruptions, it is imperative to have in place systems and services that can support learning equity, inclusion and general wellbeing of vulnerable children. Some research indicate that online learning and home schooling can be effective for catalyzing learning inclusivity if resources are sufficiently availed (García & Weiss, 2020). However, nearly a third of students globally today are still unable to access remote learning due to lack of digital devices, internet connectivity or sufficient skills to use digital content (UNESCO, 2021).

Most of the literature regarding the use of digital and online learning assumes no divide in terms of equitable accessibility to requisite digital services. However, some studies have dispelled this notion. For instance, García, Weiss and Engdahi (2020), in United States found that about 16 percent of learners in eighth grade lacked access to a laptop or desktop computer at home. Further the devices that would be used for homework before the pandemic would now be shared or engaged by parents who had to work from home due to pandemic (U.S. Census Bureau. 2020). This therefore means that not all children could follow classes from home during school closure.

Further, OECD (2020) report established that while the universal response to school closure was the introduction of online learning, some students still lacked equal access to information and communication technology (ICT) platforms. According to Liu (2020) in China, online education occasioned by the pandemic was found to have widened the learning gap between the most vulnerable and privileged learners. The study found that about one out of every three learners in first to third grade

could not access online classes due to lack of connection. The study also found that only a half of learners based in the rural areas had stable internet connection, compared to 80 percent of their peers based in urban areas.

Various countries have devised diverse strategies to ensure that vulnerable children have equal access to education as their privileged peers. In Colombia, an online platform was created, where children from low-income families were supplied with over 80, 000 pedagogical resources. The system was devised in a way that learners could have free access, making it possible for poor families to access the resources when they could not afford internet connection. In United Kingdom, the Department for Education (DfE) created a remote learning platform through which students with special needs could access pedagogical resources during the pandemic (DfE, 2020).

Other countries embarked on distribution of digital learning devices and materials. In Chile, for instance, the government provided free computers with internet connection to about 125,000 poor households across various cities in the country (*Government of Chile, 2020*). Other countries involved strategies such as parental engagement to support learning continuity of vulnerable children. In Ireland, numerous resources intended for parental support were provided through the ministry of education. The resources included materials tailored specifically for parents with disadvantaged children in primary schools.

School closures can negatively affect vulnerable students' learning achievement as such disruptions impact on the most significant factors of effective learning, namely emotional, cognitive and behavioral engagement (Fredricks, Blumenfeld & Paris, 2004). Teacher social support includes interactions that convey appreciation, respect, and caring within the teacher–student interactions leading to engagement (Wang & Holcombe, 2010). When students work collaboratively in the school environment with a well-developed sense of their student voice, they can expand their knowledge base through positive cognitive and emotional interactions (Cunningham et al. 2020; Järvelä et al. 2016).

The Department of Education (DoE) of the government of Ireland indicated that schools and teachers supported the parents through encouraging and keeping in touch with children, assigning work and interesting activities during school closures. On their part, the parents supported their children through establishing daily routines, talking to children and ensuring they had peaceful environment to work and regularly checking on communication from school (DoE, 2020). This approach is consistent with earlier studies that parental involvement in child's education can improve learning outcome from early childhood and overall child development (Handerson & Mapp, 2002).

In Nigeria, Azubuike and Aina (2020) noted that inequality in education was likely to escalate during the pandemic disruptions. The study found out that various challenges, such as parents' educational background, knowledge as well as socioeconomic status impacted on children's remote learning. However, parents still got involved in supporting learning of their children through different approaches, such as downloading reading materials, reading with the children, encouraging them to read the materials and listen to radio broadcasts.

The literature indicates that the difficult times occasioned by the pandemic negatively affected learners' wellbeing, particularly those from poor families, subsequently impacting on such children's academic achievement. It is apparent that academic success is linked to learners' emotional and physical health, and education systems should be aimed at promoting learners' well-being. Indeed OECD (2020) recommended that countries needed to create programs for addressing children's socio-emotional needs, such as counseling and free meals. Schools can play a leading role in ensuring safety of vulnerable

learners through offering psychological support and creating a sense of belonging in the community by responding to their social needs (Colao, Piscitelli, Pulimeno, Colazzo & Giannin, 2020).

In the context of vulnerability amidst the pandemic disruptions, a school is more than a learning place. Beyond being a place for learning, vulnerable children feel more secure and protected from various problems, including abuse, violence and hunger. In Uganda, the government introduced homeschooling, where learning materials would be distributed to children in their homes. The government also introduced classes through radio broadcasts in local languages (Byenkya, Ssenjobe, Ouma, 2020). Many vulnerable children who had fled perennial conflicts in the neighboring South Sudan benefitted from homeschooling programs, where teachers would move door to door in refugee settlements providing homeschooling and necessary support to learners (Poulsen, 2020).

Learners in Kenya just as in other countries have severely been impacted by the COVID-19 pandemic. The challenges occasioned by the pandemic have affected the vulnerable children even harder due to the existing digital divide. This is also consistent with UNICEF (2020), in a recent report, which revealed that only 6% of learners in the region have access to internet. According to Orwa (2020), Kenya's vulnerable children especially those living in the rural areas as well as the orphaned children were the most affected by the pandemic. Although the Kenyan government tried to provide community learning, the initiative faced legal challenges and was before long discontinued through a court order.

According to Isbell (2020) access to the tools of remote education in Kenya was found to be unequal during COVID-19 shutdowns. The survey found that many Kenyan households owned technology devices that could be utilized during the shutdowns. This included 95 percent who had access to a mobile phone, 87 percent radio and nearly 60 percent who had access to a television set. However, the survey found that ownership of smart phones was rare among the poor households especially in the rural areas. Only 9% of the respondents without formal education had access to internet connection through a mobile phone, while only 26% of household heads with only primary education reported to have such access.

These disparities negatively impacted on the most vulnerable children due to the existing gaps in terms of connectivity and access to technology and communication devices. This paper therefore presents the findings on the appraisal of education systems supporting the vulnerable children during the pandemic with specific focus being Nakuru County.

## **METHODOLOGY**

The study utilized descriptive survey research design. This type of research approach aims at casting the light on issues or problems under investigation through the process of collecting and analyzing data with the aim of describing various characteristics or behaviors of individuals being studied, or aspects of a phenomenon (Fox & Bayat, 2007). The study's target population encompassed all the 294 principals and 4216 secondary school teachers in Nakuru County, summing up to 4,510 individuals. A sample of 374 respondents was selected through Yamane (1967) formula as cited in Israel (1992), computed as  $n = N \div (1 + Ne^2)$ , whereby  $n = 4510 \div (1 + 4510 \times 0.05 \times 0.05) = 367$ . While 367 was the lowest possible sample, the number was increased to 374 for better distribution across the county. Stratified random sampling made it possible to select 2 principals and 32 teachers from each of the 11 zones in the county, summing up to 22 principals and 352 teachers. The study used self-designed questionnaires of 5-point likert scales to collect data from the respondents. Data was analyzed in descriptive statistics by obtaining frequency counts and percentages, and in inferential statistics using t- test.

## **RESULTS AND DISCUSSION**

**Questionnaire Return Rate**

Following the administration of questionnaires 20 for principals and 348 for teachers were successfully completed and retrieved for data analysis.

**Table 1.0: Responses of Principals and Teachers on Education Systems Supporting Vulnerable Students during the Pandemic**

SN	Summary of Test Items	Respondents	SA		A		U		D		SD	
			F	%	F	%	F	%	F	%	F	%
1.	Learning through digital devices during COVID-19 pandemic enhanced quality learning for vulnerable students	Principals	12	60	4	20	2	10	1	5	1	5
		Teachers	188	54.1	64	18.4	29	8.3	37	10.6	30	8.6
2.	Radio broadcasts helped vulnerable students access equitable learning during COVID-19 pandemic	Principals	6	30	6	30	2	10	5	25	1	5
		Teachers	233	67.1	71	20.4	15	4.3	18	5.2	11	3.2
3.	Web-based materials enhanced equitable access to learning during the pandemic	Principals	5	25	4	20	4	20	4	20	3	15
		Teachers	204	58.6	73	21.0	35	10.0	19	5.5	17	4.9
4.	Virtual counseling of vulnerable students during the pandemic enhanced equitable learning	Principals	5	25	4	20	4	20	4	20	3	15
		Teachers	231	66.4	44	12.6	22	6.3	30	8.6	21	6.1
5.	Social support of vulnerable students during pandemic enhanced their learning	Principals	5	25	4	20	4	20	4	20	3	15
		Teachers	124	35.6	51	14.7	65	18.7	79	22.7	29	8.3
6.	Maintaining contact during the pandemic enhanced learning of vulnerable students	Principals	11	55	4	20	3	15	1	5	1	5
		Teachers	147	42.2	36	10.3	61	17.5	85	24.5	19	5.5
7.	Engaging parents to encourage vulnerable students to read enhanced equitable learning during pandemic	Principals	12	60	4	20	1	5	2	10	1	5
		Teachers	176	50.6	92	26.4	39	11.2	21	6.1	20	5.7
8.	Collaborating with parents to help download materials enhanced equitable learning of vulnerable students	Principals	8	40	6	30	3	15	2	10	1	5
		Teachers	137	39.4	108	31.0	53	15.2	29	8.3	21	6.1
9.	Liaising with parents to provide digital devices to students during pandemic enhanced equitable learning	Principals	9	45	6	30	3	15	1	5	1	5
		Teachers	103	29.6	132	37.9	28	8.1	31	8.9	54	15.5

As shown in table 1.0, 80% of principals and 73% of teachers sampled were in agreement that use of digital devices to teach during the COVID-19 pandemic enhanced equitable learning for vulnerable

students. Similarly on the second item, 60% of principals and 88% of teachers agreed that radio broadcasts were helpful in promoting equitable learning of vulnerable students. In response to whether web-based materials enhanced equitable learning of vulnerable learners, only 45% of principals agreed, compared to about 80% of teachers. Respondents were also asked whether virtual counseling of students during the pandemic enhanced equitable learning. In response, 45% of principals and 79% of teachers agreed. Regarding offering social support to vulnerable learners, 45% of principals and 50% of teachers were in agreement.

Responding to whether maintaining contact with students during the pandemic enhanced equitable learning, 75% of principals and 53% of teachers were in agreement. On the other hand, respondents were asked whether seeking parental support to encourage children to read enhanced equitable learning of vulnerable learners during the pandemic. In response, 80% of principals and 77% of teachers were in agreement. In response to the test item as to whether collaborating with parents to help download instructional materials enhanced learning of vulnerable students, 70% of principals agreed compared to 70% of teachers who were in agreement. Lastly, the participants were asked whether liaising with parents to provide digital devices to their children during the pandemic enhanced learning of the vulnerable learners. Out of those sampled, 75% of principals and 68% of teachers agreed.

*Hypothesis Testing*

To test the hypothesis that no significant difference on the impact of distribution of online resources in supporting vulnerable students during COVID-19 disruptions in public secondary schools in Nakuru County, the means of principals and teachers’ responses were subjected to independent t-test.

Table 1.1 Independent Samples Test on the Impact of Distribution of Online Resources

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Means	Equal variances assumed	2.315	.203	-1.617	4	.181	-.54000	.33385	-1.46692	.38692
	Equal variances not assumed			-1.617	2.660	.216	-.54000	.33385	-1.68353	.60353

As shown in table 1.1, there is a slight difference as shown on the p – value of principals and teachers’ means equal variances assumed. It is therefore observed that p – value of 0.203 is greater than the level of significance (0.05). Since the significance value is greater than the predetermined level of significance, we therefore fail to reject the null hypothesis that there is no significant difference between means of teachers and principals’ perception on the impact of distribution of online resource

Table 1.2: Independent Samples Test on Socio-emotional Support

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Scores	Equal variances assumed	.578	.489	-.620	4	.569	-.24667	.39811	-1.35199	.85865
	Equal variances not assumed			-.620	3.737	.571	-.24667	.39811	-1.38339	.89005

The independent t-test results further indicate that there is no significant difference between the means of principals and teachers at P – value of 0.489. This means that no significant difference exists between the means of principals’ and teachers’ perception on offering socio-emotional and therefore we accept the null hypothesis.

Table 1.3: Independent Samples Test on Parental Engagement

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Score1	Equal variances assumed	.940	.387	1.113	4	.328	.19667	.17676	-.29410	.68743
	Equal variances not assumed			1.113	3.149	.344	.19667	.17676	-.35112	.74445

The results further indicate that there is a slight difference between the means of principals and teachers regarding parental engagement in supporting vulnerable children during the pandemic at a p – value 0.387. Since the p – value 0.387 is greater than the level of significance or p – value 0.05, it is therefore observed that there is no significant difference, thus we fail to reject the null hypothesis.

### DISCUSSION OF FINDINGS

The findings of the study are discussed as follows:

The study sought to appraise the education systems used to support vulnerable children during COVID-19 disruptions. The findings revealed that distribution of online or electronic resources during COVID-19 disruptions enhanced equitable learning of vulnerable children in Nakuru County. The study revealed that schools utilized information and communication technology to deliver learning materials to students during school closure, which enhanced equitable learning for vulnerable students. The findings revealed that schools utilized radio broadcasts and distributed web-based materials to students

during school shutdowns, which were effective in making sure that all children accessed instructional materials.

The findings however revealed that use of web-based materials was not as effective in enhancing equitable learning. Out of all the principals taking part in the study, only 45% responded in the affirmative that web-based materials enhanced equitable learning of vulnerable learners. The findings are consistent with García et al. (2020) who found that many children were still unable to benefit from online resources due to lack of mobile phone or computer. This also lends credence to a report by US Census bureau report (2020), which found that children had difficulties in following classes from home since the devices that were initially used for homework were being shared with parents who had to work from home.

The results revealed that addressing socio-emotional needs of vulnerable children during school closure can be effective in promoting safety and wellbeing of vulnerable learners thus promoting equitable learning. The findings showed that schools utilized school counseling leadership to virtually stay in touch with children and families to help them cope with traumatic experiences posed by the pandemic and school closures. The results support Colao et al. (2020) that during pandemics and emergencies, schools can be supportive to vulnerable learners by responding to their psychosocial needs so as to promote sense of belonging and safety. This is also consistent with OECD (2020) recommendations for schools to have in place programs that can address children's socio-emotional needs and general wellbeing.

The findings however showed that schools were not well prepared in other areas of addressing children's socio-emotional needs. The results pointed to weaknesses especially on the facet of providing social support to students during the pandemic. The results showed that maintaining contacts with students during school closure positively impacted on enhancing equitable learning of vulnerable students. The results however showed that schools engaged parents in a partnership to encourage children to study during school closure. Collaborating with parents to help in downloading learning resources was helpful in supporting vulnerable students.

These findings corroborate DoE (2020) study in Ireland, where school leaderships collaborated with parents to support learning of their children through assigning them work and activities to do during closures. The study findings revealed that schools reached out and liaised with parents to provide children with digital devices that they required to access learning materials during the pandemic. This had positive impact on supporting the vulnerable children to have equitable learning based on the report by UNESCO (2021), which indicated that almost a third of students in the world could not access remote learning due to limitations of internet connectivity and lack of digital devices. The study null hypothesis revealed that there was no significant difference between the means of principals and teachers on the impact of distribution resources, addressing students' socio-emotional needs and parental engagement in supporting vulnerable children during COVID-19 pandemic.

## **CONCLUSION**

Based on the findings the study made the following conclusions:

The study concluded that education systems put in place during COVID-19 pandemic were generally helpful, and enhanced equitable learning for vulnerable children in secondary schools in Nakuru County. The study concluded that digital devices used for remote learning during the pandemic enhanced quality learning and promoted equitable learning. The study concluded that use of radio broadcasts was helpful in reaching most of the children even in rural areas where coverage of internet and mobile network was poor.

The study concluded that distribution of web-based materials was not very effective due to lack of internet connectivity and availability of digital devices such as laptops desktop computers and mobile phones especially in rural areas. It was concluded that virtual counseling and maintaining contact with learners during the pandemic enhanced equitable learning. The study however concluded that providing social support was not effective in supporting vulnerable students' learning.

The study concluded that collaboration between schools and parents positively impacted on equitable learning during the pandemic. The study concluded that the collaboration enabled parents to fetch the materials supplied online for their children, provided them with the digital devices they needed to interact with online resources and assigned them tasks and activities.

The null hypothesis that there is no significant difference between the means of teachers and principals' perception on distribution of resources, addressing students' socio-emotional needs and parental engagement in supporting vulnerable children during COVID-19 pandemic was retained.

### **RECOMMENDATIONS**

The study recommended that the Ministry of Education establishes a free complimentary platform where children who could not afford internet connection or have access to radio could receive learning resources during pandemics. There is need for policy makers in the Ministry of Education to develop resources and remote learning platform to cater for learners with special needs during pandemics or emergencies. There is need to conduct regular workshops and continuing training for teachers on effective ways of using and integrating modern technology to complement standard instructional delivery during pandemics or emergencies.

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## Influence of Principal Management Practices of Academic Progress Records on Students' Academic Performance in KCSE in Public Schools in Mashuru Sub-County

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### Abstract

The purpose of the study was to determine the influence of principals' management practices of academic progress records on students' academic performance in KCSE in public schools in Mashuru Sub-County. According to records available from the office of the Kajiado County Director of Education, the performance of students in KCSE in Mashuru Sub-County has not only been poor but also spiralling downwards. This has culminated in only 23 students attaining a grade of C+ in a period of four years. The minimum grade for university entry for KCSE graduates is C+ whereas majority of the candidates in the subcounty are scoring below D+. The study utilized a descriptive research design. The target population consisted of 45 principals, 540 teachers and 585 student leaders totalling to 1170. Simple random sampling was employed to select a sample size of 13 principals, 54 teachers and 56 student leaders. Data was collected by use of interview schedule for principals and questionnaires for teachers and student leaders. The collected data was analysed using descriptive statistics consisting of frequencies and percentages with the help of SPSS. The study concluded that that principals' management practice of academic progress records influence students' academic Performance in KCSE in public secondary schools, hence compromising the quality of examination grades achieved in the sub-county. From the students, it was established that this activity had no definite time in many schools and the principals cited that they were facing a number of challenges which hindered efficiency in the practice of management of academic progress records, translating poor academic results. The findings of the study will help the Ministry of Education in formulating of assessment modules for students' academic progress as well as empower the principals to enhance performance.

**Keywords:** *Principals' Management Practice, Academic Progress Records, Students' Academic Performance in KCSE, Public Secondary Schools*

### 1.0 INTRODUCTION

Instructional supervision endeavours to improve students' achievement. The principal's task is to initiate academic activities leading to a successful realisation of set goals and targets. Principals are leaders and managers of all that take place in schools. They are charged with ensuring that educational strategies are put in place to support effective teaching and learning in schools (Naomi, Ronoh & Tanui, 2016). Ayako (2009) observed that effective school principals set goals for academic achievement by harnessing their resources to attain them. They are conversant with timetabling procedures for effective teaching, management of professional records and academic progress records, class visitation as well as to monitoring, setting and administration of examinations. Namunga (2017) points out that academic performance could be improved if instructional performance is heightened with good teacher-student observation, frequent checking of teachers' professional documents, induction of new teachers and having instructional conferences to improve teaching and learning. This is corroborated by Mutinda (2016) and Reche, Bundi, and Riungu (2012) who found that if principals conduct their role effectively in instructional management, there is inevitable influence on improved students' academic achievement in KCSE.

Bernard and Goodyear (2002) stated that some supervisors will not be able to carry out instructional evaluation effectively if they are not well qualified and trained in techniques of evaluation, versed with

subject content, good organization skills and ready to accept teachers' idea and interest. Danielson and MCGreal (2000) cited limited supervision experience and skills as being a problem in teacher supervision where supervisors lacked enough training in providing constructive feedback while maintaining professional relationship. Mbera (2015) asserts that many school principals experience great difficulty in balancing their administrative duties with their curriculum leadership or instructional function.

In Kenya, principals have the responsibility of directly influencing goal setting, tasks accomplishment and supervising curriculum implementation. They are expected to have working knowledge of effective instructional strategies in order to understand the instructional needs of their students and teaching staff to effectively address emerging needs (Blankstein, 2010). Principals are bound to help teachers to comprehend instructional goals and work with them to improve content delivery with clear understanding that what student learn is critical.

### **1.1 Problem Statement**

According to records available from the office of the Kajiado County Director of Education (2020), the performance of students in KCSE in Mashuru Sub-County has not only been poor but also spiralling downwards. This has culminated in only 23 students attaining a grade of C+ in a period of four years. The minimum grade for university entry for KCSE graduates is C+ whereas majority of the candidates in the subcounty are scoring below D+ (CDE-Kajiado County, 2020). The poor performance calls for a scrutiny of what could be the cause to this status quo. Just like many public schools in Kenya, schools in Mashuru Sub-County have the necessary resources – including textbooks, furniture, classrooms and trained teachers. Despite such effort, the performance in K.C.S.E continues to decline. There is therefore need to establish whether despite all efforts put in place by all concerned educational stakeholders there exists a link between principals' instructional supervision and the students' academic performance in KCSE since 2016 in the sub-county.

### **1.2 Objective of the Study**

The objective of the study was to determine the influence of principals' management practices of academic progress records on students' academic performance in KCSE in public schools in Mashuru Sub-County.

## **2.0 LITERATURE REVIEW**

### **2.1 Theoretical Review**

#### **2.1.1 Systems Theory**

The Systems Theory which was developed by Ludwig Von Batenlaffe (Patton & McMahan, 2006). A school as a system is composed of various parts which work in an interrelated manner for accomplishment of stated goals. A school exists in the form of an open system because it receives input from the society and it also gives output to the society. The school receives curriculum, teaching materials, finances, teachers, parents and students. The principal coordinates the activities as he/she performs the instructional supervision tasks. Checking of professional documents, class visitation, checking students' academic progress records and implementation of instructional programmes play a major role in the realization of the institution's objectives. The teacher, students and parent as representatives of the environment influence the function of the system at greater percentage. It is also applicable that the institution as a process unit shapes the environment. Therefore, effective instructional supervision such as principal management practice of academic progress records by principals plays a major role in the success of an individual student, school and the entire society.

### 2.1.2 Role Theory

Role Theory which was advanced by Gatzels and Egon (1975). They looked at an organisation as a social system. The theory espouses a social system where individuals define their role, role of others and expectations (Nyongesa, 2007). The theory postulates that people in their position use their roles to perform their functions and their roles dictate their outward mannerisms. This affects the responsibilities and the expectations in regard to the roles and more so in educational institutions (Hindsin, 2007). According to this theory, education has various positions; namely, principals, HODs, teachers, parents, education officials, the government, and students and if one fails in their role then the system fails. A school receives teachers and students from the society and the head teacher coordinates the activities as he/she performs his/her instructional supervision tasks: checking of the professional records, pupils' notes/exercise books, classroom visitation, provision of learning and teaching resources, checking of students and instructional programmes play a major role in the realization of good performance (Perker & Wikman, 2005).

### 2.2 Empirical Literature

In monitoring students' progress, Halverson (2005) observed that school leaders should have intermittent measures of student learning across the classes and that collaborative focus should be encouraged on problems of teaching and learning. Meetings to discuss school instructional initiative should be organised and learning goals discussed based on student achievement data. A principal who provides instructional leadership promotes performance through frequent monitoring of students' progress. The strategies for monitoring student progress is keenly based on the usage of student data for instructional decision making, meeting regularly with teachers to review students' progress, and continuously checking on student progress data to assess teacher effectiveness. Principals are basically concerned with value-addition and commitment to raise student standards, school improvement and facilitating the process of change (Barber, Whelan, & Clark, 2010).

Lydia and Nasongo (2009) observed that the most outstanding factor that influence students' performance in examinations has to do with the school management and that principals play this significant role due to their tasks and roles. According to Bush, Kigunda and Moorosi (2011), effective leadership promotes favourable school and learners' outcome. Principals' leadership as instructional supervisors in checking students' academic progress plays an important role in the outcomes of the set goals. It is the genius of the leadership of the principal that mobilises human and material resources and creates the necessary climate of students' productivity in quality grades (Pont, Nusche & Hopkins, 2008).

The key function through which principals' leadership appears to shape students' outcomes includes setting directions, selecting and developing teachers, establishing supportive conditions and shaping core values. Alimi and Akinfolarin (2012) conducted a study on the impact of instructional supervision on students' academic performance in senior secondary schools in Ondo State, Nigeria. Their study found out that there is significant impact on checking pupils' notes on academic performance in English language subject area. Williams (2003) and Campbell (2008) assert that, there is a significant impact of checking of students' academic performance in English language subject in secondary schools in New York City, USA. They argued that checking of student progress is a mediating influence on teachers, instructional community and school organization that lead to high performances.

McDevitt (2008) on forming personalized goals and monitoring academic progress established that students' academic self-regulation on their goal directed learning strategies related to attainment of educational standards. The consistent monitoring of students' progress by principals saw an increase in their academic performance in KCSE. Pansri (2008) affirmed the importance and usefulness of

providing extra coaching to pupils who are preparing for major national examinations. Frequent exposure of students to tests can improve examination performance. Promptness in giving and making homework assists in identifying areas of weakness to be improved.

### **3.0. RESEARCH METHODOLOGY**

A descriptive survey design was used to guide this study. The target population consisted of 45 principals, 540 teachers and 585 student leaders totalling to 1170. Simple random sampling was employed to select a sample size of 13 principals, 54 teachers and 56 student leaders. Data was collected by use of interview schedule for principals and questionnaires for teachers and student leaders. The collected data was analysed using descriptive statistics consisting of frequencies and percentages. Data was analysed with the help of the SPSS version 27. Analysed data was presented using frequency tables, pie-charts and bar graphs.

### **4.0 KEY RESULTS AND FINDINGS**

#### **4.1 Response Rate**

Results demonstrate that all the students filled in and returned the questionnaires while 47 questionnaires administered to the teachers were properly filled and returned. Of the 13 targeted interviews, the researcher managed to successfully interview 11 principals. The results show that the study had a response rate of over 80% as shown on Table 1.

Table 1: Response Rate

<b>Response</b>	<b>Sampled Respondents</b>	<b>Successful Participants</b>	<b>Return Rate</b>
Principals	13	11	84.6%
Teachers	54	47	87.0%
Students	56	56	100%

## Towards a Virtual Environment for Sharing Curriculum and Research Collaboration among Universities in Kenya during COVID-19 Pandemic

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### Abstract

Universities in Kenya need to be aware of the impact of curriculum and course sharing in order to become world-class academic institutions and to help one another during this period of COVID-19 pandemic. This research filled an unexplored gap in regards to the impact of curriculum and course enablers; trust, knowledge self-efficacy, reciprocal benefits, top management support, organizational rewards, organizational culture, curriculum system infrastructure and curriculum system quality, openness in communication, and face-to-face (F2F) interactive communication on knowledge sharing that supports teaching, learning and research collaboration by University faculty members. The study further classified these enablers into a six-point pyramid of variables on adoption; personal volition, education resource availability, technical capability, conceptual awareness, legal permission, infrastructure access. The purpose of this study was to research factors associated with curriculum sharing that University management should leverage to ensure a strong innovation management process and successfully deliver quality teaching and learning to the intended customer. No prior research has focused on the impact of curriculum enablers that influence research university members to share knowledge, research findings, and curriculum and course materials via a virtual environment. Virtual education environment is a standard and accepted way of life, and many people prefer the virtual system as it comes with numerous advantages such as saving on costs and time spent. A self-administered questionnaire was employed on members of fourteen universities in Kenya. The usable responses were analysed using partial least squares path modelling.

**Keywords:** *Strategies, Curriculum, Virtual environment, Virtual education, Research, Universities, partial least squares.*

### Introduction

The evolving growth in networking and telecommunication technologies leads to their enhanced usage in many and different aspects of human activity. One of the technologies that shows great interest is Collaborative Virtual Environments, which may be used in various applications, such as tele-education. Virtual Learning Environments (Britain & Liber, 1999) are learning management software systems that synthesize the functionality of computer-mediated communication software and on-line methods of delivering course material. Most of the systems that are currently under development are intended not simply to reproduce the classroom environment online, but also to use the technology to provide learners with new tools that facilitate learning. An Educational Virtual Environment is a system where the emphasis is mainly on the “education and collaboration” Bouras, Psaltoulis, Psaroudis, & Tsiatsos (2002). Collaborative e-learning is any kind of learning process performed by more than one person that takes place mainly in a virtual environment Michailidou, & Economides, (2002).

Development of a virtual environment for collaborative teaching and learning and sharing research outcomes is an important and difficult task. Pedagogical issues, like conceptual learning, collaboration, constructivism and adaptability, should be taken under serious consideration. These parameters are crucial in achieving strong learning effectiveness. The parameters to consider include; the pedagogical – psychological issues, the technical - functional issues, the organizational - economic issues and the social - cultural issues

The implementation of innovative pedagogical practices is a response to the social needs for educational advancement. Participants are experiencing new ways of learning and communicating with teachers by organizing the learning environment in a different way, based on several technological innovations. Additionally, one should respond to the academic, linguistic and cultural diversity of today's world, to avoid the risk of creating systems of low social, pedagogical and economic efficiency.

Education has long been seen as a crucial tool for national development, with various education initiatives designed to work towards eliminating poverty, increasing the health of a population or enhancing local economies, among others.

Higher education plays an important part in the life of any country as it provides them with highly-qualified specialists for future development and progress. Currently higher education is facing a number of challenges: rapid technological development, growing competition between universities both nationally and internationally. Besides, in spite of the financial crisis which has affected the whole world standards of living are steadily changing in Kenya. Today's world is vastly different from that of 20 years ago. And the pace of change is accelerating, with increasing globalisation; advances in technology, communications and social networking; greatly increased access to information; an explosion of knowledge; and an array of increasingly complex social and environmental issues. The world of work also is undergoing rapid change with greater workforce mobility, growth in knowledge-based work, the emergence of multidisciplinary work teams engaged in innovation and problem solving, and a much greater requirement for continual workplace learning. Student pressure on universities to help them get good jobs is not new, but it is becoming a greater priority of governments as well. Governments in many countries have for years put pressure on universities to be relevant and responsive to societal needs. This initially focused on applied research and expanding access, but recently, improving employability has been added to the list. University curriculum must attempt to equip students for this significantly changed and changing world. The rising cost of traditional education is another reason for change. While it is clear that higher education systems and institutions worldwide face unprecedented challenges in meeting the increasing demand for initial and continuing education, it is also clear that there are developments that will increase access, make learning opportunities more flexible and help contain rapidly increasing costs.

However, many features of university curriculum have been unchanged for decades. We continue to present disciplines largely in isolation from each other, place an emphasis on the mastery of large bodies of factual knowledge and treat learning as an individual rather than collective activity. This all means that the kind of education, which was good enough twenty years ago, is not good today Frumina, E., West, R., (2012). This means that styles of teaching, quality of learning materials and university education management have to be brought up-to-date and improved Tuomi, I., (2013). The time has come to reimagine education.

One of the important issues which has to be settled in Kenya is developing connections between universities and business by means of implementing new technologies in education and making education, to a greater extent, international. Universities focus on educating people and in creating new knowledge and excelling in existing know-how, while companies concentrate on mastering the challenges of a competitive environment and are striving for market success. Current pedagogical approaches are insufficient for preparing students pursuing higher education globally as well as the type of leaders, entrepreneurs, and thinkers that we need for the future. The curriculum of most institutions still focusses on acquiring skills needed to become a researcher or a scholar. What is even worse, most university teachers have no practical experience other than research and teaching. The vast majority of graduates, however, do not plan to become researchers, nor would they ever become scholars. What they really need is adequate training, real-world experience and practical knowledge.

Only with students being well-educated in new methodologies and corporate experts transferring these innovations into practical projects which involve students, it will be possible to see how the collaboration can bring about mutual advantages.

The researcher believe that only a balanced combination of well-designed, standardised and evidence-based professional university education with implementation of Open Educational Recourses (OER), with Shared Online Courses (SOC) and Massive Open Online Courses (MOOCs) can provide a solution to the problems mentioned above especially in the wake of the global corona virus pandemic.

This study critically look at the developing global challenges such as; no overcrowding in places including classrooms, the ongoing restrictions on keeping social distance due to COVID-19, the duplication of curricula, funding of research, lack of adequate experts in various programmes and new market demands. The paper proposes a virtual environment (VE) that will enable room for collaborating universities to formulate and developing acceptable policies that govern the environment.

### **Situational Analysis**

The globalisation of the world's economies is leading to increased permeability of national educational boundaries as well as to greater emphasis on the internationalisation of curricula. Internationalisation continues to be on the agenda of higher education providers worldwide. It has significance for the sustainability of higher education at national level and subsequently the contribution that higher education makes to the development of a nation, its people; and its ability to compete in a global market. Developing the ability to be flexible, to adapt to differing contexts, to apply skills and knowledge, to be able to engage with other students who are internationally or culturally diverse – these are all characteristics of students in a successful university of today. Thus, the internationalisation of higher education seems to be a double-edged phenomenon, inducing growing collaboration and growing competition among countries and among institutional providers Altbach, P.G., Reisberg, L., Rumbley, L.E., (2009).

Internationalisation takes many forms, including co-taught courses and degrees, online courses, academic faculty exchanges, student recruitment and joint research, collaborative research projects and student exchanges. All this has become possible only recently, with the emergence of the Internet, to a greater part. Today, almost all higher education institutions offer programs that integrate digital media in an online environment to provide flexible learning opportunities, independent of time and place. All of these activities involve reaching out into the international arena in some way and partnering with or communicating with institutions, staff, faculty and students in other countries European Commission, (2014) This cannot be fully applied to Kenya, though. Despite the growth of and further demand for international links and partnerships, there remain a variety of challenges, particularly relevant to its higher educational system. One key barrier is a finances, the GoK cannot get financial support for either students or academic faculty exchanges or for co-taught courses.

At last, while the internationalisation of the higher education classroom provides many benefits, challenges are also associated with a culturally diverse and rich environment. Each culture that is represented possesses varying expectations, perceptions, and prejudices based upon their cultural norms and experiences. Unless these differences are recognized and addressed, a true globalization of the classroom will not exist. Rather, students from different societal backgrounds will co-exist in the same classroom, but intercultural learning will not occur Crose, B., (2011).

### **Information Communication Technology and the Society**

Although information and communication technology has been widely introduced to most domains of human life, researchers have not yet come to an agreement of how virtual environments should be

defined. From the 1980's, social scientists began to use the concept of 'virtual community' to describe people linked by e-mail and other similar systems on the Internet. Howard Rheingold (1993) defined a virtual community as follows: Virtual communities are social aggregations that emerge from the Internet when enough people carry on ... public discussions long enough, with sufficient human feelings, to form webs of personal relationships in cyberspace.

For Rheingold, virtual communities emerged in response to a widespread 'hunger of community', a hunger which is increased as more traditional types of communities disintegrate (Mercer, 2000). However, many communication researchers like Neil Postman and Neil Mercer have suggested that there are four good reasons for being cautious about applying the term 'virtual communities'. Compared with 'community of discourse' and 'community of practice', the term virtual community has been mostly used very loosely, and it has been suggested that, unless it is more precisely defined, it will be of little value. For this reason, instead of the concept of community, we use in this publication the concept of environment to refer to the virtual sites and places used as other environments of learning and working.

The virtual environments, which have emerged with the growth of the information society, do not exist in isolation from the wider social context. The information society, which is based on global information environments, has been characterized as a society in which knowledge is situated in dynamic weblike networks rather than in static, often hierarchical structures Castels & Himanen (2001). Information societies have also been characterized as learning societies which implies that continuous learning is a necessity for communities as well as for individuals. Moreover, learning is not something that takes place only in the context of schools and other institutions. Rather, it is a central constituent of human life – indeed, a way of life. Such a conception of learning corresponds to a definition of learning as something essential to human survival. This definition is all the more apt when our environment is undergoing continuous and rapid change.

### **The Kenyan Higher Education**

The economic and political events of the past decades have had a dramatic effect on every sphere of Kenyan life, including the education system. These reforms brought new ideological and managerial freedom for universities as well as new opportunities and demands. The higher education reform in Kenya are aimed at bridging the gap between the educational quality of the graduates, research outputs and the ratio of academic staff and non-academic staff. The situation in higher education is complicated by many problems resulting from Kenya's economic difficulties and the transition to a market economy.

As a result, the system of higher education has undergone considerable change in the following areas: Goals: with an orientation towards the needs of the market, society, and individuals; Structure: hiring of more academic staff than non-academic staff and assigning administrative functions of the university to academic staff ; Autonomy of higher educational institutions: universities left to shape their own niches; Financing: diversification of financial sources instead of a reliance solely on state financing; Content: increasing the humanitarian components in the curriculum, and diversifying programs and courses Nikolaev, D., Chugunov, D., (2012).

The system continues to experience major changes, all connected to the political goal of improving the quality and therefore international competitiveness of the country's universities. Political initiatives focus particularly on the consolidation of the system, which is characterized by a very high number of higher education institutions, many of which do not meet national and international quality standards Zawacki-Richter, O., Kondakci, Y., Bedenlier, S., Alturki, U., Aldraiweesh, A., Püplichhuysen, D., (2015). The thing is that the network of higher education institutions has experienced significant growth and decline, increasing by almost 200 percent in 2015 and then decreasing by about 40 percent in 2020.

At the moment, the Kenyan higher education system remains relatively centralized; the Government of Kenya provides no less than 80% of all higher education institutional expenditures and keeps all state-owned institutions' funds under strict control through a special system of treasury accounts, it provides accreditation, attestation and licensing of all institutions, private or public, it establishes considerably detailed unified standards of higher educational programs defining the curricula and content for all disciplines and it maintains a monopoly on controlling the issuing degree level diploma certificates.

In Kenya, there are three possible ways of studying at universities and other higher education institutions: conventional study: students attend mandatory face-to-face lectures, seminars, practical classes (usually 21 -27 hours a week); combination of face-to-face and self-study: students attend evening and week-end classes (after 5.00 pm and on Saturdays and Sundays) at the university 3-4 times a week and combine it with self-study (usually 21 hours a week); correspondence study, combined with face-to-face study blocks: twice a year students attend face-to-face sessions including lectures, seminars and examinations

Online education and eLearning is was not considered to be a part of university education until the COVID-19 pandemic came early 2021. Currently most universities in Kenya have at least a learning management system and web conference application that enables them to provide online learning as a measure to avoid physical contact to help reduce and contain the spread of the virus.

On the other hand, significant development of Internet connectivity around the world and proliferation of digital devices give birth to new uses in the field of teaching and learning and there are strong efforts by the Kenyan Government, as well as higher education institutions, to increase the range of programs and courses offered online, to improve their quality and to make new forms of education a universally accepted part of university education. The time has come to reimagine education and regional state-budgeted universities have to do it with a minimal expenditure.

### **The Research Strategy**

The current pedagogical approaches are insufficient for preparing students pursuing higher education globally as well as the type of leaders, entrepreneurs, and thinkers that we need for the future. The rising cost of traditional education is another reason for change. So are the enormous advances in technology that allow the customization of education to individual learning styles, group learning, online interactivity, gaming and real-time employer projects.

At the same time, technology is becoming central to the process of learning and teaching in higher education and it is also driving wider access to education and training. As societies rapidly develop into knowledge-based information economies, information technology becomes a key driver of both economic competitiveness and social development.

We all know that eLearning and open distance learning has gained momentum around the world as a new, flexible, and dynamic way of acquisition of academic knowledge and professional experience in a complex albeit changing and challenging global environment of the XXI century Giving Knowledge for Free: the emergence of open educational resources”, (2007).]. But now it is not enough. There are three innovative practices that can successfully reform and improve the existing system of higher education in Kenya if properly introduced. Thus, the researcher hopes to develop a “Virtual Learning Environment (VLE)” with implementation of Open Educational Recourses (OER) with Shared Online Courses (SOC) and Massive Open Online Courses (MOOCs).

### Massive Open Online Courses

In 2011, the respective roles of higher education institutions and students worldwide were brought into question by the rise of the Massive Open Online Courses. MOOCs are freely available, accessible and contain materials that are cleared for use in any educational or personal context. The European Commission defines a Massive Open Online Course as: “an online course open to anyone without restrictions free of charge and without a limit to attendance, usually structured around a set of learning goals in an area of study, which often runs over a specific period of time (with a beginning and end date) on an online platform which allows interactive possibilities (between peers or between students and instructors) that facilitate the creation of a learning community. As it is the case for any online course, it provides some course materials and (self) assessment tools for independent studying” Alekseev, O., (2014). These courses are offered mainly by universities, and, increasingly, institutions around the world are joining various MOOC platforms to offer their courses.

The literature on MOOCs is growing Barber, M., Donnelly, K., Rizvi, S., (2013). This literature tends to acknowledge that MOOCs bring an impetus of reform, research and innovation to the process of learning. For example, using a definition of MOOCs as courses which “are free of charge, open to a global audience and built for large numbers of people”, Prof. M. Barber from Institute for Public Policy Research identifies the significant difference between MOOCs and prior forms of online learning as “this shift from depending on the government to focusing on the customer – in this case the student – has played out again and again in other sectors as globalisation and technology have changed the rules of the game.” Anderson, T., Dron, J., (2011).

American and European literature addressing MOOCs from the perspective of university education considers the pros and cons of MOOCs for universities, assesses the problems of MOOC production and delivery, forecasts MOOC impact on university models, and analyses trends Feldmann, B., Schlageter, G., (2011). However, there is little published discussion on MOOCs and their possible contribution to university education in Russia and some universities and their staff have not even heard about them.

Still, MOOCs offer university-level courses without the need to complete an entire program. They are ideal for unsupervised activities and other universities can select courses from any institution offering them to their students. There are very few face-to-face courses that include the flexibility of online access to lecture materials and recordings.

MOOCs provide an online version of a complete course, with video instruction, online quizzes and forums to encourage student engagement, virtual office hours where professors communicate with students, and graded assignments (using software or peer students to do the grading) to evaluate whether students learn from the course.

The main limitation of these distance-learning approaches is the fact that it only impacts those whose primary motivation is to acquire new knowledge and skills. In other words, this type of course is not very effective with those who are only motivated by obtaining credits. The MOOC format itself suffers from weaknesses around access, content, quality of learning, accreditation, pedagogy, poor engagement of weaker learners, and exclusion of learners without specific networking skills.

Another problem here is that content from a MOOC offered by a university outside your students' home country may not match cultural and other conditions with which they are familiar. There may also be some issues for students who lack motivation Hanson, J., (2010). Since a MOOC is voluntary and there is no penalty for dropping the program or lagging behind, there may be issues with course completion. Although a student may have received an excellent education, there will not be a corresponding diploma. Besides, MOOC certificates are not recognised by Russian universities at the moment, so

MOOCs serve mostly for the purpose of self-education. Besides, Russian universities face here other problems, including the need to localize content by translating it from English into Russian and a difficult adjustment of online courses to Russian universities' curricula.

On the other hand, at a national level, MOOCs represents a further blurring of the borders between formal and informal learning, and universities are recommended to study how MOOCs can be efficiently used to meet some of the demand for increased lifelong learning.

### **Open Educational Resources**

First of all, it is Open Educational Resources: digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research [20]. The development of the information society and the widespread diffusion of information technology give rise to new opportunities for learning. At the same time, they challenge established views and practices regarding how teaching and learning should be organised and carried out. Higher educational institutions have been using the Internet and other digital technologies to develop and distribute education for several years. Yet, until recently, much of the learning materials were locked up behind passwords within proprietary systems, unreachable for outsiders. The open educational resource (OER) movement aims to break down such barriers and to encourage and enable freely sharing content Giving Knowledge for Free: the emergence of open educational resources", (2007). The term "OER" is not synonymous with online learning, eLearning or mobile learning. Many OER – while shareable in a digital format – are also printable.

Let us mention briefly that it was the Massachusetts Institute of Technology that first talked about placing learning materials for free on the Internet in 2001. Soon after the term "Open Educational Resources" (as well as an abbreviation OER) emerged and was defined as: "educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes" United Nations Educational, Scientific and Cultural Organization (UNESCO), (2002). The trend towards sharing software programmes (open source software) and research outcomes (open access publishing) is already so strong that it is generally thought of as a movement. It is now complemented by the trend towards sharing learning resources – the open educational resources movement.

Using OER is not cheating; in fact, it can improve the quality of learning experiences by building on other people's work. Too often staff are creating learning materials for modules and courses that have already been developed elsewhere to an excellent standard.

Since this first initiative, the number of repositories storing OER has grown in number and constantly shifts. The institutions involved so far seem to be well-reputed internationally or in their countries. Attitudes are changing in education globally to promote the open sharing of educational courses and resources Anderson, T., Dron, J., (2011).

The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them. OERs range from textbooks to curricula, syllabi, lecture notes and recorded lectures, essay questions and other assignments, tests, projects, audio video and animation, discussion topics or reading lists. Teaching staff can "pick and mix" them to suit their own purposes Butcher, N. (2011).

That leads us to the role that institutional staff play in producing and what is more important for our study using the content. A number of studies conducted in European universities have explored staff attitudes towards OER Giving Knowledge for Free: the emergence of open educational resources", (2007). Generally, the most significant barriers surrounding the use of OER included the lack of time and lack of a reward system. In Russia we add here staff attitudes to borrowing and sharing resources.

A culture of borrowing and sharing of resources exists between close colleagues, but not further afield something like “I only use resources recommended by someone I know and trust”, and whilst some teachers would obtain resources from the Internet, they are unwilling to place materials there saying: “Why give away resources to other universities?” Besides, the concept of open licensing with respect to content has arrived to Russia relatively recently: people producing and using intellectual products in Russia are predominantly familiar with the concepts of copyright and author rights and unaware or know very little about open licenses, the more so as the culture of sharing is not prevailing yet.

Another difficulty of using OER is that the openness of the resources is often limited by a language barrier. Most repositories are in English and university staff in Russia use and create their own cultural content in their own language. That is why advantages of OER and opportunities they offer to different levels of the educational system are not yet fully recognized.

As for the arguments supporting OER projects, they are as follows: OER expand access to learning for everyone but most of all for non-traditional groups of students and thus widen participation in higher education; they can be an efficient way of promoting lifelong learning for both the individual and the government; they can bridge the gap between non-formal, informal and formal learning.

Thus, OER projects expand access to learning for everyone, most of all for non-traditional groups of students and thus widen participation in higher education. They can be an efficient way of promoting lifelong learning. They can bridge the gap between non-formal, informal and formal learning. OER is itself a challenge, but may also become a sound strategy for individual institutions to reimagine.

### **Shared Online Courses**

Shared Online Courses are high-quality online courses and learning modules that are broadly available for sharing across multiple institutions. The idea of SOCs comes from MOOCs as to share eLearning courses via a learning management system now is common Baaren, J. van der, (2015). Still there are differences here; A SOC is a combined effort of higher education institutes and not of an individual company or a prestigious university. Current approaches to reduce cost have a negative effect on quality and diversity (smaller studies disappear). Only by sharing resources this can be prevented. Resource sharing is not necessarily restricted to digital resources; also teachers can be shared, e.g. by using on-line classes or webinars, SOCs developed by a group of universities are good quality courses and materials positioned within their institutional branding and are available online for students of these universities only and SOCs also provide support for actual certification to be carried out by certain universities. Certification is probably the last service universities want to lose. That is the reason Shared Online Courses are not open.

This initiative aims to present the various online offerings of Kenyan universities on one website, and to develop a platform for further development of high-quality online education in the country Sigalov A., Skuratov A., (2012). Its long-term goal is to make a full analogue of university’s curricula which will allow to get knowledge of the same level and quality as during academic education. It implies high requirements to the developing programs and their effectiveness. Students will have an opportunity to successfully complete the basic education programs staying at home. This resource is expected to raise higher education to the next level and improve overall quality in regional universities and affiliated structures

The platform, used for publishing online courses created by the members of the Association, facilitates the adoption of international standards, formulates its own requirements concerning the quality of online courses and collaborates with providers of higher educational programs, which are implemented

using online courses hosted on the platform. Each course undergoes an internal expertise at a university, and a review by the Association to ensure compliance with the “Requirements and Recommendations for Online Courses on the National Open Education Platform”, co-developed by members of the Association. In contrast to other on-line educational resource, Open Education is designed primarily for university students. Nearly all the offered courses are part of higher education programs and are compulsory modules in higher education curricula. Upon successful completion of the course, learners get a course certificate, and credits for the course can be counted towards the students’ curriculum at any university in Russia. In the future, students will be able to master a major part of their university program online by taking courses on this platform. Since the teacher’s role as supplier of reading lists and teaching materials is diminishing, SOCs are likely to accelerate changes in the traditional teaching role and the evolution of more independent learners. Most university authorities believe that the quality of education in Kenya will grow thanks to the fact that any student from any Kenyan university will be able to take courses at top Kenyan universities wherever and whenever they choose. Still now the choice of courses on the platform is limited. It is the goal of the Kenyan Ministry of Education to incorporate more universities in this national open learning initiative and to increase the number of courses offered via this gateway.

The ultimate goal of the program is to replace distance learning with online courses, improve the quality of education in universities and regional branches, make the educational process in Kenya more modern, and improve students’ computer skills. Furthermore, the introduction of new technologies will enable the program creators to produce more research resources for universities and increase competition in higher education by enabling students and administrators alike to choose their online options in accordance with the suitability and quality of the courses.

### **Conclusion**

Technology is becoming central to the process of learning and teaching in higher education and, in some countries, is driving wider access to education and training. As societies rapidly develop into knowledge-based information economies, information technology becomes a key driver of both economic competitiveness and social development. Knowledge in information technology has thus become a central pillar of higher education – both implicitly in how information is shared and explicitly in preparing students for the global markets they will enter after graduation.

The current challenges facing traditional higher education, including higher tuition, budget cuts, and the gap between theoretical and practical training, have caused many universities to search for alternatives. Thus, online learning environments have come to the forefront of higher education. The options the researcher choose are implementation of Open Educational Recourses, Shared Online Courses and Massive Open Online Courses into the educational process. All three offer new approaches to traditional campus-based teaching, with virtual learning environments used for course administration, storage of course content and additional resources. Still these new resources should be introduced gradually, while maintaining proper balance between introducing them and traditional education. Only on this condition will we create a new effective learning environment and increase students’ satisfaction, better management of intellectual property, and community building.

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## COVID- 19 Pandemic and its Impact on the Lecturers’ and Students’ Performance in Teaching and Learning at Kenyatta University, Kenya

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### Abstract

The outbreak of the Covid-19 pandemic brought unprecedented disruptions in all aspects of human life across the globe. In the education sector, university calendars were re-scheduled and in-class learning was commuted to online platforms. The present study focused on performance of lecturers and students at Kenyatta University. The chosen institution has the second largest number of enrolled students and it is ranked as number 2 in Kenya. Performance, in this study, is broadly defined as ‘the expectations placed on the lecturers and students during their stay at the University’. Performance during the post-Covid period has received little attention in literature relating to adjustments in universities. A case study approach was adopted within the broad mixed-methods research design. Interviews and questionnaires were used to obtain qualitative data. Quantitative data derived from questionnaires was computed into mean and Standard Deviation scores. This was further subjected to Analysis of Variance (ANOVA) using the Statistical Package for the Social Sciences (SPSS). The Pearson-mark was also used to correlate the data. The findings indicated that interactive activities were drastically reduced during the post-Covid period; a significant number of classes and postgraduate defenses were postponed for various reasons. Make-up classes were created from time to time; reduced class attendance; failure by students to remain in classes throughout the entire class sessions; internet interruptions and numerous disconnections were reported. Modules were written as a stopgap measure for augmenting lost time. The paradigm shift in pedagogical approaches impeded, to some extent, the lecturers and students’ performance. Activities on proposal writing for funding and research activities were drastically reduced. In conclusion, the University lost heavily due the intermittent resurgence of the pandemic and a sluggish approach to confront it. The study recommends a robust online-based system of monitoring classes and postgraduate defenses; provision of internet for both students and lecturers in order to avoid numerous disconnections. Lastly, both students and lecturers should be proactive in order to surmount the Covid-19 related challenges.

**Key words:** *Performance, e-tivities, monitoring, challenges, interactions, disruptions*

### 1. Introduction

Kenyatta University is one of the largest universities in Kenya. According to UniRank (2021), the University has a student population of over 45,000 and it is ranked position 2 n Kenya, 24 in Africa, and 2170 in the world, among the top best universities. This ranking is undoubtedly associated with the performance of both lecturers and students at the University. Performance, in this study, is limited to the expectations placed on the lecturers and students during their stay at the University. Prior to the Covid outbreak in early 2020, lecturers were required to prepare and attend all the classes assigned to them for teaching during the semester. They were also required to engage the students in learning activities in class throughout the lecture sessions. Among these activities were Continuous Assessment Tests (CATs) and quizzes, which are a formative form of assessment whose ultimate purpose is that of ‘improving learning’ ( ,p.17). Students on the other hand were required to attend all the ‘face- to face’ classes and do the assignments provided by the lecturers. All the students who attended the classes were required to sign a class attendance form. The lecturer also counter signed this form.

Following the outbreak of Corona, the classes were commuted to online teaching and learning. Like the other higher education learning institutions around the world, Kenyatta University invested heavily in online platforms. Among these online platforms are the Learning Management Systems (LMS) and Google Meet. These two platforms are capable of generating class attendance records for both students and lecturers. Google Meet also has the capability of audio recordings and lecturers are required to record the online classes and forward the recording links to their respective chairs of departments. This ensures that the University's online facilitation is monitored by the Quality Management Systems (QMS) section.

While the University has sufficient quantitative data on class attendance and recordings, there is little information on the actual activities that happen in individual online classes. For instance, there is hardly any information on what actually happens in the online classes right from the moment the lecturer logs in and invites the first student, up to the time that he/she ends the class for everyone. This paper used the mixed methods approach to investigate the 'real happenings' which relate to lecturers' and students' performance during online class facilitation. These activities are juxtaposed with the activities, which went on during the face-to-face sessions.

In the next part of this paper, we present the statement of the problem. This is followed by the research objectives and the attendant research questions. The methodological approach that is adopted in the study is then described. This is followed by a presentation of findings, conclusions and recommendations.

## **1.2 Statement of the Problem**

Kenyatta University has been ranked as position 2 in Kenya 24, in Africa and position 2170 in the world. The university has an elaborate quality management system (QMS) and its adherence to standards is confirmed by the ISO certification which is consistently renewed. The Academic Section, like any other sections in the organization, has well outlined QMS procedures, which are backed by records to ascertain whether the procedures have been met. Based on the University Calendar and upon the registration and enrollment of students, teaching timetable is prepared. Lecturers and students are expected to adhere to the timetable. Besides teaching students that are enrolled in their classes, lectures are also expected to provide a minimum of two Continuous Assessment Tests (CATS) and provide feedback for the same. Following the advent of Covid-19, the classes were commuted to online teaching. Consequently, there has been a dearth of literature relating to adjustments in teaching and learning. This study examines the performance of teaching and learning at Kenyatta University during the Corona period.

## **1.3 Research Objectives**

The following objectives informed this study:

1. To assess lecturers' and students' teaching and learning performance.
2. To examine the challenges that lecturers and students face during teaching and learning.
3. Examine what the University management has done to assist the lecturers and students to overcome the challenges
4. To proffer suggestions that the University can adopt to make it better prepared for future eventualities.

#### 1.4 Research Questions

1. How is the teaching and learning performance of both lecturers and students rated by both students and lecturers?
2. What challenges do lecturers and students face during teaching and learning?
3. What has the University Management done to assist the lecturers and students to overcome the post- Corona challenges?
4. How can the University be better prepared for future eventualities?

#### 2. Methodology

This subsection presents the research design, the sampling procedures as well as the data collection and analysis methods that were used in the study. A case study approach was adopted. This was premised within the broad mixed-methods research design. A Purposive sampling approach was adopted. Since this was a case study, all the students were drawn from Kenyatta University (KU). KU was selected because of its high student and lecturer population and proximity to the city center. The students are drawn from virtually all the regions across the country.

##### 2.1 Piloting

A pilot study was conducted to test both the instruments, and data collection procedures; and ascertain whether the whole study would take off. Two students and two lecturers, all from Machakos University were used in the piloting.

##### 2.2 Sampling

Fifteen lecturers were sampled in each of the 15 schools at the University. The *friend-of-a-friend* approach (Milroy, 1987, Milroy & Gordon, 2003) was used to obtain a sample of the lecturers who were willing to respond to the interview questions, as well as to provide the contacts of their class representatives. These lecturers were duly informed about the study objectives and they were requested to also inform their class representatives before sharing their phone contacts with the researchers. The researchers further contacted the students on phone and reiterated the objectives of the study. Two lecturers ‘accepted’ to participate in the study but they failed to respond to the interview questions which were sent to them two weeks before the scheduled Google Meet Interview. Consequently, two other lecturers from different departments within the same schools were contacted before the interview sessions. These replacement lecturers aptly replaced the descenders.

All the students who were referred by the lecturers were willing to participate in the study, and they aptly responded to the questionnaires, which were send to them by mail. These students were also class representatives and their views were regarded to more or less represent those of the entire classes that they were in. The students who were recommended to participate in the interview were either in 3<sup>rd</sup> year or Fourth year. These two groups of students had ‘experienced the ‘two worlds’: that of learning before Corona, and learning after during the epidermic. The students also belonged to the Regular Group of students. This group was mainly taught only in the in-class mode before Corona struck. The other groups such as those from the Digital School of Virtual and Open Learning (DSVOL) and the Continuing Education Program (CEP) had variable experience with online teaching and were therefore, considered not ideal to respond to questions regarding the transition to online teaching.

The identities of the lecturers and the students, as well as the schools and departments where they belonged were coded as shown in Table 2.1 below.

Table 2.1: Sampling Frame

1	Lec1	Dpt1	Sch1	Std1
2	Lec2	Dpt2	Sch2	Std2
3	Lec3	Dpt3	Sch3	Std3
4	Lec4	Dpt4	Sch4	Std4
5	Lec5	Dpt5	Sch5	Std5
6	Lec6	Dpt6	Sch6	Std6
7	Lec7	Dpt7	Sch7	Std7
8	Lec8	Dpt8	Sch8	Std8
9	Lec9	Dpt9	Sch9	Std9
10	Lec10	Dpt10	Sch10	Std10
11	Lec11	Dpt11	Sch11	Std11
12	Lec12	Dpt12	Sch12	Std12
13	Lec13	Dpt13	Sch13	Std13
14	Lec14	Dpt14	Sch14	Std14
15	Lec15	Dpt15	Sch15	Std15

## 2.2 Data Collection

Structured questionnaires group interviews were used to obtain data. The questionnaires had 14 questions, whose responses were based on Linkert Scale. These questions related to the same object of study for both the lecturers and students. This was designed to enable meaningful correlation during data analysis. (See Appendix ii and ii). Quantitative data was obtained from the subjects' responses to questionnaires. Further, both lecturers and students were interviewed in online Google meet sessions. These sessions were recorded. The oral data was recorded using Bailey (2017) Open Broadcasting Software (OBS). The data recorded was annotated and transcribed in ELAN (Version 6.0) and segmented using Audacity.

## 2.3 Data Analysis

A total of 14 questions were asked to both lecturers and students. A Linkert scale to evaluate an aspect of performance in each of these questions helped the coding and subsequent quantification of the data for analysis. The statics of mean, standard deviation and Pearson- mark correlation were computed. Analysis of Variance (ANOVA) was also used to evaluate the significance of the mean scores obtained. The Social Sciences (SPSS) was used to compute these measures. Qualitative data was obtained from the interview sessions. Four open ended questions, each relating to the research objectives (cf. 1.3) were asked to the participants during the Google Meet interview sessions for the lecturers and for the students. The narrative approach analysis was used to analyze and present the study findings for from the qualitative data. According to Creswell and Poth (2018), different sub-fields have adopted various types of narrative research. Among these is the 'postmodern, organizational orientation' Czarniawska (2004). In Czarniawska (2004: 43), data on stories told about organizations is usually collected in an

interview, but also an observation technique. Czarniawska (2004) enumerates the procedure for organizational orientation narrative design as shown below:

1. Establishing general aims of an activity
2. Describing the unit and the actors
3. Choosing an incident
4. Description of the critical incident
5. Critical judgments of the observer may be included but must be clearly separated

In this study, the general aims of the activity comprise the statement of the problem, the objectives and the research questions. The ‘unit and the actors’ in the study refer to the University and the students. The incident is teaching and learning performance, and description of the incident relates to the subjects responses during the interviews. The critical judgments of the observer relate to the recommendations provided.

### 3. Findings, Conclusions and Recommendations

As noted in the Methodology Section, 14 research questions were designed to provide answers relating to the first study objective namely; to assess lecturers’ and students’ teaching and learning performance during teaching and learning. The first two questions in both the students’ and lecturers’ questionnaires required the subjects to rate their performance in relation to class attendance, both before and after Corona. Both the students and lecturers rated their class attendance highly with an equal frequency score of 7 and 9 for rank 1 and rank 2 respectively, during the online classes. None of the subjects rated themselves lower than 2. Before Corona, the level of class attendance by lecturers and students was lower. Majority of the subjects rated themselves highly, but a few students and lecturers indicated lower class attendance levels than they recorded in the online classes. For instance, a lecturer who indicated a rank of 4 for his face-to-face class attendance also mentioned, during the interview, that there was no room for multitasking during the face- to- face sessions and absenteeism was common because of the need to travel from the campus where he taught to attend physical meetings at main campus such as exam moderation, post-graduate defenses and other official functions.

The students were asked to rate their lecturers class attendance during and before Corona in in Question 3 and Question 4, respectively. 53 percent of the students gave a rank of 2 (good) and 20 percent of the students rated their lecturers’ class attendance in the third rank (‘average’). The lecturers on the other hand, indicated that some of the student’s class performance was below average as demonstrated in Table 3.1 and 3.2 below.

Table 3.1: Lecturers’ rating of students’ class attendance before Corona

Q3					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	13.3	13.3	13.3
	2	9	60.0	60.0	73.3
	3	2	13.3	13.3	86.7
	4	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

Table 3.2: Lecturers’ rating of students’ class attendance after Corona Q4

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	2	13.3	13.3	13.3
2	10	66.7	66.7	80.0
3	1	6.7	6.7	86.7
4	2	13.3	13.3	100.0
Total	15	100.0	100.0	

From the data presented in the two tables, it is clear that more students fail to attend classes during the online teaching. These findings are statistically significant as evidenced by the ANOVA statistics presented in Appendix vi. This may be attributed to the fact that in the in-class teaching sessions, majority of the students stay within the University premises. One of the students during the oral interviews told the panel that one of her major challenges of online teaching was that while at home, there were other domestic chores that were ‘competing for the hours with the scheduled classes’.

The 4<sup>th</sup> and 5<sup>th</sup> questions relate to the level of interaction between lecturers and students during both online and face-to-face classes, respectively. There was variable rating of integration in class by both lecturers and students for the online classes as well as the face-to-face classes (see Appendix v. This variability may be attributed to the individual class student-lecturer interaction. This attests to the fact that interaction in every class, irrespective of the mode of teaching, is dependent on the students and lecturer relations.

The next two questions relate to timely attendance to CATs and quizzes. The face-to-face CATs were administered and done in a timelier manner than the online cats. The students rated their own timely attendance to CATs higher than the lecturers, who have indicated several tokens of ‘below average’ self-evaluation CATs and Quizzes admiration. During the oral interview, two lecturers indicated that the online schedules were often overwhelming since lecturers were also tasked with other duties such as Modules writing attendance to online defenses.

As relates to provision of feedback on CATs and quizzes, the lecturers evaluated themselves higher than the way the students evaluated them. The two tables below manifest this discrepancy.

Table 3.3 Students Rating of Lectures’ Provision of Feedback on online CATS

**Q11**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	6	40.0	40.0	40.0
2	6	40.0	40.0	80.0
3	3	20.0	20.0	100.0
Total	15	100.0	100.0	

Table 3.4 Lecturers' Rating of their Provision of Feedback on online CATS

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	8	53.3	53.3	53.3
2	5	33.3	33.3	86.7
3	2	13.3	13.3	100.0
Total	15	100.0	100.0	

The same pattern of a higher self-evaluation is also evident in the face-to-face sit in CATS (See Appendix v). While it is expected that subjects will do a higher self-evaluation, this outcome needs further investigation to determine why a significant number of students are not content with the nature of feedback provided by their lecturers. This will inform the educators on whether other pedagogical approaches need to be adopted so as enhance quick and effective feedback of formative evaluation.

The last two questions asked both the students and lecturers about how often they conducted personal reading and research during both online and the pre-Corona period. The data showed that lecturers created more time to conduct their personal reading than the students during the period before Corona. However, both lecturers and students do not significantly differ in terms of how much time they allocate for personal reading. The majority of the subjects from the two groups indicated that they either 'frequently' or 'less frequently' found time to conduct their personal reading (Appendix v).

In the interview questions, the subjects were asked to compare their teaching/learning performance before Corona with their performance after. Both the lecturers and students indicated that life was 'better' and more predictable before Corona struck. The lecturers indicated that online teaching was sometimes overwhelming; since they also had other official duties to do such as the writing of modules, marking of examinations as well as attending to meetings and post-graduate defenses. Students on the other hand treasure the moments when they were in campus or outside residence, away from home, where they did not have to do multiple chores besides their learning tasks. Several students also mentioned that consultation hours with the lecturers in their offices were much better than online interaction.

When asked to describe some challenges that they faced during the online classes, both the lecturers and students indicated the issue of connectivity whereby they would be disconnected when the classes were going on. Students also mentioned that internet was expensive and sometimes, they were forced to subscribe to data which was more expensive because some of the cheaper internet providers were not available in some locations across the country.

Asked about how these challenges can be surmounted, both lecturers and students suggested that the University could negotiate with the main internet service providers to avail cheaper internet for classes. All the students should also be provided with learning tablets to enable them access the learning modules and class sessions without the hindrances that were common whenever they used their mobile phones. A student also pleaded to the University to communicate with parents so that they (parents) could free them from the numerous domestic chores that they were assigned because of their 'presence at home'.

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## Influence of Resource Mobilization on Competitiveness of Tvet Institutions in Kenya

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### ABSTRACT

The aim of this paper is to assess the influence of resource mobilization on competitiveness of TEVT institutions in Kenya. TVET institutions have been facing tremendous challenges, despite their immense contribution in the country's education sector and to the economy at large. The institutions have been characterized with low intakes and their level of competitiveness has been shrinking over the years. One of the key lacking aspects among the institutions has been inadequacy in resources including finances, human resource and infrastructure. This has seen most of the TVET colleges struggle to meet their daily operational needs thus incapacitating them to remain effective. Despite the evidence of lack of resources in the TVET colleges, there have scant evidence on the efforts by the institutions to mobilize these resources for continued performance. It is against this background that this study seeks to assess the ability of the leaders in the TVET institutions to mobilize the resources and how these resources affect competitiveness of the institutions. This study was informed by the resource dependency theory. A descriptive research design was employed while the target population was TVET institutions in Kenya. A total of 272 respondents were purposively sampled from the 68 TVET institutions in Kenya. A structured questionnaire was used to collect data which was analysed using SPSS. The findings revealed that resource mobilization was an integral aspect of strategic leadership that steered the competitiveness of the TVET institutions in Kenya. The study concluded that TVET institutions lacked adequate resources which could enhance their competitiveness thus recommending the need for leaders in these institutions to develop ways through which adequate resources can be mobilized.

**Key words:** *Resource Mobilization, Strategic Leadership, TVET institutions, Institutional competitiveness*

### INTRODUCTION

#### 1.1 Background of the Study

Resources are essential in every organization's performance. Resources can be defined as the available stock of factors of production controlled or owned by the firm. According to Shin, Sung, Choi and Kim (2015) resources are the assets, skills and capabilities of a firm that it can use in its operations to ensure success and sustained performance. Organizational resource allocation is the institution ability to management and avail the required resources such as technology, funds and workforce to its operations for effectiveness and sustainability (Strand, 2014). For the projects to perform better and achieve the required mandate, it is important for the organizational managers to avail adequate resources to the projects. In fact, resource allocation is considered as one of the competitive strategies that seek to enhance the performance and competitiveness of the firm (Phipps & Burbach, 2016).

The internal capability of the firm and the ability of the firm to meet its set goals determine the effectiveness and competitiveness of the organization. These however depend on the success of the organizational as far as their performance and competitiveness are concerned. On this basis, therefore, mobilizing and allocating resources to the operations of the TVET institutions is a keys aspect of leadership that steers the competitiveness of the institutions.

In most of the developed countries, technical and vocation training has been considered as the main direct economic driver and a lead to an innovative and industrious generation (UNESCO, 2015). Most of the governments across the world are taking proactive roles in strengthening vocational education

systems. The governments especially in the developing world are providing a positive evaluation of efforts in upgrading the quality of vocational education institutions (World Bank, 2013). Equipping youth with skills and knowledge to address the problem of youth unemployment and supporting creation of skilled work force are being prioritized as the key pillars to sustainable development (UNESCO, 2009). This has seen increase in productivity and hence economic growth in these countries. In Kenya, technical and vocational training has been a subject of concern as the government has realized the integral role played by these institutions in terms of economic transformation and development (UNESCO, 2015). Despite the country embracing a 8-4-4 system of education which is much based on managerial skills, the government has continued laid out efforts to make TVET education effective and competitive as well. Technical and Vocation Education and Training programmes comply with the aim of addressing youth vulnerability. So far, most TVET programmes have successfully improved quality of life and reduced risk of vulnerability of youths (Cho, Kalomba, Mobarak & Orozco 2013; UNESCO, 2010a). A quality and relevant TVET system is, therefore, critical for national economic growth and global competitiveness as well as holding a strategic position in effective implementation of Kenya Vision 2030 and the Big Four Agenda (KIPPRA, 2019).

### **1.2 Statement of the Problem**

Despite the critical role played by the TVET institutions in Kenya, the institutions operate in a unique and challenging environment characterised by complex governance structures, legal regimes, and varied stakeholder interests. Currently, TVET is being implemented through 116 institutions in the Ministry of Education, 43 institutions in other line ministries, over 800 vocational training centres managed by County Governments, and over 700 private institutions countrywide (Kipkirui, 2018). Most of these institutions have remained stagnant for decades, with most of their revenue streams relied on government funding. According to Reypens, Bacq, and Milanov (2021), resources remain the main drivers of competitiveness in educational institutions, in that without them, the implementation of any other strategy becomes incapacitated. The available empirical evidence on the TVET institutions has done very little in regard to resource mobilization and competitiveness of the institutions. This study therefore seeks to fill the existing gaps by assessing the influence of resource mobilization on the competitiveness of TVET institutions in Kenya.

### **1.3 Research Objectives**

The study sought to meet the following specific objectives

- 1) To assess the influence of resource mobilization on competitiveness of TVET institutions in Kenya.
- 2) To establish the moderating effect on institutional culture on the relationship between resource mobilization and competitiveness of TVET institutions in Kenya

### **1.4 Statistical Hypotheses**

- 1) **H<sub>0</sub>:** Resource mobilization has no significant influence on competitiveness of TVET institutions in Kenya
- 2) **H<sub>0</sub>:** There is no significant moderating effect of institutional culture on the relationship between resource mobilization and competitiveness of TVET institutions in Kenya.

### **1.5 Justification of the Study**

This study seeks to bridge the existing gaps on the role of resource mobilization on the competitiveness of TVET institutions in Kenya. By revealing the current availability of resources and efforts made by the leaders in these institutions to mobilize resources, the study will create an informing consent for the managers of the TVET colleges on the need to mobilize resources and how this can strengthen the competitiveness of the institutions. The findings from the study will be significance to the policy makers, management of the TVET Institutions, other public and private institutions as well as future researchers and academicians.

## 2.0 REVIEW OF LITERATURE

### 2.1 Theoretical Review

The paper drew its support from Resource Dependency Theory. RDT theory was publicized by Pfeffer and Salancik (1978) in an attempt to pin-point the need for resources in an organization to steer performance and growth. The theory states that organizations depend on resources so as to keep their operations on-going and effective. In this basis therefore, the organizations have to seek for these resources to ensure that they sustain their operations (Yeo, 2013). According to Pfeffer as cited by Ullah (2013), resources are the basis of power to any organization. This therefore shows the need for the organization to seek for these resources and avail them to its operations.

Pfeffer and Salancik (1978) argue that even the independent organizations will at some point require resources for some of its operations and thus they have to have some relationship with the organizations in their environment. Smerek and Denison (2007) cite Pfeffer and Salancik and stated that resources and power go hand in hand thus any organization that seeks to be powerful in an organization will eventually seek resources for sustaining itself as a powerful organization.

TVET Institutions require resources for them to be effective and directed towards achievement of the set goal. This means that for the institutions to effectively enhance their competitiveness through awareness creation, marketing and providing exemplary services, they should have adequate resources in terms of finances and human skills. The TVET institutions will require to seek better ways of ensuring that their operations have enough resources to keep them running (Ozcan & Eisenhardt, 2009). The RDT therefore comes in as an attempt to influence the TVET institutions through the management to seek resources from the government and other stakeholders so as to ensure their smooth running through which competitiveness will be enhanced (Pfeffer, 2005). Basing the argument on the RDT theory, it is quite clear that for TVET institutions to be competitiveness, the management of the institutions ought to mobilize more resources in terms of finances, infrastructure development and human skills. The views therefore show a wide relevance of the resource dependence theory to support the second objective of the study on influence of resource mobilization on the competitiveness of TVET institutions in Kenya.

### 2.2 Empirical Review of the Literature

Resource mobilization involves the process of management of resources in an organization to promote its effectiveness and performance. Studies have been carried out across the globe on the connection between asset activation and hierarchical execution. For example, Milden (2015) completed an examination on the effects of asset activation on execution of Non-administrative associations in Pakistan. The examination concentrated on setting up the role played by effective resource mobilization on firm performance based on the number of customers and efficiency in delivery of the services by the NGOs. According to Milden (2015), organizational performance is based on the effectiveness and adequacy of the resources thus mobilizing the resources to make available at the required time, quality, quantity and place. Milden (2015) further argued that the organizational management has the duty to mobilize the resources for uninterrupted operations. The scholar further established that some resources were better placed and considered to be more important than others in an organization such as human resources.

In another study, Karliegh (2012) examined the role of resource armament on the employee commitment and performance. Karliegh (2012) aimed at establishing the role of resource allocation and management on the performance of employees and firm performance. The scholar focused on commercial banks in Egypt and adopted a cross-sectional research design with a study sample of 114 respondents drawn from the employees of the commercial banks. Karliegh (2012) established that commercial banks dedicated adequate resources to the human resource departments and this enhanced the performance of the employees. According to Karliegh (2012) employees are crucial organizational

resources who require training, rewarding and motivation which can be attained through adequate allocation of budget to the said departments.

Elsewhere, Mueni (2015) conducted a study on the relationship between resource allocation and performance of non-financial firms listed at the NSE. The study sought to establish the role played by effective and adequate resource allocation to different projects and departments among the non-financial firms listed at NSE on their performance. Descriptive survey design was adopted and had a sample of 97 respondents drawn from different managerial levels in the firms. The study found out that performance of non-financial firms relies of the adequacy and appropriateness of the resources allocated to the firms. The resources in this case are the human resources, management support, ICT tools as well as adequate budgeting to various projects and departments (Mueni, 2015).

Serda, Mark, Dilek, Shaisha and Xiaoyun (2014) conducted a study on quasi-moderating role of organizational culture rewards and knowledge shared and gained. They applied a regression method using a survey model. Analyses show knowledge sharing and gaining in and organization is a reward of organizational culture of knowledge transferring. Furthermore, the interaction between cultures and reward influences knowledge gained, but not knowledge shared. This leads to concluding that knowledge gains can be prompted by rewarding, even in the absence of a supporting culture.

### 2.3 Conceptual Framework

Figure 1 below shows the conceptual framework for the study.

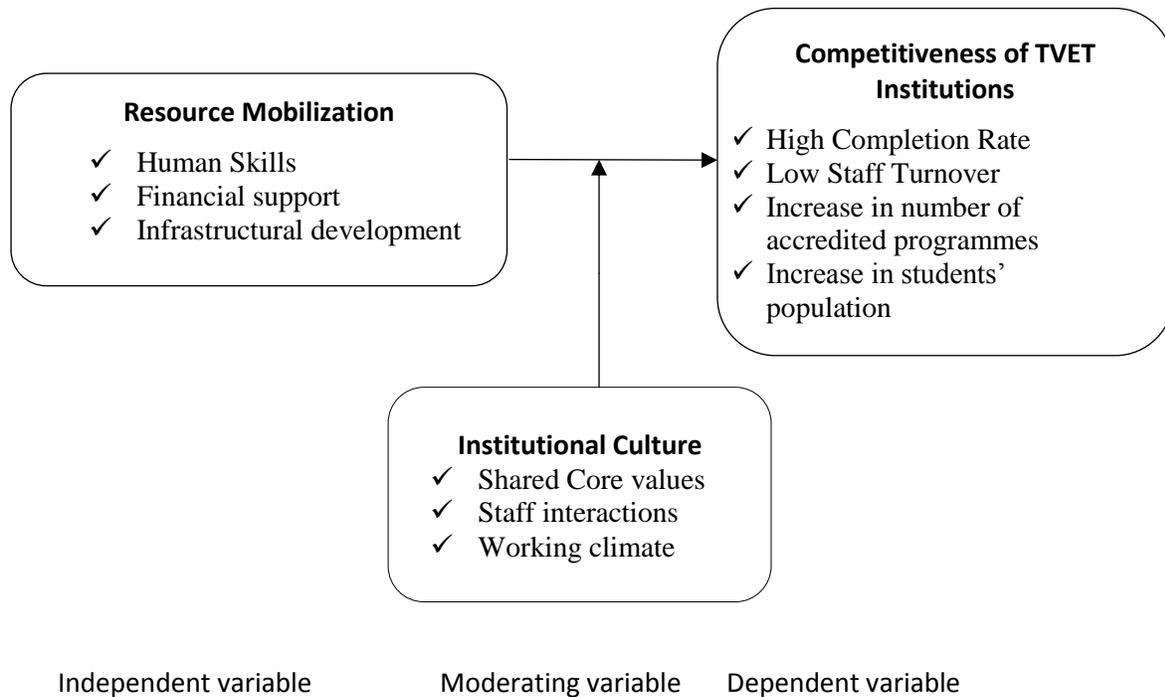


Figure 3: Conceptual Framework

### 2.4 Research Gaps

The study addressed various gaps including the evidence that most of the available reviewed studies focused on other approaches of resources such as budgeting, adequacy of resources and use of the available resources but failed to address the generation or mobilization of these resources. The studies used different approaches such as feasible approach and exploratory hence a different study adopting a different approach (descriptive) would be necessary in confirming their findings. Other studies

focused on performance, sustainability and growth, which cannot be reciprocated to competitiveness. Other studies were carried out in developed countries where business operations and other aspects of strategic leadership is more advance unlike the current study that focuses on a developing country (Kenya). The studies focused on other industries such as NGOs, small businesses and commercial banks whose management and perception of competitive advantage may not be the same as that in TVET institutions.

### 3.0 METHODOLOGY

#### 3.1 Research Design

Descriptive research design was used in this study. It entails explanation of a phenomenon, estimating a proportion of a population with similar characteristics and ascertaining the relationship that occurs amid the variables under study (Myers, 2013; Saunders, Thornhill & Lewis, 2009).

#### 3.2 Target Population and Sampling

The accredited TVET institutions in Kenya were targeted. According to Ministry of Education (MOE-2018), there are 68 registered operational TVET institutions in Kenya. A census was used whereby all the 68 TVET institutions were selected while the principals, heads of finance department, heads of ICT and heads of R&D were purposively selected making the ample size to total to 272 respondents. The respondents were surveyed using a structured questionnaire.

#### 3.3 Data Analysis

Both descriptive and inferential statistics were used to analyze quantitative data while the qualitative data was analysed through description and thematic analysis. Descriptive statistics such as frequency distribution and measures of central tendency was used to analyse the demographic data. Testing of the hypothesis was done by calculating an F-Value using a two-way ANOVA.

### 4.0 FINDINGS AND DISCUSSION

#### 4.1 Test for Reliability

Reliability is the extent to which data collection techniques or analysis procedures will yield consistent findings (accuracy and precision of a measurement procedure) (Creswell, 2014). Cronbach's coefficient alpha was used to test for reliability. It determines the internal consistency of items within the test were used after collection of the pilot data to test the findings.

The results as shown in Table 1 indicate that that Resource Mobilization, which had sixteen (16) questions (items), had a cumulative Cronbach's ( $\alpha$ ) of 0.876 indicating that 87.6% of the variance in the scores is reliable and only 12.4% is not reliable hence all the 16 questions were maintained for analysis. Institutional Culture had 11 items which had a Cronbach's Alpha of 0.931 implying that the variable had a reliability variance of 93.1%. Competitiveness of TVET institutions which had 4 items was also reliable with a Cronbach's Alpha of 0.887.

Table 1: Reliability Results

Variable	Coefficient ( $\alpha$ )	Number of Items	Comment
Resource Mobilization	0.876	16	Reliable, use all the 16 Items
Institutional Culture	0.931	11	Reliable, use all the 11 Items
Competitiveness	0.887	4	Reliable, use all the 4 Items

#### 4.2 Factor Analysis Results

Principal Component Analysis (PCA) method of factor extraction was used to assess the validity. The findings as reported in Table 2 indicate that the average factor loading of 0.776, 0.709, and 0.759 for resource mobilization, institutional culture and competitiveness respectively. These were considered to meet the 0.40 threshold hence the questions had met the validity test.

Table 2: Factor Loadings for Validity Test

Variable	Number of Factors	Average Factor loadings
Resource Mobilization	16	.776
Institutional Culture	11	.709
Competitiveness	4	.759

#### 4.3 Demographic Results

The study obtained a response rate of 84.1% (229) out of a sample size of 303 respondents drawn from the TVET institutions across Kenya. The demographic results revealed that majority of the respondents were drawn from finance and research and development departments with most of them having served in their respective institutions for a period of less than 3 years. Most of the surveyed TVET Institutions had been in operation for 10 years and above and were drawn from the technical institutes category. The demographic results revealed that the characteristics of the institutions as well as those of the respondents were diverse hence the diversity in the study findings for the main subject of the study.

#### 4.4 Descriptive Analysis of the Study Variables

This sub-section covers the descriptive analysis of the data based on the specific study objectives. Descriptive analysis according to Young (2014) helps describe things the way they in a study through means, standard deviation, frequencies and percentages. The analysis herein is done systematically as per the study objectives.

##### 4.4.1 Resource Mobilization

The study aimed at establishing the influence of resource mobilization on the competitiveness of TVET institutions in Kenya. Resource mobilization is a process of seeking, planning and monitoring the use of resources in an organization. This is a major role of a strategic leader as noted by Lear (2012). The major aspects of resource mobilization focused on in the study were human skills, financial support and infrastructural development. The respondents were asked to rate the extent to which their respective institutions embraced these main aspects of resource mobilization. As the findings in Figure 2 reveal, financial resources were rated at 70.7%, infrastructure development was rated at 64.2% while human skills were rated at 53.7%. The findings imply that financial resources and infrastructure were the major resources upheld by the institutions.

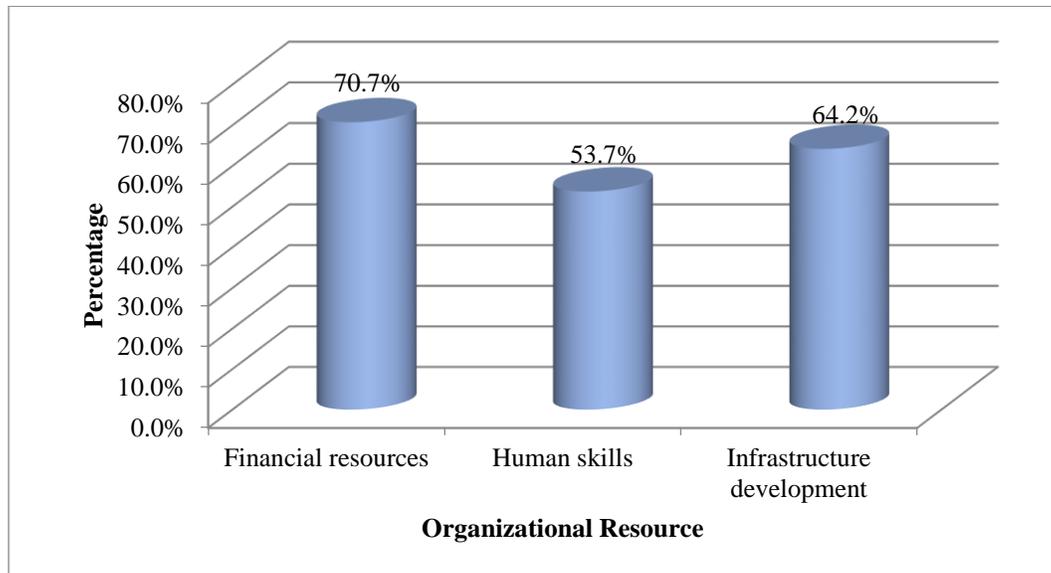


Figure 2: Aspects of Organizational Resources

The study sought to establish the respondents' level of agreement on specific statements on resource mobilization based on a five-point Likert's scale. The findings are as shown in Table 3. The findings imply that financing made towards the TVET institutions is inadequate and not reliable and this could be the bottleneck towards competitiveness of the institutions. The findings further revealed that the infrastructure in most of the TVET institutions was not adequate to run the operations of the institutions and this could negatively affect their competitiveness. According to Rajesh and Regilal (2017), financial resources are critical to steering the success of strategic decisions and promoting their competitiveness. Wijetunga (2013) allude that frequent training is a key aspect in ensuring that the employees are well conversant with changes and emerging issues that enables them to be more effective and productive.

Table 3: Level of Agreements with Statements on Resource Mobilization

Statement	Mean	Std. Dev.
The Government frequently sponsors employees to enhance their skills and competencies	3.78	1.30
Trainers sponsor themselves to upgrade their skills and competencies	3.17	1.21
Frequent training has improved the staff output	2.85	1.30
Level of experience and educational level are considered when recruiting new employees	2.86	1.42
The organization strives to retain the best talents through rewarding and motivation	3.52	1.23
There is adequate budget allocated to the institution by the government	3.26	1.25
The institution has adequate finances to finance and keep the operations running	3.18	1.16
There are reliable sources of alternative financing for the institution's financial needs	2.56	1.20
There are adequate furnished classrooms for use by the students enrolled and programmes on offer	3.12	1.17
The institution's laboratories/workshops are well equipped with up-to-date training equipment	3.28	1.21
There are adequate offices for the trainers	3.59	1.18
The institution library has adequate print and e-resources information to support the programmes on offer and students' enrolment	3.13	1.09
Infrastructural development is set as one of the goals of the institution	3.54	1.11

#### 4.4.2 Institutional Culture

The study aimed at examining the moderating effect of institutional culture on the relationship between resource mobilization and the competitiveness of TVET institutions in Kenya. The main indicators used to explore institutional culture were; shared core values, staff interactions and working climate. The findings are as summarized in Table 4. The results revealed that reliable and effective communication systems allowed information sharing among the employees in their respective institutions. According to Myeongju and Hyunok (2017), the organizational culture cuts across the organization as a determinant of how effective any strategy succeeds and this is made possible by a culture where employees relate well with each other and are free to share ideas and information amongst themselves. The finding concurs with the reviewed literature by Awan and Mahmood (2010) who established that organizational culture steers the way employees relate to each other and how they socially interact with stakeholders in the organisation. Taormina (2008) argued that leadership behaviors tend to be more control-oriented in bureaucratic culture; and more flexible-oriented in innovative culture. Hartog, Van Muigen and Koopman (1996) and Hartnell, Ou and Kinicki (2011) found that there is a positive relationship between the group culture and transformational leadership factors. Lok and Crawford (2003) found that innovative and supportive cultures, and a consideration leadership style, had positive effects on job satisfaction and organizational competitiveness.

Table 4: Descriptive Statistics on Institutional Culture

Statement	Mean	Std. Dev.
Accountability is encouraged in the organization among all the employees	3.98	1.02
Instilling discipline among the trainee fraternity has been a major concern of the institutional management	3.80	1.16
The management respects the personal goals of the trainers	3.91	1.06
There are effective and reliable communication systems to allow sharing of information among the trainers	3.74	1.21
There are regular meetings held to enhance interaction among the trainers	3.86	1.06
The top management regular organizes events such as cultural day, team building and sport to enhance interaction among trainers and trainees	3.82	1.17
New staff members are adequately inducted across the departments in the institution	3.61	1.19
The working space provided is adequate and conducive for staff to work in	3.83	1.07
The top management has provided a cohesive environment for trainers and trainees	3.83	1.06
The institution has policies to guide in conducts of trainers and trainees	3.65	1.17
The institution has a welfare that cater for trainers and trainees	3.67	1.30

#### 4.4.3 Competitiveness of the TVET Colleges

The study sought to establish the competitiveness of TVET colleges in Kenya and the major aspects of competitiveness used included the number of accredited courses, staff turnover, rates of completion and intake. According to UNESCO (2017), the success of technical training institutions is determined by their level and ability to compete with other higher learning institutions by attracting a reasonable number of students, offering variety courses and relevant to the market as well as instilling skills and competencies that can solve modern-day problems. The findings are summarised in Figure 3. According to Kyaw and Naing (2015), TVET colleges ought to come up with newer courses as frequently as possible as a show of enhanced innovation but they should not duplicate courses. According to Urdaneta (2017), the turnover rate in higher learning institutions especially the TVET colleges can be a major predictor of how things are as far as performance and competitiveness of these institutions is concerned.

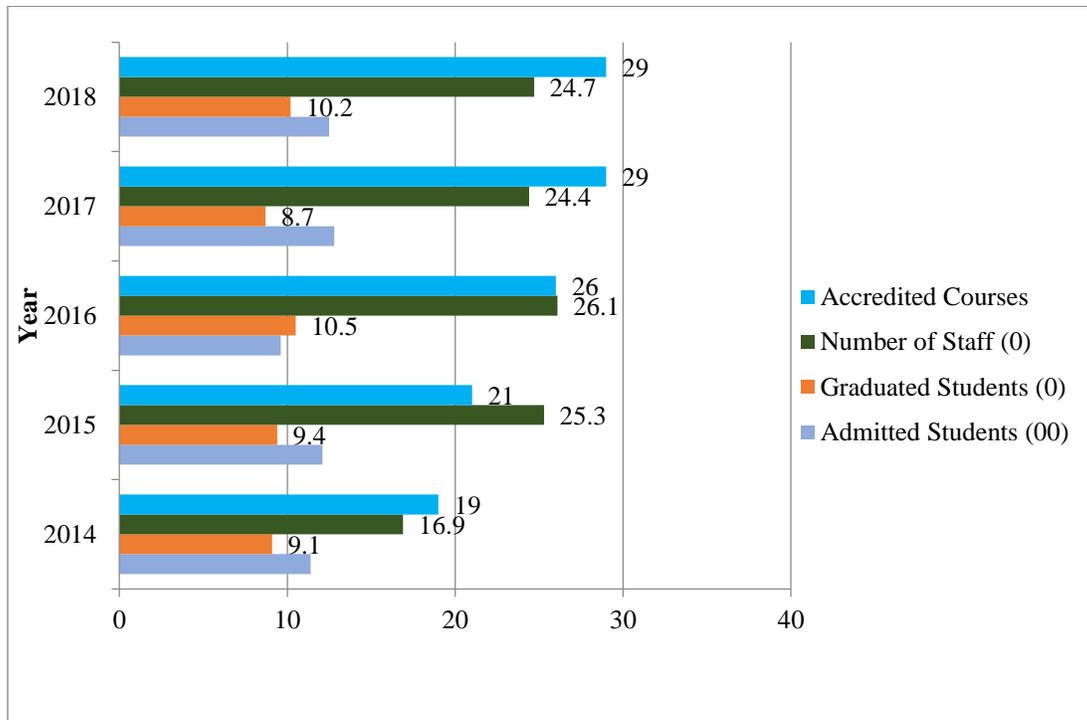


Figure 3: Competitiveness of TVET Institutions

#### 4.5 Inferential Results

The first hypothesis of the study was that resource mobilization has no significance influence on the competitiveness of TVET institutions in Kenya. To test the hypothesis, linear regression model was used and the results are as herein shown in model summary, ANOVA test and regression coefficients. As the model summary in Table 5 reveal, the  $R^2$  for the model was 0.265 which is an indication that resource mobilization explained up to 26.5% of the variations in the competitiveness of TVET institutions in Kenya.

The ANOVA results on resource mobilization and competitiveness of TVET institutions are as shown in Table 6. As the results indicate, F-statistics for the variable was 82.039 at a significance level of 0.000. This implies that the model could statistically explain the relationship between resource mobilization and the competitiveness of TVET institutions in Kenya.

Table 7 shows the regression coefficients for the model. The Beta coefficient ( $\beta$ ) for the model was 0.518 at a 0.000 significance level. The proposed model;  $Y = \alpha + \beta_2X_2 + \epsilon$ , now becomes  $Y = 1.853 + 0.518X_2 + 0.057$ . The findings imply that a unit change in resource mobilization could lead up to 51.8% increase in the competitiveness of TVET institutions in Kenya. This leads to the decision to reject the null hypothesis that resource mobilization has not significant influence on the competitiveness of TVET institutions in Kenya.

The results are in line with the findings by Sosik et al. (2015) who found that the main role of a strategic leader is to make the right connection for the organization. One of these right connections is mobilizing for resources to cater for both internal and external needs of the organization. Organizations such as the TVET institutions require intensive resources in order to finance and execute their mandate. Obtaining these resources is mainly the role of the leaders who have to be strategic and outgoing in

order to unveil new and reliable sources of resources including finances, human resources and infrastructure (Pangarkar, 2015).

Table 5: Model Summary for Resource Mobilization

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.515 <sup>a</sup>	.265	.262	.91301

a. Predictors: (Constant), Resource Mobilization

Table 6: ANOVA for Resource Mobilization

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.386	1	68.386	82.039	.000 <sup>b</sup>
	Residual	189.223	227	.834		
	Total	257.609	228			

a. Dependent Variable: Competitiveness

b. Predictors: (Constant), Resource Mobilization

Table 7: Regression Coefficients for Resource Mobilization

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.853	.227		8.162	.000
	Resource Mobilization	.518	.057	.515	9.058	.000

a. Dependent Variable: Competitiveness

*Ho: There is no significant moderating effect of institutional culture on the relationship between resource mobilization and competitiveness of TVET institutions in Kenya*

The results revealed that insitutional culture had no signifcint moderating effect on the relationship between resource mobilization and competitiveness of TVET institutions in kenya. The null hypothesis was therefore not rejected.

Table 8: Moderating effect of Institutional Culture

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.169	.552		~ 2.119	.035
Resource Mobilization * Institutional Culture	-.075	.051	-.498	~ 1.475	.142

a. Dependent Variable: Competitiveness of TVET Institutions

#### 4.6 Overall Summary of Findings

The study sought to assess the influence of resource mobilization on the competitiveness of TVET institutions in Kenya. The findings revealed that most of the institutions were in need of financial resources (70.7%) followed by infrastructure development (64.2%) and human resources was the least needed with 53.7%. The respondents agreed that the government of Kenya frequently sponsored

employees to enhance their skills while others indicated that the trainers sponsored their own training to upgrade their skills and competences. The respondents disagreed that there was frequent training of the trainers in their respective institutions to enhance their output and indication that employee training was not effectively upheld. Majority of the respondents disagreed that their respective institutions had adequate financial resources to finance their operations and projects. Moreover, it was established that most of the institutions did not have adequate furnished classrooms as well as adequate furnished classrooms for use by the students enrolled. The implication of the findings was that the resources available at the TVET institutions (human skills, finances and infrastructure) were inadequate to effectively run the operations of the institutions to attain competitiveness. The results from the analysis of the regression model revealed that resource mobilization had a significant and positive influence on the competitiveness of the TVET institutions in Kenya.

## **5.0 CONCLUSION AND RECOMMENDATIONS**

### **5.1 Conclusion**

Resource mobilization was found to be a key aspect of strategic leadership that significantly contributed to the competitiveness of the TVET institutions in Kenya. The study concluded that most of the TVET institutes faced competitiveness issues as a result of inadequate resources especially financial resources and infrastructure. Strategic leadership is about mobilizing resources for the organization and ensuring effective and accountable use of these resources towards the overall benefit of the firm. The study concluded that while resources were recognized as a key aspect in steering the competitiveness of the TVET institutions, they were not adequate hence they were among the missing factors in the competitiveness of the institutions.

### **5.2 Recommendations**

The Government has the key mandate of ensuring technical skills enhancement among the citizens especially the youth for economic growth and development through job creation and self-employment. To this end, the government through the relevant ministry should ensure adequate, timely and effective funding of the TVET institutions so as to enable them offer the right skills and operate effectively. The management of the TVET institutions on the other and should ensure that the available resources are effectively used and ensure accountability in order to reap the best out of these resources.

### **5.3 Areas for further Research**

The study aimed at assessing the influence of resource mobilization on the competitiveness of TVET institutions in Kenya. The study was limited to the TVET institution in Kenya hence the suggestions that a different study should be carried out to focus on other higher learning institutions such as the private or public universities which as well are critical to the country's educational sector and resource mobilization is necessary to their competitiveness.

The study addressed the competitiveness of TVET institutions in Kenya. Apart from the competitiveness, there are other aspects that have affected the continued effectiveness and contribution of these institutions to their intended goals. Other studies can be carried out to establish the effect of different aspects such as public awareness, acceptance, government commitment, operating environment and the educational system in Kenya on the effectiveness of the TVET institutions in Kenya.

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## The Effects of Inquiry-Based Science Teaching Approach on Task Competence of Secondary School Physics Students in Kitui County, Kenya

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### Abstract

The purpose of this study was to investigate the effect of Inquiry-Based Science Teaching Approach on learners' task competence of secondary school physics students in Kitui County, Kenya. It adapted a mixed methodology and a Quasi-Experimental Research Design and in particular the Solomon's Four Non-Equivalent Control Group Research Design. The target population of the study was 1600 form four Physics students from 40 Extra-County secondary schools in Kitui County. Stratified random sampling was used to select four Extra-County schools (2 Girls and 2 Boys). Purposive sampling was used to select 40 students from each of the four schools and a Physics teacher from each of the two sampled schools; giving a sample size of 160. A Physics Task Competence Test (PTCT) was the research instruments. A reliability coefficient of 0.847 was obtained. The descriptive analysis was by means of frequencies, means, standard deviation and percentages. Inferential analysis was through Analysis of Variance and the Least Significant Difference (LSD) technique at a significance level of coefficient alpha  $\alpha=0.05$ . The findings showed a statistically significant difference in task competence between students taught using IBSTA and those taught by the conventional methods. The study established that Students from the experimental groups outperformed the ones from the control group in the results obtained. This showed that IBSTA had a positive effect on their task competence. There was a significant difference in the post-test (PCBT) on task competence mean scores between students in the experimental groups who were taught Physics using IBSTA than those in the control groups taught by conventional methods. Consequently, the study concludes that IBSTA is effective in enhancing students' task competence. Finally, the study makes recommendations key among them the creation of an enabling environment for IBSTA adoption in schools.

**Key words:** *Achievement, Conventional Teaching Approach, Inquiry-Based Science Teaching Approach, Learning outcome, Self-concept and Task competence.*

### 1.0. INTRODUCTION

Inquiry-Based Science Approach teaches concepts, facts or skills that lead learners to formulate their own questions or problem thereby enhancing outcome (Bulbul, 2012). Inquiry-Based Teaching Approach is positively associated with outcomes when it incorporates teacher guidance, and negatively when it does not (Aditomo & Klieme, 2019). In another study conducted in South Africa by Baloyi (2015) on the effect of Inquiry Based Science method in teaching practical in Physics, learners developed better understanding of science concepts when using this method than the use of traditional methods. According to Chelangat (2014) in his study on effects of practical on investigation and scientific creativity amongst secondary school Biology students in Kericho sub-County, Kenya, indicated that the use of practical laboratory investigation approach and integrating it with Inquiry-Based Approach enhances creativity amongst secondary school Biology students. Njoroge, Changeiywo & Ndirangu (2014) observed that students taught using Inquiry-Based Teaching Approach in Physics outshined students taught using the traditional method. This aspect suggests that the general poor performance in physics in Kitui County may benefit from a change of teaching methodology. However, Njoroge et.al did not show evidence that they investigated aspects of: task competence.

### Statement of the Problem

Persistent poor performance in KCSE Physics at both the Nationally and Kitui County in particular has been greatly attributed to factors such as Conventional instructional method, inadequate facilities, poor mastery of teaching and learning content on the part of the teacher, lack of interactive forums for learners and shortage of teachers among others (KNEC reports: 2014 to 2019). Several initiatives have been put in place to improve performance in this subject. The Government of Kenya in collaboration with Japanese Government introduced the Strengthening of Mathematics and Science Education (SMASSE) in Secondary Schools. This programme may have put more emphasis on hands-on rather than mind-on approach. Despite such effort, the performance of learners in K.C.S.E Physics continues to decline. The impact of this trend on task competence among students has been inadequately investigated. If there will be no attempt to solve the problem this worrying trend will continue. There is currently limited information on the effects of IBSTA in physics especially in Kitui County. In an attempt to bridge this gap, the current study investigated the effects of Inquiry-Based Science Teaching Approach on task competence of secondary school physics' students in Kitui County, Kenya.

### Objective of the Study

The objective of the study was to determine the difference in task competence between students taught by Inquiry-Based Science Teaching Approach and those taught using conventional methods.

### Research Hypotheses

The hypothesis was tested at  $\alpha = 0.05$  level of significance.

$H_{01}$ : There is no statistically significant difference in task competence to learning Physics between students exposed to Inquiry-Based Science Teaching Approach and those exposed to conventional methods.

## 2.0 LITERATURE REVIEW

A study carried out in Mexico by Llewellyn (2013) indicated that Inquiry learning is a scientific process of active exploration that uses critical, logical and creative thinking skills to answer questions by teacher guidance hence learner achievement is obtained. His argument is in line with a study conducted by Ural (2016), who observed that through inquiry learning, significant improvement occurs in all aspects of student's motivation and their task competence. In a research study in USA by Bittinger (2015) on the impact of an Inquiry-Based Approach on attitude and learners task competence in a high school physics laboratory, the finding indicated that inquiry learning in a laboratory setting improves task competence and motivation.

Harrison (2014) studied how teaching in Europe adapts to a change in pedagogy as teaching shifts from a deductive to an Inquiry Approach. The finding indicated that Inquiry activities allow teachers to collect more evidence of student performance by observation during the experiment because instead of teaching the instruction, teachers could listen to conversation for misconceptions and perform formative assessment.

In a research done in Turkey by Demirbag & Gunel (2014) on effect of Inquiry-Based learning on science achievement, writing and argument skills, the findings indicated that the experimental group outperformed the control group in terms of their quality of argument given and their task competence

Inquiry-Based Learning Approach is a method that arouses learners' creativity in mathematics and science and it enhances achievement for the learner. This is according to a study in Nigeria by Abayomi (2013). According to a research carried out In Uganda by Ssempala (2017) on science teachers' understanding and practice of Inquiry-Based Instructions, it was observed that some of the teachers are conversant with the use of Inquiry-Based Science Approach yet they do not use it in teaching in their stations thus performance is still poor in sciences

According to a research by Mwanda (2016), instruction by Inquiry Approach has positive influence on learners' achievement in Biology. Munene (2015) observed that the main factor that leads to poor performance in learning Physics in Gatundu secondary schools is the use of conventional learning since the approach is teacher-centered. Conventional learning has also been observed to be commonly used in teaching physics in private and public schools in Kitui County (SMASSE Kitui county Report 2014)

### **Theoretical Framework**

Dewey's (1938) Constructivism Theory guided this study. The constructivism theory of learning upholds that knowledge is actively constructed by organizing subjects not passively received from the environment (Lerman, 2012). Piaget and Bruner who viewed constructivism in slightly different approaches adopted Vygotsky's Theory of Constructivism. Piaget based his examples on philosophy and epistemology while Bruner focused on cognitive structure, which he called mental schema (Culata, 2019).

A person's education is an element of related involvements, mental structures, and convictions that are utilized to translate articles and occasions (Bredo, 2014). In constructivist, learning, repeated manipulation of objects and ideas enables learners to construct meaningful concepts that can be transferred to logical abstract reasoning in a formalized manner.

The rationale for using this theory is that, student learning using inquiry were based on the fact that the majority of students have difficulty engaging in constructive learning because they fail to make adequate connections that are necessary in arriving at a desired understanding without hypothesizing and questioning as is the practice in physics classrooms currently thus will motivate the learner.

### **3.0 RESEARCH METHODOLOGY**

The study used Mixed Methodology that combines quantitative and qualitative research approaches for the aim of breadth and depth of apprehension and certification.

#### **Research Design**

The study applied Quasi-experimental research in which the researcher used Solomon's Four, Non-Equivalent Control Group Design. Quasi-experimental designs identified a comparison group that was as similar as possible to the treatment group in terms of characteristics.

Table 7: Solomon’s Four Non-equivalent Control Group Design (as Adapted from Shuttle worth, 2009)

Group	Design Group		Pre-test	Treatment	Post-test
I	Experimental E1		O <sub>1</sub>	X	O <sub>2</sub>
II	Control	C <sub>1</sub>	O <sub>3</sub>	-	O <sub>4</sub>
III	Experimental	E <sub>2</sub>	-	X	O <sub>5</sub>
IV	Control	C <sub>2</sub>	-	-	O <sub>6</sub>

### Sampling Procedure and Sample Size

Stratified random sampling technique was used to select 2 Extra-County Boys Schools and 2 Extra-County Girls Schools out of the 40 Extra-County Schools in Kitui County. Purposive sampling was employed to select Form Four students taking Physics at KCSE level in each of the selected schools. Simple random sampling was used to assign groups to experimental groups (E<sub>1</sub> & E<sub>2</sub>) each with 40 students and control group (C<sub>1</sub> & C<sub>2</sub>) with 40 students each. Purposive sampling was used to select a teacher each from two of the sampled schools. These two teachers taught only the control groups using the conventional methods.

### Research Instruments

#### Physics Competence-Based Test (P.C.B.T.)

Student’s task competence in both experimental and control groups in the study were evaluated using the researcher created Physics competence-Based Test (P.C.B.T). Two Physics Task Competence Test: Pre-test and Post-test, were constructed and used. Pre-test was administered to the respondents in the first week of the study to assess their pre-treatment Physics academic levels. Pre-tests are administered as formative evaluations to assess students’ pre-treatment Physics academic levels (Creswell, 2005).

The pre- test was test that was used to measure students’ learning outcomes in learning Current Electricity II in secondary school Physics course. The Physics test was extracted from the K.C.S.E. past papers therefore they were already standard. A test consisted of twelve structured questions carrying a maximum of 30 marks. The items tested included knowledge, comprehension and application of material learnt. They were scored at different levels along the process of answering statement questions and solving physics problems relative to respondent’s ability. The marking scheme was prepared and modified to maintain the validity of the test. The researcher assisted by the Physics teachers did examination administration, supervision, marking, scoring and recording. The Researcher analyzed the marks by calculating their mean per group.

### Data Analysis

Both the pre-test and post-test Physics Competence-Based Tests (PCBT), were marked and the marks recorded for each respondent while the data from the questionnaires was sorted, edited and recorded. On qualitative data, the researcher used content analysis approach, which emphasized on thematic analysis.

Table 1: Summary of Quantitative Data Analysis Procedure

Hypothesis	Independent Variables	Dependent Variables	Descriptive statistics	Inferential statistics
HO <sub>1</sub> : There is no statistically significant difference in task competence between students exposed to IBSTA IBSTA other exposed to conventional teaching method in Kitui County Kenya.	IBSTA teaching Approach Conventional teaching method.	Task competence	Frequency Mean Standard deviation Percentage	t-test LSD

#### 4.0. RESEARCH FINDINGS

The objective of the study sought to determine the difference in task competence between students taught by Inquiry-Based Teaching Approach and those taught using conventional methods. Before the treatment started experimental, group1 and control group1 were given a pre- test exam. The means and standard deviation obtained for the pretest exam for both groups are presented in Table 2

Table 2: Students Mean Scores for Each Group in the Pre-test

	Category	N	Mean	Std. Deviation	Std. Error Mean
Pre-test score	Control	38	43.34	14.28	2.3173
	Experimental	37	42.75	13.05	2.1457

Table2 shows the mean scores and standard deviation for all the respondents that undertook the pre-test. E1 had a mean score of 42.33% and standard deviation of 14.28 while C1 had a mean score of 43.34% with a standard deviation of 13.05. The findings show that the mean scores for the two groups were different with the control group C1 having a higher mean score than experimental group E1.

To check whether there was a statistically significant difference between the means of control group1, experimental groups1 a t-test was computed, and the findings are shown in table 3.

Table 3: The Independent t-test for Pre-test Mean Score of PCBT1

		F	Sig.	T	Df	Mean Dif.	Std. Error Dif.	95%Conf. Lower	Intval of the Dif. Upper
Pre-test score	Equal var. assumed	.319	<b>.574</b>	.185	73	.585	3.162	-5.717	6.887
	Equal var. not assumed			.185	72.715	.585	3.158	-5.709	6.880

Table 3 shows that the t-statistical value was 0.185 with 73 degrees of freedom which yielded a significance level of 0 .574 which is higher than the set value of 0.05. This means that there is no significant difference in the means of the two groups (control and experimental). The findings of this study implies that the experimental and control groups were homogenous in terms of learning outcomes at the start of the study.

### Students Learning Outcome on the Post-test

After the learning period, a post-test exam to gauge the effectiveness of each teaching method was administered to all the groups, their percentage means and standard deviations were computed, and the findings obtained are as shown in table 4.

Table 4: Comparison of Mean Scores and Standard Deviation of Post-test in all the Groups

Sub-category	Mean	N	Std. Deviation
C1	45.42	38	14.63
C2	43.00	39	15.06
E1	59.75	37	10.70
E2	57.95	36	11.52
<b>Total</b>	<b>52.03</b>	<b>150</b>	<b>14.80</b>

Table 4 shows that the experimental group E1 had a mean score of 59.75% and E2 had mean score of 57.95%. Control group C1 posted a mean score of 45.42% and control group 2 obtained a mean score of 43.00%. This finding indicates that experimental group E1 and E2 posted a higher mean score as compared to the control groups C1 and C2.

Table 5: Post-test Score by Category

Category	Mean	N	Std. Deviation
Control	44.31	70	14.776
Experimental	58.78	80	11.122
<b>Total</b>	<b>52.03</b>	<b>150</b>	<b>14.804</b>

The figures on table 5 indicate that the average of the experimental and control groups mean scores were 58.78% and 44.31% respectively. This means that the average mean score for the control group was lower than that of experimental group.

These findings are in line with a study by Banerjee (2010), who argued that Inquiry-Based lesson had a positive effect on students and posted a very high score in an achievement test as compared to a class that was taught through traditional Approach.

To understand whether there was a statistically significant difference in task competence depending on the teaching approach used, the following hypothesis was tested:

*H<sub>0</sub>: There is no statistically significant difference in task Competence to learning Physics between students exposed to Inquiry-Based Science Teaching Approach and those exposed to Conventional methods.*

A t-test was used to test this hypothesis. Table 6 presents the findings on the t-test computation of the significant differences between means.

Table 8: Independent t-test for Post-test Examination

		F	Sig.	T	Df	Sig. (2-tailed)	Mean Dif.	Std. Error Dif.	95% Conf. Interval of the Dif.	
									Lower	Upper
Post test score	Equal variances assumed	4.67	.03	~	148	.000	~	2.120	~	-10.283
	Equal variances not assumed	6	2	6.826	~	127.09	.000	~	2.159	~
				6.701			14.473		18.663	- 10.199
							14.473		18.747	

From table 6, the control group C1 and experimental group E2 had a t-statistic of 0.185 with 148 degree of freedom yielding a significance level of 0.032, which is, less than the set value of 0.05. This shows that there was significant difference in the means of the control and experimental group.

The findings of this study show that the mean difference between the pre-tests and the post-test scores show that the Inquiry based science teaching approach had a great impact on the performance of students in Physics. This is in line with Osborne (2014), who argued that science teachers' ability to practice Inquiry-Based Instruction enhances good performance. The present study concurs with a study conducted in Europe by Shafqat (2015) who argued that Inquiry based learning is more effective as compared to traditional methods of teaching, since it improves different learning domains such as knowledge, ability and task competence that improves learner's outcome. The findings are also in line with a study carried out in Malaysia by Rakhmawan, Setiabudi & Mudza (2015) that indicated that Inquiry-Based Learning makes a student more confident and makes learning more meaningful hence increases learning outcomes.

To further understand the different significance levels that exist between the sub-categories (C1, C2, E1 & E2), Least Significant Difference was computed. The findings obtained are shown in table 7.

Table 7: Results of LSD Post Hoc Comparison of PCBT2 Mean Score

(I) category	(J) Sub-category	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
C1	C2	2.421	3.118	.439	-3.743	8.585
	E1	-14.335*	3.0023	.000	-20.269	-8.402
	E2	-12.532*	2.894	.000	-18.252	-6.812
C2	C1	-2.421	3.118	.439	-8.585	3.743
	E1	-16.756*	3.138	.000	-22.958	-10.554
	E2	-14.953*	3.034	.000	-20.951	-8.955
E1	C1	14.335*	3.0023	.000	8.402	20.269
	C2	16.756*	3.138	.000	10.554	22.958

	E2	1.803	2.914	.537	-3.957	7.564
E2	C1	12.532*	2.894	.000	6.812	18.252
	C2	14.953*	3.034	.000	8.955	20.951
	E1	-1.803	2.914	.537	-7.564	3.957

\*. The mean difference is significant at the 0.05 level.

As tabulated on table 7 the difference between C1 and C2 (0.439) and E1 and E2 (0.537) was not statistically significant since  $P > 0.05$ . This implies that E1 and E2 groups, C1, and C2 performed relatively the same on Physics task competence test scores. However, the comparison between the mean difference in the groups C1 and E1 (0.000), C1 and E2 (0.000), C2 and E1 (0.000) and E2 (0.000) were statistically significant since  $P < 0.05$ . This shows that the experimental groups' mean score was higher than the control groups' mean score in task competence. Therefore, the null hypothesis one, that read *H<sub>01</sub>: There is no statistically significant difference in task Competence to learning Physics between students exposed to Inquiry-Based Science Teaching Approach and those exposed to Conventional methods*, was rejected.

These findings concurred with a research conducted by Vandewalle, (2007) who argued that Inquiry Learning when well introduced to the learner has positive impact on students' task competence in physics. This is also in line with a study by Chopra and Gupta (2011) who argued that, inquiry-based teaching approach allows students to make meaningful real-world connections in the class as they link the relevance between what they learn in the classroom and their potential careers. Awafala (2013) observed that those teachers who use the Inquiry Based Teaching posted a high achievement (mean scores) in their subjects.

## 5.0. CONCLUSIONS AND RECOMMENDATIONS

### Summary of the Findings

In this study the findings show that the post-test score for students in the Experimental groups E1 and E2 ( $M_1=59.76$ ,  $M_2 =57.95$ ) were higher than those in the control groups C<sub>1</sub> and C<sub>2</sub> ( $M_1=45.42$ ,  $M_2=43.00$ ). This indicates that Students from the experimental groups outperformed the ones from the control group in the results obtained. The answers and flow of calculation for the experimental group was well detailed and clearly elaborated. This showed that IBSTA had a positive effect on their task competence. The inquiry approach also enabled students to develop process skills and thus enhanced good performance. There was a significant difference in the post-test (PCBT) on task competence mean scores between students in the experimental groups who were taught Physics using IBSTA and those in the control groups taught by conventional methods ( $F_{4.676}$ ,  $df=148$ ,  $P=0.000$ ) since  $P < 0.05$ .

The results of the study also indicated that the difference between C1 and C2 (0.439) and E1 and E2 (0.537) was not statistically significant since  $P > 0.05$ . This implies that E1 and E2 groups, C1, and C2 performed relatively the same on Physics task competence test scores. The comparison between the mean difference in the groups C1 and E1 (0.000), C1 and E2 (0.000), C2 and E1 (0.000) and E2 (0.000) were statistically significant since  $P < 0.05$ . Therefore, the null hypothesis, one was rejected.

### Conclusions

From the summary of the findings above, the following conclusions were made:

- 1) The Inquiry based science teaching approach is a good method for teaching Physics as it enhances task competence.
- 2) There is need for an environment in which inquiry-based science teaching approach can be adopted in schools.
- 3) There is need to find a way of promoting inquiry-based science teaching approach through ICT given three factors.
  - i. The impact of covid-19 pandemic.
  - ii. The need to adopt a new pedagogy.
  - iii. To realign the teaching of physics with the new competence-based curriculum (CBC).

### Recommendations

- 1) School administrators should reward Physics teachers who use IBSTA to create a culture that would improve students' inquiry skills of engagement, elaboration, exploration, explaining and evaluation which consequently improves students' learning outcomes by making them competent and build
- 2) Sources of funding should be identified to purchase more science practical equipment and build more infrastructures to promote the use of IBSTA by Science teachers in preparation for the implementation of the Competence-Based Curriculum.
- 3) Since online practicals can be carried out in science subjects, the school management should expand ICT infrastructure, computer hardware and practical integrating software for schools to conduct experiments online using the IBSTA.
- 4) An appropriate policy should be developed for diploma colleges and universities to train their teacher trainees with an emphasis on IBSTA as part of their Physics training curriculum. The teacher trainees should then be assessed on the appropriate use of this method during microteaching and teaching practice in order to equip them with IBSTA skills.

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## Reflection on English Textbook in the Kenyan classroom

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### Abstract

An English textbook plays a crucial role in a secondary school level classroom in Kenya. It gives newly recruited tutors proper guidelines in the English course and learning activities. It enhances continuity and consistency in the presentation of content and presents students with a sense of system and progress. Further, textbooks play a crucial role in modelling the required values, social behavior and norm; it provides a lens through which the world is portrayed thus acting as a potential medium of socialization. English is an important language in Kenya and the world at large. Language textbooks especially the English ones assist learners in attaining communicative competence. English language textbooks play a central role in teaching and learning in many developing countries where English is either a subject and/ or medium of instruction. English is one of the languages offered in the Kenyan secondary school curriculum, and it is the medium of instruction for all the other subjects offered (except for other languages). Textbooks are critical materials used to support the implementation of the curriculum. The textbooks provide input in the form of explanations, texts and activities to simplify educational activities that appear complex. Specifically, the linguistic items and the visual images used in the presentation of the content are key in ensuring production of quality English textbooks. Again, textbooks are agents of effective and long-lasting change that shape learners' mindsets, perceptions, and attitudes in their later life. Textbooks are crucial tools in as far as the conveyance of direct or indirect meanings regarding the way happenings produced in society is concerned. Specifically, the language textbooks are influential instruments, which present indelible experiences to the learners. Consequently, it is important to think about this powerful tool in the Kenyan classroom.

**Key words:** *textbook, English, curriculum, reflection,*

### 1.0 Background information

Kenyan government is committed to ensuring that its learners get quality textbooks to enhance quality education. Textbooks play a key role in shaping the social skills, values, and attitudes essential to achieving the curriculum goals. Education and quality education is been given much prominence because of the key role that it plays in the learners' lives. Notably, education is organized in form of lessons in a classroom, is an ever-changing interaction among teacher, materials, and learners. This interaction has to be managed in order to provide the structure and predictability that are necessary in making the event socially tolerable to the parties that are involved. The management also enables learners and teachers to know where the lesson fits into the general pattern of the lessons' structured pattern, to save teachers and learners work, and to give legitimate external parties access to, and possibly influence upon, what takes place in the classroom. The very fact that a lesson is a dynamic interaction, therefore, leads not to a need for maximum flexibility, but to a need for a predictable and visible structure both within the lesson and across lessons. The textbook, is the best means of providing this structure.

The teaching and learning process, as a shared experience with already predetermined objectives requires a blue print or a map to achieve the desired outcomes. There are only three places where this map can reside—in the teacher's head, in a written syllabus (produced by external authorities or mediated between teacher and students), or in the form of pre-planned materials (that is, a textbook). If the map were within the teacher's mind, no one else would access it. On the other hand, when the map is in the form of a syllabus, it would be accessed more but only by the experts who understand the code in which the syllabus is framed, even though the syllabus lacks the actual content of the lessons structure. A map, therefore, needs to be as full and as accessible as possible and this characteristic can be achieved by the textbook. In the Kenyan context, textbooks continue to dominate in the packaging of the curriculum and the government is committed to producing quality textbooks.

Kenya initiated educational publishing to ensure that quality textbooks are published. Educational publishing in Kenya has evolved through the years to the current educational publishing context. The first textbook policy was put in place five years after independence, 1968. The Kenya Institute of Education (KIE) was established as a curriculum body in 1968 by an Education Act. The KIE put in place subject panels, came up with materials, and published them through parastatal companies, namely the Jomo Kenyatta Foundation (JKF) and the Kenya Literature Bureau (KLB). The Ministry of Education (MoE) made a recommendation of textbooks to be bought under the Kenya School Equipment Scheme (KSES), whose responsibility was procurement and distribution of books. Chavaka (1992) explains that change from the 7-4-2-3 to the 8-4-4 system of education in 1985 brought life to the publishing industry but books from private publishers were discredited on the basis of being costly and irrelevant to the school situation in Kenya. The MoE, at last, mandated the KIE to write the required textbooks. The institute organised writing workshops, which involved bringing together teachers with no prior training or experience in writing, with the instruction to 'produce a manuscript' for a specific subject within a stipulated time. The manuscripts which were produced were passed on to state publishing houses with the direction to 'produce a book,' and in stipulated time. These books were to become the official textbooks for schools while books from commercial publishers were relegated to supplementary material or teacher reference.

Kiai (2012) advances that the 1998 National Policy of Textbook Publishing, Procurement and Supply became fruitful in 2002 when the curriculum was reviewed leading to high enrolment in primary schools in 2003, as education at this level was declared 'free'. This move demanded new and higher quantities of learning materials. Commercial publishers engaged in materials development, while KIE's mandate was limited to materials evaluation and recommendation for approval of a maximum of six books per subject to the MoE. Approved materials are captured in the Approved List of Textbooks' and other Instructional Materials for ECDE, Primary Schools and Teacher Training Colleges, an annual publication of the Ministry of Education (MoE). Schools would then decide and choose the textbooks which best suited their teaching and learning needs since books would not be classified as 'mandatory' or 'supplementary'. The policy also intended to promote high-quality textbooks and enhanced reading culture. This textbook policy has been in place until 2017, when a re-evaluation of the existing approved school textbooks was conducted by the Kenya Institute of Curriculum Development (KICD), which was established by the Kenyan Government in 2013 under the Act of Parliament number 4 of 2013 as the successor of the KIE.

Before the re-evaluation exercise, schools were free to choose and buy textbooks based on a catalogue of approved textbooks prepared by KICD on behalf of the MoE. Each school made purchases using funds allocated to them through a specific votehead earmarked in the school capitation grant. While this process of textbook acquisition enabled schools to control which books to use, the money used to buy books by schools in Kenya was quite high compared to other Sub-Saharan African countries such as Benin, Côte d'Ivoire, Madagascar, Namibia, and Rwanda. The re-evaluation sought to achieve a 1: 1

student- textbook ratio, a goal that had not previously been met. Migosi (2017) observes that 'one of the four main components of Secondary Education Quality Improvement Project (SEQIP). The SEQIP is a nationwide project aimed at ironing out major challenges in the achievement of quality education among them poor quality Science, Mathematics and Language education at the secondary level. Beneficiaries of the project would be secondary subject teachers of the three subjects, county and sub-county officials, MoE technical staff, KICD, Teachers Service Commission (TSC), Kenya National Examination Council (KNEC). The project would be implemented by MoE state department of Basic Education, a Project Steering Committee (PSC) and the Directorate of Project Coordination and Delivery (DPCAD).

One of the components of SEQIP is to improve the quality of teaching by ensuring that textbooks used in Kenyan secondary schools are available. One of the areas that contribute to poor learning outcomes is the availability of textbooks. Under SEQIP, more textbooks would be made available in English and Mathematics in forms one, two, three, and four.

## **2.0 Why the English textbook?**

Kenya has more than 70 indigenous languages (termed local languages), and two official languages, Kiswahili and English. In many nations where English is an official language and language of instruction, which includes former colonies of British in Asia and Africa, students and pupils have a tendency of using English in specific spheres, specifically school, as most conversation away from learning institutions is in the native languages. This scenario applies in the Kenyan context. Official educational policy states that the foundation three years of schooling (Class One to Three), should be in the mother tongue, or the indigenous language spoken in the respective catchment areas where the schools are located; and that in Class Four, English is used as the medium of instruction (Nabea, 2009). English is one of the teaching subjects in secondary schools in Kenya; it is one of the compulsory subject-all students take the subject. "English as a medium of instruction in Kenyan schools is indeed a very important subject both in our curriculum and as a service subject" (English Language Syllabus 8-4-4, 1994:45). It is the latter statement, which underlines the function of English Language in the system of education. The purposes are varied, beginning with "the school leaver would need good English in an enormous range of technicalised, commercialized and daily affairs in the Kenyan and International environment". Further, "English is there ...to facilitate debates and discussions amongst many African states" (Eshiwani, 1990:19).

English like all other foreign languages that are official languages is taught and learnt in Kenya to achieve several objectives, which include: (i) To nurture and grow the learner's intellectual powers. (ii) To increase the learner's personal culture by reading literature and philosophy. (iii) To increase the learners' understanding about how language works. (iv) To teach the learner to learn a language so that he can do research. (v) To enhance the learners' understanding of worldwide issues. (Ministry of Education 1994). English as a subject influences students because all the learners are taught therefore has an impact on many people who go through the Kenya 8.4.4 education. The learning and teaching materials used in secondary schools are textbooks and, in this case, the English textbooks. Teachers and students perceive textbooks as sources of authority.

Textbook play an essential and incontrovertible part in the day-to-day teaching and learning English, and that the usefulness of the textbook tends to be substantial cycles of change. The English textbook has thrived since the colonial times. Many more textbooks have continued to be published and distributed every year by the government. Strikingly, each latest generation sets of textbooks is more compendious than the previous ones. English Language plays a vital role in the language situation in Kenya. In addition, English is the official language of communication as well as the medium of

instruction in Kenya primary four through secondary education, colleges and universities (Okwara, Shiundu & Indoshi, 2009). This means that English is a subject across the entire school curriculum. Moreover, English as an international language is one of the leading media for communication in international conferences and meetings. Consequently, those who master the language are likely to reap many academic, social and professional benefits (Othuon & Tella, 2011).

### **3.0 Textbooks during Pandemics**

Textbooks especially the English languages textbooks become the only learning tools during pandemics especially in areas where communication technology has not been embraced. After closure of schools following the confirmation of the first case of COVID 19 in Kenya, few learners who could afford the required gadgets and power embraced remote and digital learning. In 2019, Kenya had approximately 3.26 million secondary school students. When schools were closed in response to COVID-19, the education system turned to electronic information and communication technologies (ICT)—internet, laptops, smartphones, and even earlier broadcast technologies like radio and TV, to deliver the curriculum. Few learners who could afford the required gadgets and power embraced remote and digital learning. However, most learners were excluded from online education due to challenges of access to internet, information communication and technology and access to electricity. Bell, Cardoso, Giraldo, El Makkouk, Mizunoya ... (2020) and Buchbinder (2020) established inequalities in electronic abilities and access to digital and remote learning. In the family units, which had smart cell phones, it was not possible to necessitate digital learning since the parents and guardians had to attend to their daily routines outside home because not all could work from home. Accordingly, the learners could not access the smartphones. Another reason would have been that some parents could not entrust their children with their phones as they protected them from cyber bullying and pornographic materials.

To bridge the gap, textbooks came in handy. However, the negative effect of closures was especially severe in areas, where textbooks are often the main teaching tool and significant proportion of students (most of the times the majority) had their own copies. In areas where learners had textbooks at home, tutors would use voice calls, WhatsApp messages, or announcements on the radio to instruct parents and guardians on the pages the students should cover and at what time. Differently, in some cases, teachers had given assignments to students that were derived from textbooks and the textbooks were the main points of reference in doing the assignments.

### **4.0 The place of English textbooks in the Kenyan classroom**

Textbooks play an important role in almost any school system in the world, representing a useful resource for both teachers as course designers and students acquiring knowledge. Textbooks are of great value and effect in the process of teaching and learning. According to Zohrabi, Sabouri and Behroozian (2012), textbooks are considered an essential component of any ELT course so that the use of ELT published materials is more widespread than ever. They serve teachers with guidelines concerning syllabi, teaching methodologies, and the materials to be taught. Here, care should be taken in choosing the best suitable text for a particular context. Textbooks are valuable in each language classroom, and they have several roles in English Language Teaching (ELT) curriculum and help the process of language teaching and learning. A textbook has a virtual role in teaching and learning of English. According to Hour and Ahmadi (2012), "textbooks are the main sources that can convey the knowledge and information to the learners in an easy and organized way" (p.176). As noted by Zohrabi, Sabouri, and Kheradmand (2014), "textbooks are one of the elements that may advance or try to prevent students based on their materials. They provide a kind of support to teachers and learners. Textbooks provide learners a kind of consistence"(p. 95). They have an essential influence in the teaching process. ELT

textbooks have key major function in the present discussion. Sheldon (1988) states that ‘a textbook represents the visible heart of the ELT curriculum in the classroom.’

English textbooks are an important constituent of curriculum and the system of education as they bring about uniformity in the Kenyan classrooms. The English textbook determines the components and method of learning by controlling the contents, the method and the procedures of learning. Therefore, all the students in secondary schools in Kenya are exposed to the same linguistic content. In this sense, languages textbooks bring about uniformity in the Kenyan classroom. Following textbook re-evaluation, the MoE has been managing the procurement of textbooks since January 2018. The MoE through KICD invited all publishers’, whose textbooks are in the current catalogue to resubmit the proposal with revised unit prices, including book production and distribution costs. Publishers were also invited to present new books for review. The best-evaluated book based on content, quality and price per subject and grade was selected as the respective course book. Starting January 2018, the MoE, through publishing firms, has been distributing enough textbooks to all the public secondary schools in Kenya. Currently all learners in public schools are provided with one textbook per subject from among the approved. This policy ensures that all students in the Kenyan secondary school classroom consume similar linguistic content.

In addition, English textbooks enhance the practicability of some skills right from the classroom. English as a subject imparts listening, speaking, writing and reading skills. Most of these skills are applied outside the classroom many years after graduating to institutions of higher learning. Some of the practical writing skills, which are useful, are; writing application letters, which provides learners with skills that may be useful later in life as the learners are looking for jobs especially when they are required to do so through an application letter. Learners who are ultimately employed as police officers, nurses, doctors, can apply further, report-writing skills; auditors among others are expected to make reports by making entries in daily occurrence books and specific reports involving their nature and conditions of working. Speech writing skills are substantial in circumstances when the learners are called upon to address a certain audience. Recipe and shopping list writing are practical skills that the learners can make use in their day-to-day living.

English textbooks provide the primary language input in the Kenyan classroom. This role is substantial as textbooks play a central role in English reading lessons especially in areas where information technology has not been embraced. Kasule (2011) highlights that a reading activity consists of several constituents, but textbooks and other materials of instructions used by the teachers of English are the most substantial. Kiai & Maroko (2013) advance that the textbook predominantly turns out to be the actual course of study which permeates the endured culture of teachers and learners as they interact during their classes. Nunan (1999) adds that a textbook is the key component in ELT and it is impossible for a class to do without it. In Kenya, teachers use textbooks to meet curriculum needs. Richards (2001), further notes that textbooks are essential components in many language programs since they provide the primary language input that learners receive and practice in the classrooms, especially during lessons in most of the institutions. Bruegilles and Cromer (2009) note that textbooks play a crucial function in society by modelling the required values, social behavior and norms.

Textbooks provide a lens through which the world is portrayed, thus acting as a potential medium of socialization. These materials become the “‘real curriculum’ that is filtered through the lived culture of teachers and students as they go about their daily lives in the classroom” (Apple 1989, p.282 as cited in Kiai, 2012, p. 33). Additionally, textbooks are ordered set of instructions consisting of the curriculum content that promotes teaching (Tomlinson, 2011). Textbooks facilitate timely syllabus coverage, ensuring that learners are involved in emerging issues and suitable language is used. Therefore, the

textbooks should be written in relevant language, provide for learners' participation and gauge their discrepancies in their enthusiasm levels.

Textbooks are central and influential tools in teaching and learning that help in molding covetable attitudes in learners. Learners' perceptions about the world and the future are substantially influenced by language that is commonly represented in an English textbook in the Kenyan context. Textbooks remain the most multifaceted instruments of enculturation in the society. English textbooks provide crucial information in teaching and at the same time are powerful basis on which images are formed. The content in the textbooks shape attitudes by transmitting a society's way of life. The manner in which women and girls, men and boys are represented in textbooks contribute to the type of images that students and pupils pick up about females and males in the society. Textbooks are thus crucial tools in the teaching and learning process for they are primary carriers of the content that is disseminated to the learners at different levels of learning. They play a substantial role in the preparation of the future actors in society. That is, (the learners by molding their perceptions and providing for them an overall worldview of gender roles and the society in general.

Further, the English language used in the secondary school English textbooks configures the learners' perception of females and males and the relations that exist in the sexes. It mirrors and propagates the perceptions in the culture and what the society expects of every gender. It suggests who we should be as females and males thus people are informed of culturally prevalent traditional engendered roles and that the content in English textbooks for secondary schools accounts for this awareness, which influences the views of the learners concerning themselves and their perceptions on gender. The English textbook is an important means of fulfilling the range of needs that emerge from the classroom and its wider context. Education is a complicated process, which needs to be simplified. The textbook creates a sense of order in a potentially chaotic environment. Textbooks give visible and practicable framework around which the many forces and demands of the teaching—learning process can cohere to provide the basis of security and accountability that is necessary for purposeful action in the classroom. This vital management role takes on even greater importance in the insecure context of change. Rather than denigrating and trying to do away with textbooks, we should recognize their importance in making the lives of teachers and learners easier, more secure and fruitful, and seek a fuller understanding of their use in order to exploit their full potential as agents of smooth and effective change.

English textbooks are central and influential tools in teaching and learning that help in molding covetable attitudes in learners. They remain the most multifaceted instruments of enculturation in the society. Textbooks provide crucial information in teaching and at the same time are powerful basis on which images are formed. These images may bring change in character and behavior that depending on the knowledge and skills that are imparted based on the subject matter. Poetry and comprehension content provides a basis on which students can be transformed from weak and evil young men to strong and virtuous leaders in the society. Most often than not the passages portray characters from a wanting level to a level where they end up being transformed to likeable and dependable characters. Such passages when brought in the classroom in form of textbooks may help change some learners involved in questionable activities like drug and substance abuse. In this sense therefore the languages textbook is invaluable in the Kenyan classroom.

Further, some reasonable study skills contained in the languages textbooks may bring change of perception of academics by the learners. Summary study skills enhance the learners understanding on the other subjects especially when they are required to read and condense the content for easier revision as they prepare for examinations. Again, some skills as note making and note taking may assist the students during lessons for lesson involvement and grasping most of the content delivered in other subjects. Additionally, some content in some sections of the textbooks is based on realia and facts. For

instance- comprehensions on realities on calamities such as famine, drought, war, outbreak of some deadly diseases such as polio, cerebral malaria, COVID-19 among others. Other passages are based on scientific developments inventions and innovations as developing vaccines, atomic bombs as a terroristic tool, organ transplants, cloning as a possible way of procreation and real phenomena such as climate, global warming, managing lifestyle diseases through diet, exercise and drugs to subdue the disease-causing organisms and the ozone layer. Therefore, the languages textbooks bring ‘the world’ in the classroom. This particular content helps the students to understand the world even without interacting with the environment one on one since it mirrors the society.

The structure provided by the textbook saves the teacher work and helps him or her to manage the class. The English textbook is structured in units which consist of specific content to be covered on comprehension, grammar, study skills, writing and listening and speaking sections. This structuring frees the teacher to concentrate attention on coping with new content and procedures. Furthermore, since English subject is taught on a daily basis, the textbook is portable and permanent, and can therefore provide constant support. Availability of languages textbook means that teachers are not spending their time sourcing for materials and producing visual aids, but are free to concentrate on planning the lessons and understanding the subject matter. A textbook, which is well structured in terms of grammar and vocabulary, present, and offer some balance of the skills taught and gives teachers easy time to prepare and deliver lessons. This results in better-planned lessons, a more creative methodology, and more useful materials adaptation and supplementation. The textbook can provide as complete a picture as possible. Through structured scripts, (particularly when supported by a teacher's guide) it can show as explicitly as possible what to do, and because it is immediate to the actual context of use, there is no problem of transfer from training context, such as a seminar, to the classroom.

Lessons on grammar of the English language are crucial for the learners in and outside the classroom. For one, use of correct grammar enables learners to express themselves well and coherently when writing creative compositions and essays based on the set text in the examination. In addition, grammar is also important in responding to the functional writing question which is tested in paper one. Most importantly, in the Kenya Certificate of Secondary Examination question four, which is examined in paper two. In this question, the grammatical competence of the student is tested. This section is awarded fifteen marks. Grammar is also tested in the comprehension and excerpts questions. The grammar learned in the classroom is useful away from the classroom as it enables learners to choose proper words when speaking for effective communication.

Listening and speaking skills learned in the languages classroom enable the learner to communicate effectively through proper articulation of sounds and pronunciation of words including proper stress and intonation of words. Further, the learner is also able to be a good team player following the acquiry of skills such as, conventions of conversations, active listening, role-playing, hot seating, negotiation and discussion, giving and receiving instructions, debating, proper use of non-verbal cues in communication. Study kills like notification of minutes, writing speech, letters of application, writing messages of condolences, thankyou notes and congratulatory messages, minutes writing, writing invitations, advertisements, shopping lists, letters of apology, filling forms and telephone messages. All these skills are practical in life and the learners can use them in their day-to-day interactions. As they are contained in the textbook, the students can read and read them both in class and outside the class since the content is contained in the textbooks, which are readily available to the learner

In some classrooms, the English textbooks uptrend the tutors’ instruction in the ELT teaching and learning process. Principally, teachers believe that textbooks provide the basis for the content allotted for scheduled lessons, for the balancing abilities to be taught, besides providing the required practice of language that the learners need in the classroom. For the ESL learners, the textbook becomes the major

source of contact they have with the language apart from the input provided by the teacher. Prior to selecting a textbook, educators should thoroughly examine the program curriculum. If the goals and curriculum of the program are clear and well defined, the parallels with certain textbooks may become obvious. For example, if one of the goals of the program is to give students an opportunity to interact with authentic texts, then books that use articles written for native English speakers would be appropriate. If the program focuses on developing reading fluency, books designed to support the development of reading skills would be appropriate. According to Gretchen (2003) research, the textbook has a process for developing curriculum that is based on a needs assessment of learners and includes participation and input from other stakeholders. The curriculum and instructional materials are easily accessible, up to date, appropriate for learners, culturally sensitive, oriented to the language and literacy needs of the learners, and suitable for a variety of learning styles. Sample Measures for Instructional Materials: They are up to date (e.g., published within the past

Textbooks provide source of learning during leisure times. Holmquist (2006) a textbook, if well-designed, is a basis for learners' exploration, learning, and enjoyment. Course textbooks should be learner-centered to nurture the minds of students, without enhancing or strengthening stereotypes and gender biases. Textbooks aid learners in mastering the languages content in a leisurely way. Students can recite poems during their free time. During such times, they end learning on their own in a flexible and relaxed environment as they take a break out of the confining classroom.

## **6.0 Conclusion**

The influence of new technologies notwithstanding, languages textbooks will certainly keep on playing a key part in teaching language and providing a practical means for tutors and students. Quality textbooks satiate to transform the guideposts in the formal government syllabus into an invaluable source of content, texts, and activities, which are beyond the capacities of most teachers to develop on their own. The use of textbooks should not be interpreted as a reflection of a deficiency on the part of the teacher, any more than the use of computer-based materials would be so regarded. Textbooks should be considered as one among various resources from which tutors draw upon in coming up with productive lessons. However, teachers should be trained on how to adapt and modify textbooks as well as in utilizing original materials and in coming up with their own teaching materials. Again, the government should make immediate, major, and perhaps sacrificial investments in textbooks to ensure that all learners have textbooks.

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**SUB-THEME 4: IMPLICATIONS OF CLIMATE CHANGE ON  
SUSTAINABLE ENVIRONMENTAL & NATURAL RESOURCE  
MANAGEMENT**

Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021, Machakos University, Kenya



## Implication of Climatic Change on Sustainable Environmental and Natural Resource Management in Africa: Individual and Collective Responsibility

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### Abstract

The impact of climate change is quite evident: Increasing aridity, disruption of livelihood in term of food and drinking water supply, risking the collapse of marine eco-systems, food insecurity, Arctic melting, loss of glaciers, Amazon and Siberian fires, droughts and floods. Several studies analyzing the content of scientific articles on climate show that almost all articles that take a position on the causes of global warming support the scientific consensus that global warming is due to human activity. This is explained first of all by the use of fossil fuels, and secondly by the balance of emissions from changes in land use. The ocean has absorbed about 30% of human made carbon dioxide emissions which has led to acidification of the waters. Global warming relies mainly on the greenhouse gas emissions, which are currently increasing. There is need to redesign our curricula and demand that ecology be at the Centre for the curriculum today at all educational levels; young people need to be taught about the urgency, severity and scientific basis of the climate crisis. Unless we make a paradigm shift in our curriculum design and development and also change our lifestyle, we risk suffering the worst impact of climatic change aforementioned. The paper is a review of both theoretical and empirical studies on impact of climate change in Africa. It brings to the limelight the global views of this impact in Africa. The paper contributes to new knowledge by suggesting the need for the African nations to collectively take responsibility to address the impact of climate change by recommending a Pan African Ecological Curriculum.

**Key words:** *Impact of climate change, Pan African Curriculum, African Nations, Collective Responsibility*

### Introduction

Climate change is a global phenomenon and has been identified as a leading human and environmental crisis of the 21st century and is rooted in the human interreference with mother nature mostly for economic purposes (Singh & Shishodia,2007). Francis (2015) explains that marine life in rivers, lakes, seas, and oceans, which feed a great part of the world's population, is affected by uncontrolled fishing, leading to a drastic depletion of certain species and the livelihood of the poor. The adverse impact of climate change is experienced in developing counties and specifically in Africa evidenced by; increased aridity, disruption of livelihood in term of shortage of drinking water supply, risk of the collapse of marine eco-systems, food insecurity, loss of glaciers, droughts and floods among others (Religious of Assumption Newsletter 2020, Sing & Shishodaia 2007, Awojobi, & Tetteh, 2017, Ireghenu, Uzonwanne, & Nwogwugwu, 2014, Francis 2015).

The paper reviews both theoretical and empirical studies with the main objective of bringing to the limelight the impact of climate change in Africa and what African nations ought to do in order to address the challenges of the climate change. The paper specifically appeals to the African nations to collectively address the adverse effect of climate change and improve the livelihood of the poor people in the continent without heavily relying on the foreign aid. This paper adds to new knowledge by suggesting the need for the African nations to make a paradigm shift from their individual curriculum to a Pan African ecological curriculum where all the young people in Africa at all educational levels will be

taught about the urgency, severity and integration of scientific and traditional methods to address the impact of climate change. The paper is keen on showing that through participatory spirit and wisdom from the African scholars, the African nations have the potential to mitigate some effects of climate change in the continent.

The paper is divided into five sections. The first section reviews global literature on the impact of climate change in Africa, the second focuses on the environmental education. The third section proposes and discusses a Pan African Ecological education, the proposed content, benefits and the sustainable model. The fourth and last section provides the summary and conclusion.

### **Global Literature on the Impact of Climatic Change in Africa**

The UNEP Report of 2012 points out that the problem of understanding climate change (or global warming) is one of the major challenges confronting African people, their governments and the African Union. Africa suffers significant threats from climate change yet it is the lightest polluter and responsible for a negligible amount of total global greenhouse gas emissions (UNDP,2018-2020, Tadesse 2010; Besada & Sewankambo, 2009). It is predicted that the temperature in Africa continent will rise by 2 to 6°C over the next 100 years and in terms of economy, the Sub-Saharan Africa will lose a total of US\$26 million by 2060 due to climate change (Gemedda, & Sima, 2015). Predicted changes to rainfall regimes indicate that southern African will become drier, and eastern and western Africa will become wetter, with more intense rain and increased risk of floods.

Some projections indicate that 250 million Africans could face water shortages by 2020 if nothing is done – and done quickly (UNDP,2018). Further still, some economists predicted that in order to achieve “climate resilient” Millennium Development Goals over the whole continent, Africa will require US\$100 billion a year in the 2010-2020 period with approximately US\$82 billion required for standard development assistance, and an additional US\$11-21 billion for adaptation. A scenario analysis undertaken by the Food and Agriculture Organization (FAO) indicates that by 2080, Gross Domestic Product from agriculture could decline in Africa from 2 to 9%. FAO stresses that changes in agricultural practices will be required to respond to these impacts including changes to crop species, new irrigation techniques, the use of different fertilizer inputs, seasonal changes and sowing dates. It is clear that all the projections are inconsistent and unreliable

On a different note, Sigh & shishodia (2007) opine that it is not possible to eliminate land degradation altogether but it can be minimized. They assert that Prevention is far often more cost effective than rehabilitation of degraded lands. They point out that that once land has been excessively degraded, restoration cost is higher and effectiveness is low. They stress that not only is a 100 percent abatement of land degradation technically difficult but economically not viable. They ascertain that what is needed is an integration policy for management of natural resources to ensure that they address the adverse impact of climate change.

The impact of climate change has weakened Africa’s capacity to grow and develop and has posed a great threat to the continent’s agricultural production, food security, health, water and energy and infrastructure as evidenced by the elongated and heightened droughts in the Eastern Africa, exceptional floods in the Western Africa; reduction of rainforests in equatorial Africa; and a rise in ocean acidity across Africa’s southern coast coupled with extremely altered weather patterns leading to food shortages due to crop failures and loss of livestock that has endangered rural and pastoralist populations (Tadess,2010, Awojobi & Tetteh, 2017, UNEP,2012; Besada & Sewankambo, 2009). Francis (2015) points out that tropical forests that possess the ecosystems of enormously complex biodiversity are senselessly burnt down or leveled for the purposes of cultivation to the detriment of countless species

and the poor people are most affected. A majority of African people are poor and live on the front lines of pollution, disaster, and degradation of resources and land (Besada & Sewankambo, 2009).

Vulnerability of the continent to adverse impact of climate change has compelled UNEP to call upon decision makers in Africa, to help reduce negative consequences. UNDP (2018) opines that the time is now for the African nations to support bold, innovative approaches to foster low-carbon climate-resilient development across sub-Saharan Africa and the rest of the continent. This means that African nations need to become active participants in finding solutions to the impact of climate change. To address these climatic challenges, the UN Environmental Programs in collaboration with other stakeholders, is promoting capacity development for future professionals through environmental education. Francis (2015) affirms that ecological education can lead to new habits and lifestyles that can promote a new relationship with the environment and all creation and with God.

### **Environmental Education**

Education plays a major role in alleviating environmental problems and promoting sustainability. The relationship between education and sustainable development was first officially recognized at an international level at the 1972 Stockholm Conference on Human Environment (Kawa,1991). Proper and relevant environmental education should provide appropriate knowledge and skills needed to address the adverse effects of climate change and simultaneously improve a country's economy and people's way of life. In the same vein, Wahyuni (2016) points out that education provides answers or solutions to the world's pressing conditions and problems such as those related to climate change, politics, and socio-economic as well as other issues related to poverty and sustainable development. In order for the education to yield the aforementioned outcomes, it must be well designed with relevant content and pedagogy.

Otewa *et al* (2007) in their studies on *Environment and sustainable Development: A Guide for Higher Education in Kenya Volume II* observe that since the teaching of environmental concepts were integrated in various core subjects in Kenya's school curriculum, environmental deterioration continues to amount. These scholars assert that learners have failed to comprehend the meaning of environment. This implies that the content of environmental education is probably shallow and therefore ineffective in making the students to act responsibly towards the environment. The learners may not be aware of how their individual and collective lifestyles could be impacting on environmental degradation and in the long run to climate change. Caduto (1989) similarly elaborates that ecological education includes spiritual values and the spiritual aspects of children' lives. It helps children to assimilate the symbols that are necessary for developing an ecology of mind that will enable them to understand the earth in all of its aspects, to solve problems, and to adapt their behavior so as to create a means of living in an ecologically balanced, sustainable way. Religious of Assumption Winter Newsletter (2020) summarizes that young people need to be taught about the urgency, severity and scientific basis of the climate crisis.

Francis (2015) asserts that effective education is critical for creating awareness, enhancing values, changing people's attitudes and improving skills consistent with environmental sustainability. This means that is not enough to merely integrate environmental concepts in various core subjects as is done in the schools in Kenyan and perhaps in many educational systems in African Nations. Francis further explains that environmental education in its broad sense can achieve ecological equilibrium and is capable of producing "ecological citizens." He enumerates that environmental education needs educators capable of developing an ethics of ecology, and helping people, through effective pedagogy, to grow in solidarity, responsibility and compassionate care of the environment. He asserts that it is only by cultivating sound virtues that people will be able to make a selfless ecological commitment.

Le fay (2006) supports the idea of ecological education by explaining that:

*“If we are to make the shift to an ecological worldview, then the principles of ecology must become the principles of education. That is, the education system must be radically redesigned using ecological principles at every level: curriculum, pedagogy, philosophy, organization, management and architecture, and in its relationships with the wider community and environment. It is not enough to teach ecology as a ‘subject’ in a still fragmented and industrially orientated ‘curriculum’; education systems must embody ecological principles in their total design”.*

The views of the scholars on environmental education clearly calls for a paradigm shift in the way environment education is delivered in general and particularly in Africa. Although UNDP is working to help African countries address the challenges of climate change through various projects, and remains the largest service provider in the UN system globally on climate change adaptation and mitigation, African nations need to take both individual and collective responsibility to understand the impact of climatic change and speedily address the climatic crisis in the continent. Relying solely on foreign and international policies with their inconsistent statistics and projections aforementioned will not help the African nations to address the adverse effects of climate change in the continent.

Anesu (2013) observes that Africa’s voice in international climate change negotiations has been very limited and the continent has struggled to influence global policies to tackle its particular challenges without much success. limited financial resources have always been made available to the continent. This clearly shows that excessive reliability on the EU-funded research projects in finding solutions of the impact of climate in Africa will not help the continent to grow and develop. There is need for the African nations themselves to actively participate and be part of the solutions. The nations to affirm themselves and devise viable and affordable means to curb the impact. One of these means is drawing wisdom from the research findings from the African scholars such as the one from Egeru (2012) on *the Role of Indigenous Knowledge in Climate Change, Adaptation in the Teso Sub Region, Eastern Uganda*.

The study of Egeru (2012) examined the role of indigenous knowledge in climatic change adaptation in Uganda with specific focus on the Teso -Sub-Region. Data was collected using semi structured questionnaires, individual interviews, focused group discussions and observations of the cultural practices. The findings revealed that the Iteso people have been very good custodian of their immediate environment. The study further shows that the Iteso have acquired detailed knowledge about the functioning of their immediate environment and have been vital in responding to environmental challenges including droughts, diseases and pest infestations. Citing the Iteso as an example, Eguru explains that many traditional societies have built up knowledge over a long period about their environment and have developed strategies to recognize and cope with these changes. Unfortunately, wide applications of traditional knowledge systems in mitigation and adaptation to climate change have long been neglected in developing and implementing climate change policy. Consequently, he recommends incorporating indigenous knowledge into climate change policies and is quite optimistic that this will lead to the effective adaptation strategies that are cost effective, participatory and sustainable. Eguru emphasizes that traditional and indigenous people have valuable lessons to offer about successful and unsuccessful adaptations to climate change. He concludes that that it is important for education institutions, including primary schools, secondary schools and universities to work with communities to validate and strengthen community practices.

The study of Eguru (2012) is in line with that of Tosam (2019) which argues that it is time for African governments to start appraising and encourage the re-institution of traditional conservationist values and practices to help extenuate the adverse effects of climate change in Africa and promote sustainable development on the continent. Just like Eguru (2012), Tosam is emphatic that there is an urgent need to seek indigenous solutions to environmental crisis in Africa without compromising the much-needed

development in the continent. In the same vein, Le fay (2006) ascertains that we must learn to create educational communities that model ecological communities, to devise educational structures and processes that are patterned on ecological principles earlier mentioned, that mirror the web of life.

These scholars provide insights on the kind of environmental education needed in Africa and by Africans. This will mean collective participation and solidarity among African nations to explore and come up with a common and comprehensive environmental education that will equip learners at all levels with appropriate knowledge and skills to address environmental challenges for the common good of the African continent. Unless this is done, African nations risk leaving a desolate continent for the future generations.

To come up with a common environmental curriculum will require a paradigm shift in the way African nations perceive themselves. Positive self-image will enable them to grow and develop together valuing each other's nation. This collaboration will open their eyes to realize their potentials and abilities to change the environmental face of the continent. Ahunna Eziakonwa Assistant Administrator and Director Regional Bureau of Africa UNDP is optimistic that when African Nations enhance partnership, they can tap Africa's vast resources and human talents to transform the continent and ensure a brighter future for generations to come. For them to significantly transform the continent this paper suggests that they enliven and embrace the slogan of the former US president Barak Obama of 'Yes, We Can.' They need to believe that together they can find indelible solutions to the impact of climate change in Africa. Just the way the slogan worked for Obama, and saw him rise to becoming the first black president of the coveted United States of America, it can also work for them as the leaders of the African nations in finding solutions to the environmental crisis.

There is power in working together and in self-affirmation. In Kiswahili we have a saying that *umoja ni nguvu* (unity is power). America is the most powerful nation on earth because of the unity of the states (United States of America). African nations need to borrow good practices. What is required is collective good will of the nation so that they cease act as isolated and dim stars that shine separately. The lack of unity of the African nations has led to the detriment of these nations making them to remain at the periphery in international decision making. It is time for the nations to collectively break away from the mundane of "twaomba usaidizi" (we ask for aid) through their various social media whenever they are hit by environmental challenges. This paper proposes a new thinking in regard to the collaboration of the African nations in addressing the impact of climate. It proposes a common curriculum- a **Pan African Environmental Curriculum (PAEC)** at all levels of learning from primary to tertiary levels. The paper expounds on the content, methodology and the envisioned benefits for African nations in the continent.

#### **The content of the Envisioned Pan African Environmental Curriculum and Benefits**

This curriculum will be holistic and will borrow and integrate indigenous and scientific knowledge and skills in finding solutions to environmental crisis in Africa and beyond. It will be designed to cover in details the causes, effect and appropriate, practical and sustainable solutions to the impact of climate change. Topics that will be covered include but not limited to: impact of individuals family, friends, schools, governments and developed nations and society at large on climate change. Issues of poverty, corruption and financial management will also be covered in details and at different levels. Moral and ethical values and the link to the impact of climate change will included. Some of the ecological principles outlined by Le fay (2006) will also be part of the content; philosophy, organization, management and architecture. The curriculum will be practical and compulsory at all levels and will inculcate values in the citizens and continuously raise their awareness of how their individual and collective lifestyles contribute to the impact of climate change. Francis (2015) affirms that it is by

cultivating sound virtues that people will be able to make a selfless ecological commitment that will benefit the entire society.

### **Teaching methods**

To achieve the desired outcomes, the educators will employ different pedagogies such as field trips, research, reflection papers, demonstrations, community engagements including case studies of environment heroes and heroines from different nations to inspire people of different cadres to participate in activities that will improve the environment and consequently reduce the impact of climate change. For example, in Kenya, the case of the late Wangari Maathai an environmentalist and a Nobel laureate will serve as a perfect example of the case study Her environmental and work, largely contributed to a greater consciousness of the crisis in Kenya of climate change; and the specific challenges facing Africa (Awori, 2006). Children will be taught through stories, riddles, songs and poems and nature walk on the causes and effect of climate change. Through nature walk, they can visit different places where the environment has been cared for and where people have polluted it. Learning in this way will make them individually grow up respecting the environment. They will learn good practices of planting trees to avoid soil erosion, not to throw away materials that harm the environment, the culture of recycling and many other values that will slowly but conspicuously transform the continent. The code of the curriculum across the continent will start with PAEC then the first letter of each nation for example for the case of Kenya, it will be PAEC(K). The countries that share the initial letters can use other abbreviation for identification. For example, the case of Tanzania it can be PAEC(TZ) followed by the level of the learner.

### **The Envisioned Benefits of the Pan African Environmental Curriculum to the African nations**

This curriculum will benefit the African Nations in many ways:

- Ecological virtues will be inculcated in all the learners translating to all citizens of each nation taking responsibility to care for the environment.
- The nations will significantly contribute to solutions to the impact of climate change in the continent.
- The collective African voice will be heard in global policy formation and implementation in regard to matters concerning climate change and adaptability.
- The Nations will reduce the syndrome of over dependence on the foreign aids that for years have failed to significantly solve African problems.
- They will generate, document and avail realistic data in matters of impact of climate in the continent of Africa for future plans.
- The nations will be able to develop customized and relevant tools to monitor and evaluate the impact of climate variability.
- They will have collective decisions in coming up with budgetary allocations for the sustainability of the curriculum.
- The nations will improve their self-image and esteem to the global world because they will no longer be at the receiving end.
- The level of corruption will reduce because each nation will be made to account for the funds allocated.
- The unity of African nations will be enhanced
- The African nations will be proud of them identify
- Other nations will learn good practices from them
- The general lifestyles of all the people of Africa will improve

### **The Model of sustainability of the PAEC Curriculum**

The paper proposes the adoption of the Savings and Credit Co-Operative Society (SACCOS) Economic Model. This is a model with many success stories in many countries worldwide. It is a transparent model that will help the nations to enhance their collaboration and remain accountable in implementing the curriculum and purchasing the required resources. The SACCOS created will specifically be for addressing the impact of climate change and adaptability. The nations will come up with modalities and logistics for evaluating the effectiveness.

### Summary and Conclusions

The paper has shown that there are inconsistent projections about the impact of climate change in Africa and that most of the projections are from international and western perspectives. The paper has brought to the limelight that the African voices are largely missing in the decision making and in projecting the impact of climate change in Africa. The paper has elaborated on the importance of environmental education in addressing the impact of climate change. The paper has used the case study of Eguru to explain the need to integrate the indigenous and scientific knowledge in solving the climatic challenges. The paper has generated new knowledge by passionately suggesting the need for designing and implementing a Pan African Environmental Curriculum through collective participation by the African in order to understand the impact of climatic change and get solutions without heavily depending on the foreign aids. Lastly the paper has outlined the benefits of the envisioned curriculum and suggested the content, pedagogies and sustainable model (SACCOS). In conclusion, the paper has shown that collective effort is mandatory if the African nations have to have a voice in the decision making in matters of climate change and development of the entire continent.

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## Assessing the Influence of School Environmental Programmes on the Environmental Attitudes and Behaviour Among Secondary School Students in Murang'a County, Kenya.

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### Abstract

Environmental degradation is a major challenge which requires appropriate strategies to reverse the situation. One of such strategies is experiential environmental education among high school students who, through change of attitudes and behavior, are able to participate in various environmental management activities. In this study the pro-environmental attitudes and behavior of high school students in Murang'a County, Kenya were examined to assess how environmental education programmes among the students affected environmental issues of waste management, water resources management, natural resources management and climate change in the schools. Nine hundred and sixty-one (961) students from nineteen (19) high schools from two sub-counties in the County was used in the study. The Likert type questionnaire and the 2-MEV Scale were used to collect the required data. The t-test statistic was applied to determine any differences between the variables. Results showed significant differences in pro-environmental attitudes and behavior with regard to solid waste management, water resources management, natural resources management. There were significant differences with regard to solid waste management, natural resources management, climate change and environmental concerns between members of Environmental Clubs and non-members. Pro-environmental attitudes and behavior were influenced by current membership of the Clubs rather than past membership. It is concluded that experiential environmental programmes improve the student's pro-environmental attitudes and behavior hence environmental management within the schools. It is recommended that appropriate policies be formulated to enhance the implementation of school experiential environmental programmes to ensure capacity building of the learners to effectively manage environmental issues in the schools.

**Key words:** *Environmental Education, Experiential Environmental Programmes, Pro-environmental Attitudes and Behaviors*

### 1. Introduction

Environmental degradation is a growing problem both locally and internationally, and will continue to be an issue in the future (Joldersma, 2017). This is because of the belief that “natural and physical resources are free and inexhaustible, and that the environment can assimilate all our wastes, leading to unsustainable use of resources” (Yarime *et. al*, 2012). Indeed, conservation scientists now posit that the earth is facing a sixth mass extinction (Johnson 2017). The on-going degradation can be attributed directly to human activity which has contributed significantly to the increasing crisis (Joldersma, 2017). Therefore, since human action is at the heart of environmental issues, sustainable development ultimately depends on changing human behavior (Zelenika *et. al*, 2018). Notably, it has been noted that environmental degradation has been preceded by a long-standing erosion of environmental values from the human value system (Sanrakshan, 2014), which means it can also be managed by changing relevant behavior. Indeed, according to Glažar *et. al* (1998), negative attitudes towards the environment and a low level of environmental awareness among the population are variables that can have a great social impact, highlighting the need for education for sustainable development.

Solutions to environmental issues acknowledge that environmental problems are not only problems of development, but basically problems of knowledge and education that go beyond learning about the environment, and that also have to do with the way in which environmental problems are understood and addressed (Sharma, 2016). Subsequently, coping with these problems requires education and engagement (Dillon, 2016), making environmental education increasingly important (Wals, 2014).

Environmental education is thus the key catalyst (Kaur, 2020), for the needed change, and a primary means of achieving environmental protection (Sharma, 2016). It is among the most effective strategies that does not require a large enough cost to change people's perspectives and attitudes towards the environment (Habibie, 2020).

To halt and reverse the ongoing degradation therefore requires appropriate mechanisms and strategies that promote environmental education, including policy formulation at both global, national and local levels, and upscaling of best practices. One other strategy to address this issue points at experiential environmental education among high school students who, through change of attitudes and behavior, are able to participate in various activities that conserve the environment.

In Kenya, environmental education (EE), both formal and informal, has been introduced to change students' attitudes and to appreciate environmental concerns (GoK, 2013). Kenya has incorporated environmental education considerations in the school curriculum (Kenya Institute of Education, 2002) and integrated it in the teaching of various subjects, both in the sciences and social subjects. This teaching of environmental education in Kenyan schools aims to develop in the students an appreciation of the environment, create positive attitudes and thereafter facilitate positive behaviors which will lead to the effective management and conservation of the environment (Kenya Institute of Curriculum Development, 2016). Subsequently, the knowledge and education among the students should be made manifest through positive environmental attitudes and behavior in society, leading to sustainable environmental management in the country.

However, despite environmental education being implemented in schools, the anthropogenic environmental impacts continue to increase in scale, which implies that the results on EE have not been seen (Kristalinawati, 2019). This means that EE as taught in schools does not seem to have the desired impact of promoting environmental conservation and instilling pro-environmental values and behavior. As such, the ongoing environmental degradation challenges have not been adequately addressed with most Kenyan citizens exhibiting poor environmental attitudes made manifest through negative environmental behavior

To boost environmental literacy and pro-environmental behavior, several experiential programmes are run in schools through clubs and societies. The purpose of this study was to investigate whether students' engagement in these experiential environmental programmes, which provide direct learning and conservation experiences among secondary school students, positively impacts on instilling pro-environmental attitudes and behavior among learners in Kenya and Muranga county in particular. The study compared environmental knowledge, attitudes, and practices of secondary school students in their final year of secondary education who have participated in such experiential environmental programmes, so as to assess pro-environmental behavior which is an indicator of environmental education success (Hidayah, 2017).

## **2. Study Area, Approach and Methodology**

The study sites were located in two sub-counties in Muranga County, one of the 47 counties in Kenya. The county is in Central Kenya and is located in the Upper River Tana region. The County was selected because learners here have a higher chance in engaging in environmental management activities. The

site also gives two different eco-systems – one that is semi-arid in the lowlands, and another that is humid in the highlands, and which mirrors the Kenya country context with regards to highlands and Arid and Semi Arid lands (ASALs), meaning that study results from the study can be cascaded to reflect the situation in the country. The study sample was drawn from 19 secondary schools, of which 9 were from Kahuro (in the highlands) and 9 in Muranga South (in the ASALs) sub-counties. The total number of students sampled were 961, of which 44% were from Kahuro and 56% from Murang'a South. In terms of gender, female students were 58.8% and male were 41.2% of the total sample.

The study used quantitative methods in the collection of knowledge, attitudes and practices among the secondary school students. The questionnaire used tailored and based on the Environmental Attitude/Awareness Scale of Hassan Taj Environmental Attitude Scale; the 2-MEV Scale; "Attitude Scale for Environmental Issues" developed by Saraç and Kan (2015); and standardized tool of Environmental Behavior Scale (EBS) by Urmila Verma and Archana Singhal (2012). The questionnaire focused on knowledge, attitudes and practices, and avoided questions of an academic nature.

### **3. Results and Discussion**

**Participation of Students in Clubs and Societies:** There was good student membership in clubs and societies with an environmental component among the students sampled, with 51% of students being members, while 49% were non-members. In terms of sub-county, 47.5% of students in Murang'a South Sub-county were members of environmental clubs, while in Kahuro Sub-county, membership stood at 53.9%. With regard to gender, 52.9% of male students are members of environmental clubs while female membership stood at 48.9%. Membership of clubs and societies is voluntary in most schools. Students are usually attracted to those Clubs and Societies that are active and this is the main reasons that would explain the student membership in Clubs. Activity in the Clubs and Societies depended on school support, with regards to having a Patron who was active and supportive, and financial and material support from the school administration.

Scouts had the highest percentage of participants at 23 % of student Club members; followed by Wildlife clubs (22%); environmental clubs 21%; and young farmers (19%). Other main clubs were: School Greening; Health club; while the smaller clubs included the Presidential Awards Scheme, Red Cross, and Peace Club, who were all engaged in some environmental activities.

#### **Categories of Environmental Knowledge, Attitudes and Practices Among Respondents**

The level of environmental knowledge, attitudes and practices was assessed in various environmental contexts and included: Solid wastes management; water resources management; hygiene; climate change and energy; natural resources management; and environmental concerns.

#### **Solid Wastes Management**

26% of the sampled students said they litter around when no one is watching. Of this group 15% did so because bins or they were far away; 8% because there were no bins; 15% of students did it sub-consciously; while 13% claimed it was due to ignorance coupled with carelessness.

When they get waste on the ground, 59% of the students sampled said they always picked it and placed it in trash bins; 7% always left it where it was; 25 % sometimes picked it up and put it in the trash bins, while 6% sometimes left it on the ground. When they finished eating something with some form of packaging while in a matatu (public transport vehicle); 27% of the sampled students tossed it out of the vehicle window; 7.5% threw it on the vehicles floor; 26% put it in the vehicles trash basket; and 36% kept it for later disposal in a trash bin.

45% of the sampled students had done some form of wastes recycling. Of these, 45% did it to keep the environment clean and for minimizing wastes generation; 36% did it for utility reasons as they were

able to re-use the said products; while 19% did it for economic reasons such as saving monies or generating some money. Reasons given for not recycling were: Lack of technology (1.5%); lack of knowledge and know-how (1%); while 1% considered it a waste of time; and 0.5% saw no value in the waste to warrant recycling.

83% of students said they would willingly volunteer for a public clean-up exercise, while 17% said they would not. This is important to note because conservation work, and other pro-environmental practices are regarded lowly, and even regarded as punishment, or work for the lowly in society, thus creating a negative attitude among students about these pro-environmental activities. Ability to volunteer is thus an indicator of positive environmental attitudes.

Of the Yes' students, 64% said they would do so to keep the environmental clean; 15% said they would consider it as a community service; 8% for hygiene purposes and avoid diseases; 5% for environmental awareness creation withing the community; and 3% as part of club activities. Among the 'No' students, 56% said they were busy and lacked time to volunteer; 23.4% said they were not interested; 13.3% said it was not their responsibility to clean; while 5.5% said it was risky with regards to their health.

83% of the students supported the ban on plastic bag carriers. Of these, 73% said they did so because the bags are agents of pollution (solid wastes and littering, air pollution when burnt); 21% because they are non-biodegradable; 2% because they block the drainage systems; and 1.2% because they can cause human diseases and animal deaths. Among those who did not support the ban (17%), the reasons given were that the bags were affordable (19%); the bags were re-usable (14%); have multiple uses (13%); and due to lack of good alternatives (12%).

23% consider school cleaning as part of punishment because it's mainly undertaken by wrongdoers; they came to school to study not to work (20%); its tiresome and time wasting (17%) and cleaning should be done by school support staff (7%). For those who did not consider cleaning of the school as punishment (76%); school cleaning was part of ensuing a clean and habitable environment (49%), as part of conservation work and part of their responsibility (23%); and as a duty that moulds better future behavior (11%).

Table 1: T-Test Results for Solid Wastes Management

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Solid Wastes Management	Sub-county: Murang'a South (MS) and Kahuro(K)	MS = 6.99 K = 7.11	-0.441	0.197	-0.122	0.454
	Gender: Male (M), Female (F)	M = 6.65 F = 7.31	-0.986	-0.343	-0.665	0.000
	Membership of environmental clubs: Yes (Y); No (N)	Y = 7.20 N = 6.88	0.009	0.644	0.327	0.044
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 7.13 N = 6.87	-0.080	0.598	0.259	0.134

After undertaking the comparison of means by use of t-tests, as shown in Table 1, it was determined that:

1. There is a significant difference in behavior on solid wastes management between male and female students in Murang'a county with the female students exhibiting better pro-environmental behavior. This is because girls are more conscious of their surroundings and are also generally cleaner. They also like to be associated with cleanliness than boys. This is in line with Stern *et. al.* (1993) who found that women have stronger beliefs about the harmful consequences of poor environmental conditions for others, the biosphere, and self and that these beliefs predicted more pro-environmental behavior.
2. There is a significant difference in behavior on solid wastes management between members of environmental clubs and non-members in Murang'a county. The difference in pro-environmental behavior can be attributed to the fact that most of the environmental clubs in school are engaged in aspects of cleanliness, including provision and emptying of bins. The students are also involved in improving the aesthetics of the schools by planting flowers and trees and maintaining them. The clubs thus seem to have reinforced the student's pro-environmental behaviors with regards to solid wastes management. The first-hand experience in cleanliness is an important influencing factor to getting students interested in nature, and positively influences students' beliefs towards their natural environment and eventually leads to pro-conservation behavior (Sharma, 2016). The question is "how do we create first-hand experiential opportunities for school students to learn about the natural environment?"

### **Water Resources Management**

When they find a tap running, 88% of sampled students said they would turn it off; 2% said they would leave it open; 6% would sometimes leave the tap open (and close it other times). With regards to showering, 16% of students said they would take the shortest time possible; 36% would save water as much as possible by closing taps when soaping; 25% closed taps after use; and 19% said they take the longest time possible. When brushing teeth, 7% would leave the tap running as they brushed; 85% saved water by closing taps and only opening water when they required it; while 5% used cups/glasses to save on water.

Table 2: T-Test Results for Water Resources Management

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Water Resources Management	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 4.00 K = 4.06	-0.210	0.104	-0.053	0.506
	Gender: Male (M), Female (F)	M = 3.83 F = 4.13	-0.406	-0.088	-0.247	0.002
	Membership of environmental clubs: Yes (Y); No (N)	Y = 4.09 N = 3.96	-0.021	0.295	0.137	0.089
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 4.03 N = 4.01	-0.152	0.195	0.021	0.808

After comparison of means using t-tests (Table 2), the following was determined:

1. There is a significant difference in behavior on water resources management between male and female students in Murang'a county. The difference between the means is -0.247 (95%CI -

0.406, -0.088), with the higher one being among the female gender. This means that the female students have significantly more pro-environmental behavior than among male students. The female gender role of fetching water or assisting mothers at home do so means they appreciate the difficulties associated with water access and supply and therefore can be better stewards of the resource. This is in line with Hines *et al.* (1987), who suggests that female students were observed to more likely engage in responsible environmental behavior than the males.

### Hygiene

After going to the toilets, 45% of students said they washed their hands with water and soap; 4% do not wash hands; 15% sometimes washed hands with soap; and 32% washed hands without soap. For those not washing hands with soap and water, 7% gave lack of running water as the main reason; 2% blamed broken wash basins; while % 6% said wash basins are far off. For those not using soap, 40% said that no soap was provided; soap was usually stolen (6%); and wash basins were far off (2%). Within the schools, the responsibility of washing toilets was with students 92%; staff (3.9%); and in some cases, both groups shared the responsibility.

Table 3: T-Test Results for Hygiene

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Hygiene	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 2.80 K = 2.88	~ 0.013	0.176	.082	0.090
	Gender: Male (M), Female (F)	M = 2.77 F = 2.90	~ 0.226	-0.038	-0.132	0.006
	Membership of environmental clubs: Yes (Y); No (N)	Y = 2.88 N = 2.81	~ 0.029	0.166	0.068	0.170
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 2.85 N = 2.83	~ 0.082	0.130	.024	0.658

Following comparison of means using t-test (Table 3), it was determined that:

1. There is no difference in behavior in hygiene between students in Murang'a South and Kahuro sub counties. This is because the difference between the agro-ecological zones does not impact on hygiene education.
2. There is a significant difference in behavior in hygiene between male and female students in Murang'a County. The difference between the means is -0.132 (95%CI -0.226, -0.038), with the higher mean being for female students who exhibit more pro-hygienic behavior. As with cleanliness, girls are usually more conscious of their hygiene than boys and will thus take more trouble to ensure adherence to hygiene practices than boys. Zelesny *et al.* (2018) explained this by positing that females had higher levels of socialization to be other oriented and socially responsible. This is reinforced by Stern *et al.* (1993) who found that women have stronger beliefs about the harmful consequences of poor environmental conditions for others, the biosphere, and self and that these beliefs predicted more pro-environmental behavior.
3. There is no difference in behavior in hygiene between members of environmental clubs and non-members in Murang'a County. This is because the behavior on hygiene is mainly affected by external factors, e.g., distance to taps and lack of soap in schools.

### Climate Change and Energy

The students had noticed change in the weather and climate patterns. 28% of them had noticed more rain; 3% less rain; 36% more unpredictable rains; 35% changes in weather patterns; 2% more drought; and 3% more floods. The reasons given for climate changes were that they were acts of God (42%); natural changes (31%); because of use of fossil fuels (15%); due to environmental degradation (7%); and anthropogenic activities (6%).

When leaving a room last in the evening, 80% of students said they would put off the lights; 15% said they would sometimes leave the lights on; while 5% said they would always leave the leave lights on. This compares well with the behavior of students who find un-needed lights on in a room. 80% of students said they would turn the lights off; 14% would sometimes leave the lights on as they found them; while 6% would always leave the lights on. When taking a hot shower 16% of the sampled students said they take shortest time possible while 27% enjoy the shower for as long as possible. 23% of the students said they close taps after use, while 28.5% said they tried to save power as much as possible.

Table 4: T-Test Results for Energy and Climate Change

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Energy and Climate Change	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 5.92 K = 6.19	-0.509	-0.030	-0.270	0.027
	Gender: Male (M), Female (F)	M = 5.98 F = 6.08	0.340	0.145	-0.098	0.429
	Membership of environmental clubs : Yes (Y); No (N)	Y = 6.18 N = 5.90	0.034	0.519	0.276	0.026
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 6.08 N = 5.99	0.200	0.340	0.070	0.610

To determine the impact of student's locality, gender, current and past membership of environmental clubs, means were compared by use of t-tests (Table 4) and the following determined:

1. There is a significant difference in behavior in the area of energy and climate change between students in Murang'a South and Kahuro sub-county. The difference between the means is -0.270 (95%CI -0.509, -0.030) with the higher one being Kahuro subcounty. This means that student in Kahuro have significantly higher levels of understanding and behavior with regards to energy and climate change than those in Murang'a South. This can be explained by the fact climate change in Murang'a has been explained more with regards to rain – increase, decrease, and unreliable rains. With more rain in Kahuro, aspects of climate change were thus clearer to the students who were also able to explain the links of this to human behavior.
2. There is no difference in behavior in the area of energy and climate change between male and female students in Murang'a County
3. There is a significant difference in behavior in the area of energy and climate change between members of environmental clubs and non-members in Murang'a county. The difference between the means is 0.276 (95%CI 0.034, 0.519) with the higher one being for members of environmental clubs. Most of the issues associated with pro-environmental energy and climate change understanding and behavior have to do with responsibility and leadership qualities

which are among the key attributes that school administrations tie to being in the various environmental clubs. The skills learnt in the clubs are thus expressed by the responsible behavior of the students in their pro-environmental actions.

**Natural Resources Management by Students**

78% of the students said they had engaged in tree planting in the last one year, while 22% had not. 56.4% of the students planted the trees as individuals while 31% did it as part of a larger group. Of the students who had undertaken tree-planting, 60% said they had planted trees at home; 39% in School; 14% in churches; 4% in the forest; 1% along riverines; 0.8% in hills and parks; and 0.6% in other places. 80% of students had planted 1 – 20 trees; 21-50 trees (11%); 51 – 100 trees (4%); 101 – 200 trees (3%); and 1% students planting over 200 trees. Other than tree planting, 73% students said they further tended for the seedling planted. The tending aspect had thus increased the tree survival rates with 91-100% survival rates being observed by about 28% of the students; 71-80% survival by 20% of students, and 41-50% survival by 11% of students. The main reason for not planting trees was: Lack of interest (6%); lack of land (4%); lack of seedlings (9%); others will do it (2%); lack of opportunity to plan (91%); lack of time (0.6%) and; and 0.5% lack of support.

After comparison of means using t-tests (table 5) it was determined that:

1. There is a significant difference in behavior on natural resources management between students in Murang’a South and Kahuro Sub-counties. This can be explained by the fact that Kahuro lies in the upper zone which has more rain unlike Murang’a South which is drier. The students in Kahuro engaged in natural resources management especially as regards to tree planting and tending thus have a higher chance of success than in Murang’a South where the chances of the trees planted surviving are lower. The engagement of students in the activity is thus tied to its chance of success which can be tied in to the aspect of locus of control which is the degree to which people believe that they have control over the outcome of events. In this regard, students in Kahuro can engage more in natural resources management because they believe it will have an impact as opposed to those in Murang’a South who have less control due to external factors related to the weather and changes of success. As such, the students in Murang’a South may feel that they are ‘helpless’, without blame, and not in control of their success or failure as regards engagement in natural resources management. This shows that people only behave in an environmentally responsible manner when they are sufficiently motivated and are capable of generating qualitative changes - optimistic attitudes leading to positive practices and vice-versa (Zheng, *et. al.*2018)
2. There is a significant difference in behavior on natural resources management between male and female students in Murang’a county. The difference between the means is 0.690 (95%CI 0.302, 1.077), with the male mean being higher at 6.63. This means that male students are more fully engaged in natural resources management than their female counterparts.
3. There is a significant difference in behavior on natural resources management between members of environmental clubs and non-members in Murang’a county. The difference between the means is 0.737 (95%CI 0.350, 1.125), with the mean being for those participating at 6.63. This means that students participating in environmental clubs are significantly more active in natural resources management than those who do not participate.

Table 5: T-Test Results for Natural Resources Management

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		

**Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021, Machakos University, Kenya**

Natural Resources Management	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 5.63 K = 6.99	~ 1.737	-0.985	-1.361	0.000
	Gender: Male (M), Female (F)	M = 6.63 F = 5.94	.0302	1.077	0.690	0.001
	Membership of environmental clubs: Yes (Y); No (N)	Y = 6.59 N = 5.85	0.350	1.125	0.737	0.000
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 6.35 N = 5.96	~ 0.033	0.818	0.392	0.71

The students' participation in natural resources management by the students in Murang'a county was impressive. With an average 10 trees planted per student, and at least 50% survival on average, this translates to about 5 surviving trees per student. With about 100,000 secondary school students, this means that Murang'a County students are able to plant and grow about half a million trees in a year, which is about 1% of the 500 million trees, the country plans to plant (note, not grow) this year as it tries to meet the 10% tree cover in the country. This means that the country can actually target secondary students to grow about 30% of the planned annual tree growing, and if it goes down to primary schools, assuming the same tree growing potential, the whole target would actually be met by the students.

**Environmental Concerns by Students**

With regard to environmental concerns by students, it was determined through the comparison of means using t-tests (Table 7), that:

1. There is a highly significant difference in environmental concerns between students in Murang'a South and Kahuro sub-counties due to the high significance level of  $p = 0.000$ . As outlined in the concerns, deforestation and soil erosion are more likely experienced frequently in the upper of the agro-ecological zones than in the lower areas.
2. There is a significant difference in in environmental concerns between male and female students in Murang'a county. The difference between the means is 0.4092 (95%CI 0.1991, 0.6193) with the higher one being for male students.
3. There is a significant difference in behavior in environmental concerns between members of environmental clubs and non-members in Murang'a county. The difference between the means is 0.2435 (95%CI 0.0184, 0.4686) with the higher one being for male students. This shows that it is the environmental attitudes and individual's sense of responsibility towards the environment that really shape environmentally friendly behavior (Chen 2016).

Table 7: T-Test Results for Environmental Concerns

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Environmental Concerns	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 5.711 K = 6.521	~ 1.0181	-0.6028	-0.8105	0.000
	Gender: Male (M), Female (F)	M = 6.309 F = 5.900	0.1991	0.6193	0.4092	0.000

**Proceedings of the 3<sup>rd</sup> Annual International Conference held on 22<sup>nd</sup> – 25<sup>th</sup> June 2021, Machakos University, Kenya**

	Membership of environmental clubs: Yes (Y); No (N)	Y = 6.189 N = 5.945	0.0184	0.4686	0.2435	0.034
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 6.113 N = 5.978	~ 0.1085	0.3781	0.1348	0.277

**Overall Findings**

When all the scores for the various aspects of knowledge, attitudes are combined, it was determined that:

1. There is a significant difference in in environmental knowledge, attitudes and behavior between students in Murang’a South and Kahuro sub counties with higher pro-environmental behaviour in Kahuro
2. There is no difference in behavior in environmental knowledge, attitudes and behavior between male and female students in Murang’a County. This agrees with Zelezny, *et. al* (2000) who indicated that while women report stronger environmental attitudes and behaviors than men, as a single variable, the effect of gender on pro-environmental behavior was consistently stronger than on environmental attitudes. This has been seen to be true on behavior, with attitudes being lower than males, resulting to a net zero difference.
3. There is a significant difference in behavior in environmental knowledge, attitudes and behavior between members of environmental clubs and non-members in Murang’a county. This shows that the clubs, through their experiential learning expose students to an active process of learning, where there is interaction between the learner and the environment, making leaning enjoyable (Anderson, 1987). The hands-on approach leads to heightened awareness and ultimately action (Chawla, 2015). The ultimate aim of education is to change human behavior (Harold, 2015) which is key to tackling and preventing environmental degradation. It can also be concluded that it is difficult to teach the values of conservation and preservation to persons who do not appreciate the natural world around them or who are afraid or loathe to venture into it (Chawla, 2015).
4. There is no significant difference in behavior in environmental knowledge, attitudes and behavior between students who have participated in environmental clubs in the past and those who have not in Murang’a county. This re-affirms that past membership has no impact on pro-environmental behavior, unlike that of current membership.

**Table 8: T-Test Results for Environmental Knowledge, Attitudes and Behavior**

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Total scores	Sub-county: Murang’a South (MS) and Kahuro (K)	MS = 31.13 K = 33.66	-3.4255	-1.6433	-2.5344	.000
	Gender: Male (M), Female (F)	M = 32.22 F = 32.26	-0.9459	0.8624	-0.0417	0.928
	Membership of environmental clubs: Yes (Y); No (N)	Y = 33.13 N = 31.34	0.8734	2.7050	1.7892	0.000
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 32.54 N = 31.64	-0.1169	1.9198	0.9014	0.083

5.

### 5. Conclusions and Recommendations

The findings have established that environmental programmes actually improve student's pro-environmental behaviour and thus contribute to environmental literacy. This is because students who participate in school environmental clubs with aspects of environmental conservation have significantly more pro-environmental attitudes and behaviour than those students who do not participate in such clubs. The effectiveness of the clubs in promoting environmental literacy is due to the experiential learning methods where students learn by engaging in environmental activities which in turn transform their knowledge into action as regards environmental conservation.

Across the different aspects of environmental attitudes and practices, namely, with regard to solid wastes management; water resources management; hygiene; climate change and energy; natural resources management; and environmental concerns; students participating in the school environmental programmes were seen to be significantly different with regards to pro-environmental attitudes, and behaviour and therefore overall environmental literacy as their knowledge had transformed into action.

Female students had significantly higher knowledge, attitudes, and behaviour than their male counterparts in the areas of solid wastes management, water resources management, and hygiene. The reverse was however true in the areas of natural resources management, and environmental concerns where male students had significantly better pro-environmental behaviour and attitudes and thus higher environmental literacy. In the area of climate change and energy, there was no significant difference in knowledge, attitudes and behaviour based on gender.

Overall, pro-environmental attitudes and behaviour and overall environmental literacy was also different based on the students agro-ecological zones, and also with regards to climate change and energy; natural resources management; and environmental concerns with students in Kahuro exhibiting better environmental literacy and as such better pro-environmental attitudes, and behavior. This was due to the fact that Kahuro lies in the upper zone which has more rain unlike Murang'a South which is drier. The students in Kahuro engaged in pro-environment activities more due to the fact that they had higher chances of success, which can be tied in to the aspect of locus of control which is the degree to which people believe that they have control over the outcome of events. In this regard, students in Kahuro can engage more in natural resources management because they believe it will have an impact as opposed to those in Murang'a South who have less control due to external factors related to the weather and chances of success. This shows that people only behave in an environmentally responsible manner when they are sufficiently motivated and are capable of generating qualitative changes - optimistic attitudes leading to positive practices and vice-versa (Zheng, et. al.2018). As outlined in the concerns, deforestation and soil erosion are more likely experienced frequently in the upper of the agro-ecological zones than in the lower areas. There was no significant difference with regards to hygiene, solid wastes management, and water resources management.

The clubs and programmes, having been seen as boosting environmental literacy, should thus be encouraged and supported. Leeming et al., (1993) reported that participation in nature-related activities led the students to appreciate the nature and accept the environmental issues. Their curiosity is also aroused, and their subsequent participation in the natural activities, helps develop individuals' sense of responsibility and motivation to take environmental action. This has started in a way through the Competency Based Curriculum which is being implemented in the lower primary classes at the moment. Ways to initiate a policy for informal environmental education in the current 8-4-4 system that is gradually being phased out should also be undertaken so that those who are already in the system

do not lose out with regards to environmental literacy whose success should be measured once it is translated to pro-environmental attitudes and behaviour.

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## Assessment Of Selected Physico-Chemical Parameters of Groundwater in Chuka Igambang'ombe Constituency, Kenya

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### Abstract

Groundwater is an essential source of water for drinking and other domestic uses. Recently, there has been high dependence on groundwater due to water shortage as a result of changing climates, and higher costs of accessing piped water. An occurrence of the physico-chemical parameters of the groundwater in levels past the WHO highest permissible limits can cause serious health implications to the consumers of the groundwater. This study therefore, assessed the extent of the physico-chemical parameters concentration of the groundwater in Chuka, Igambang'ombe constituency. A total of five samples was collected from 5 boreholes in the Mucw'a and Ndagani regions surrounding the Chuka University main campus. Selected physical parameters were recorded onsite by use of portable apparatus. Samples for testing chemical parameters were collected and transported in cooler boxes to Chuka University laboratories for analysis. Physical parameters determined onsite were dissolved oxygen (DO), temperature, and the pH. Dissolved Oxygen meter, mercury thermometer, and pH meter were the equipment used to test the respective physical parameters. UV- spectrophotometry was used to analyze the chemical parameters: nitrates, and phosphates, where absorbance was recorded at a wavelength of 220-820 nm and 880nm respectively. The assessment was conducted during the relatively dry months of January to March. The temperature of the water ranged from 22.8-25.2°C. The pH levels ranged from 4.50 – 9.50. The high-altitude nitrate levels were 2.4mg/L, and 7.37mg/L at the low altitude. The phosphate concentrations were below detectable limits. The results were then compared with WHO standards for the highest permissible levels for the tested parameters to determine the suitability of the water for consumption. All the tested parameters lied within the WHO permissible limits for drinking water except for the pH levels.

**Keywords:** *Groundwater, physical parameters, chemical parameters, infiltration, suitability, Chuka.*

### INTRODUCTION

Groundwater is ideally the most essential component of the water cycle as it's a key source of potable water, especially in Africa. It contributes to up to two thirds of the world's freshwater resources. Groundwater is highly relied on due to the uneven distribution and inaccessibility of surface water resources of the world (Chapman, 1996 and BGS, 2011).

According to Onwughara (2013), drinking water should be of high quality as presence of physical and chemical elements past the permissible standard levels make the water unsuitable for consumption. Groundwater faces a great threat to its quality due to contamination. Thus, it is hard to access clean, safe and potable water in most African developing countries such as Kenya (Dara and Mishra, 2011; Idibie et al., 2018).

Prospects by the Water Resource Authority ([WRA], 2018), depict potential worsening of the shortage of potable water by the year 2030. This will be due to human activities that influence groundwater quality such as wastes carried into boreholes by means of flash floods, leaching of septic and buried wastes etc. According to Talafre and Knabe (2009), it is estimated that droughts and other forms of water scarcity will affect up to one third of the world's population, and will influence consumption and migration patterns.

Even with the associated health concerns (Palamuleni and Akothi [2015], Idibie et al., 2018), noted that up to 1.5 billion world population depend on untreated groundwater. According to WHO (2011), the highest permissible levels for nitrates is 10mg/L. Consumption of water whose nitrates concentration surpasses the WHO standards cause bluebaby syndrome or methaemoglobinaemia for young children (Jain and Agarwal, 2012). It is also known to cause cancer to humans (Ayesha et al., 2012; WHO, 2011). Although there are no set standards for phosphate levels in drinking water, clean water usually has low levels of phosphates (Ombaka et al., 2013).

An assessment of groundwater is therefore, essential in order to determine the suitability of the water for consumption. The data obtained can be utilized to manage health implications resulting from water contamination. This study was thus conducted to establish the extent of selected physico-chemical parameters borehole water in Chuka, Igambang’ombe constituency.

## METHODOLOGY

### Study area

Chuka is in Tharaka Nithi county, eastern part of Kenya and it lies below the slopes of Mt. Kenya. Tharaka Nithi county is situated between longitudes 37° 19’ East and latitudes 00° 07’ and 00° 26’ south. Chuka area is a section of Igambang’ombe constituency and has an area coverage of 624.4 km<sup>2</sup>.

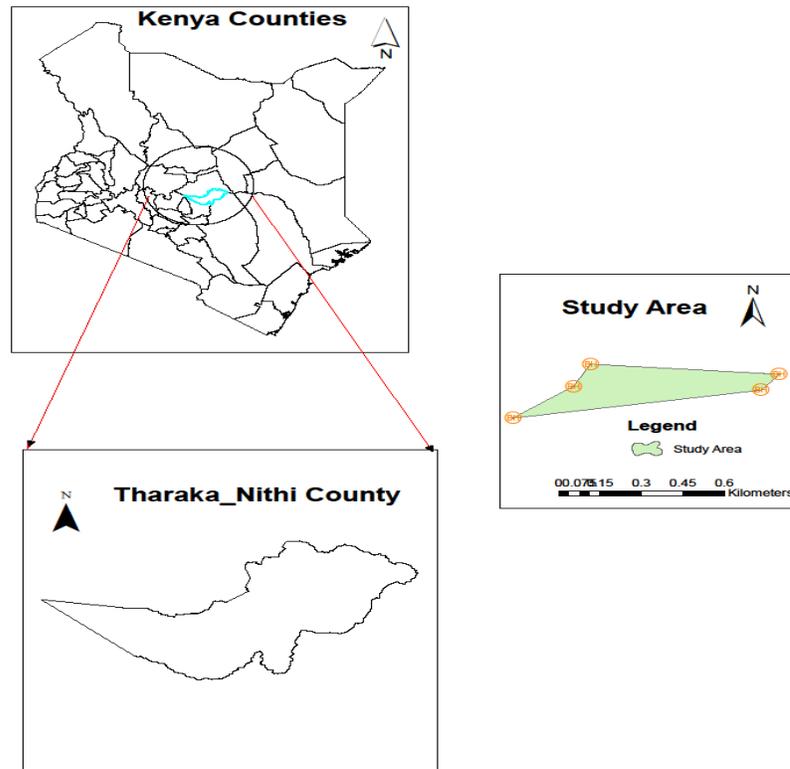


Figure 1: A map

showing the specific study area that the boreholes were sampled.

The county receives an average annual rainfall of 717 mm. Chuka being part of the high-altitude areas receives a reliable rainfall while the low altitude regions such as Kathwana receive low and poorly distributed rainfall. The temperatures in the county range from as low as 14°C to 30°C in highland areas and 22° C to 36°C in the low altitude region. Chuka and Chogoria towns have exhibited a fast growth with an increase in population (GOK, 2013; KNBS, 2019).

### Field sample collection and laboratory procedures

#### Water sample collection

A total of five samples were collected from five boreholes situated in the Ndagani and Muc'wa areas. The samples were collected during the evening hours to avoid interference of the water quality by external factors. They were collected during the relatively dry months of January to March. The boreholes were randomly selected to ensure a true representation of the study area. Before extraction of the samples from the boreholes, 3 buckets full of water were drawn from each borehole to ensure the tested water would represent a true state of groundwater quality. One litre plastic bottles pre-sterilized with 70% ethanol were used to draw the samples. Once filled with water, the bottles aseptically closed, labelled, packed in cool boxes and transported to Chuka University laboratories for analysis.

#### Physical parameters analysis

The physical parameters dissolved oxygen (DO), temperature and pH were determined on site by use of dissolved oxygen meter, mercury thermometer and pH meter respectively. The results were recorded in triplicates to ensure reproducibility.

#### Nitrate analysis procedure

Each of the samples were filtered and in each 50mls measured into separate conical flasks. 1 ml of dilute hydrochloric was added to each of the sample containing conical flasks.

#### *Blank solution preparation*

This was prepared by measuring 50mls of distilled water and adding 1ml of dilute hydrochloric acid into it.

#### *Standard solutions were prepared following the below procedure*

From 100ppm of nitrate; 4 ML to represent 8ppm and 3mls to represent 6ppm were transferred each into a 50mls volumetric flask and filled to mark with distilled water.

Absorbance of the standards, the blank, and the sample solutions was recorded at a standard wavelength of 220- 820nm. The concentrations were then established from the absorbance.

#### Phosphate analysis procedure

##### *Reagents*

Potassium antimonyl tartrate solution

Ammonium molybdate

Dilute sulphuric acid

##### *Procedure for preparation of a combined reagent*

To a 150ml conical flask; 50 ML of dilute sulphuric acid were added, 5 ML of potassium antimonyl tartrate solution, 15 ML of ammonium molybdate solution and 30 ML of ascorbic acid stepwise with gentle stirring after every addition.

##### *Full procedure*

Each of the water samples were filtered using a Whitman filter paper to remove suspended particles. 25mls of the blank solution, 25mls of each sample, and 25mls of the standard solutions were pipetted into 150mls conical flask each.

4mls of the combined reagent were added into each of the conical flasks and mixed thoroughly for 10minutes.

The absorbance of each was measured within 15-30 minutes at a wavelength of 880nm by use of UV-spectrophotometer. The concentrations were established using respective absorbance.

## RESULTS AND DISCUSSION

### The physical parameters

#### Temperature

The groundwater temperatures ranged from 22.8- 25.2 °C within all the boreholes. Water from some of the boreholes had temperatures significantly higher compared to others. The temperature data was collected during the morning and evening hours to avoid influence from external factors. This is according to Trivedi (2010), who observed that variations in water temperature could be influenced by the time of sample collection. High temperatures can intensify chemical reactions in an aquifer such as weathering of rocks which can release chemicals to the water thus changing its quality (Murhekar, 2011). The average temperature of the water in both high and low altitude regions did not lie within WHO (2008) highest permissible levels, that is, 28-32.

Table 9: temperature levels of the selected boreholes

Borehole	Temperature	t-Test: Paired Two Sample for Means		
Mc01	25.2			
Mc02	24.6		<i>temperature</i>	<i>WHO standard</i>
Mc03	23.6	Mean	23.92	30
ND01	23.4	Variance	0.932	0
ND02	22.8	Observations	5	5
		Pearson Correlation	#DIV/0!	
		Hypothesized Mean Difference	0	
		df	4	
		t Stat	-14.0825	
		P(T<=t) one-tail	7.38E-05	
		t Critical one-tail	2.131847	
		P(T<=t) two-tail	0.000148	
		t Critical two-tail	2.776445	

#### pH

The pH of the boreholes water ranged from 4.50 to 9.50. Some of the boreholes exhibited slightly acidic conditions while others exhibited basic characteristics. The weak acidic pH of some of the borehole water could be as a result of dissolved carbon dioxide and organic acids caused by decayed matter which may leach and reach the groundwater. Acidic water can cause redness and irritation of eyes in humans. It can also cause corrosion of pipes in water distribution systems (Ombaka et al., 2013). There is a link between low water pH and gastrointestinal disorders such as hyperacidity and ulcers. Water of higher pH has adverse effects such as scale formation in water heating systems (Buridi & Gedala, 2014). The pH of the water tested from the selected boreholes deviated from the WHO (2008) highest permissible levels and thus not suitable for drinking by humans.

Table 10: comparing the pH of the boreholes with WHO standards

Borehole	pH	Deviation from WHO standards	Inference
Mc01	4.71	-1.79	Acidic
Mc02	5.01	-1.49	Acidic
Mc03	4.50	-2.00	Acidic
ND01	9.50	0.3	Basic
Nd02	4.50	-2.00	Acidic

*Dissolved oxygen*

The mean dissolved oxygen levels in the groundwater ranged from 69.1mg/L to 146.1mg/L. Some of the boreholes exhibited a significantly high concentration in dissolved oxygen as compared to others. This could be attributed to nearness of the boreholes to the surface, allowing free circulation of gases in the groundwater. Dissolved oxygen concentration is a key test in water pollution control and waste treatment as is used to indicate the level of contamination and potability of water. According to Olumuyiva (2012), low levels of dissolved oxygen in water indicate microbial contamination or corrosion of chemical substances in the groundwater.

Table 11: dissolved oxygen levels of the boreholes

Borehole	Dissolved oxygen level
Mc01	69.1
Mc02	134.8
Mc03	146.1
Nd01	65.5
Nd02	117.0

**The chemical parameters**

*Nitrates*

In order to understand the distribution of nitrates in the groundwater, an aspect of altitude was introduced. This was so as to understand if altitude influenced the nitrates distribution in anyway. The selected boreholes had their nitrate concentration levels ranging from 1.1 mg/L to 3.8 mg/L in the high-altitude region and 1.6mg/L to 6.7 mg/L in the low altitude region. The mean nitrate levels in the high-altitude region was at 2.4 mg/l while that of the low altitude region was at 4.2 mg/L. There was no correlation between altitude and the level of nitrate in the groundwater. The nitrate levels in both the low and high-altitude regions were within the WHO (2008) standard levels of 10 mg/L. High nitrate levels in some of the boreholes could be attributed to infiltration of water into the aquifer from runoff containing dissolved nitrates (Prasad et al., 2014). According to Suthra et al., (2009), there is an association between high levels of nitrates in groundwater and intensive agricultural activities in the same area. High nitrate levels in water past the recommended levels is known to cause blue baby syndrome in infants (WHO, 2011).

Table 12: comparing nitrate levels with WHO standards

Region	Mean nitrate levels	Deviation from WHO standard levels
High altitude	2.4mg/L	-7.6 mg/L
Low altitude	7.37 mg/L	-2.63 mg/L

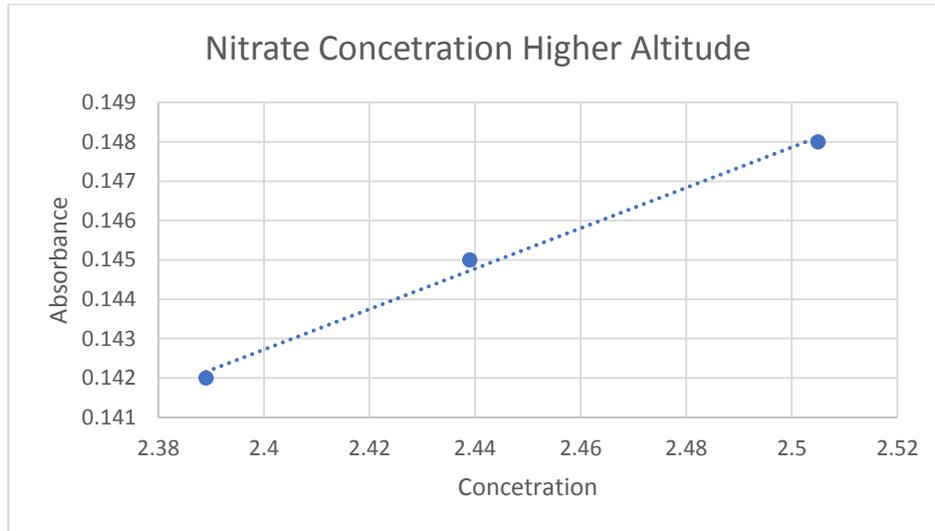


Figure 11: a graph showing high altitude nitrates concentration

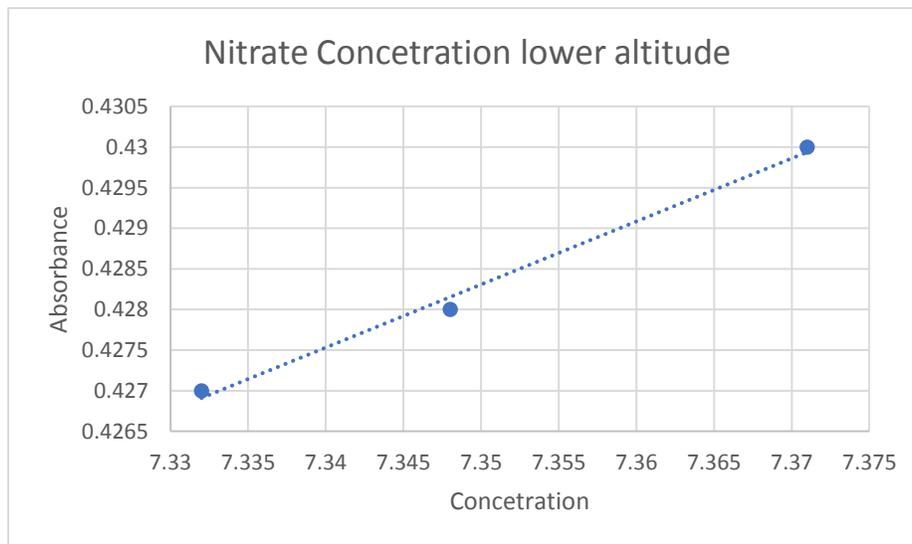


Figure 12: a graph showing nitrates concentration in low altitude region

### *Phosphates*

The mean concentrations for phosphates in the study area were below detectable levels. This was the case with both samples from high altitude region and those from low altitude region of the study area. The low concentrations of phosphates could be attributed to geology of the area (Adeyemo et al., 2013). According to WHO (2008), high phosphates concentration has no health complications despite for its role in causing eutrophication in water bodies.

### **Future Study**

- i. There is need for a periodic assessment of the influence of microbial factors to the groundwater quality in Chuka and other areas of Tharaka Nithi County.

- ii. More periodic assessments of the physico-chemical parameters of the groundwater is needed in Chuka and other areas of Tharaka Nithi County.

## CONCLUSION

Key physico-chemical parameters of the groundwater, that is, temperature and pH were significantly different from the WHO (2008) standards for drinking water thus making the water not fit for human consumption. This could be due to natural sources such as rock weathering and human factors such as poor management of septic sewage from urbanization.

## RECOMMENDATIONS

- i. There is need for good site selections for boreholes and wells in the Chuka area. It was noted that the boreholes were located too close to the urbanized areas where poor waste and sewage management could be influencing the quality of the groundwater.
- ii. There is need to prevent the boreholes and wells from contamination by runoff. This can be done by properly sealing the boreholes to prevent entry of contaminated run off water.
- iii. The local authorities need to ensure constant supply of clean piped water to the residents of the area to help safeguard their health. It was noted that the residents of the area usually turn to the borehole water when piped water supply grows short. Also, not all the residents of the have access to piped water, and so some rely on the groundwater entirely.
- iv. A borehole management committee should be formed and trained as technicians to help repair minor damages in cases of breakdown.

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## Factors Influencing Public Participation in Environmental Impact Assessment Process of Nairobi-Thika Superhighway Improvement Project in Nairobi City County, Kenya

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### Abstract

Public participation is a key component in environmental impact assessment and governance. Public participation is a process by which public concerns, needs and values are incorporated into governmental and corporate decision-making with the overall goal being decisions that are supported by the public. Public participation is also important in the development and management of natural resources. Environmental impact assessment (EIA), on the other hand, is a procedure which seeks to ensure that adequate prior information is obtained on likely environmental consequences of development projects, on possible alternatives and on measures to mitigate the adverse impacts. The objective of this study was to examine key factors influencing public participation in the EIA process for the Nairobi-Thika Superhighway Improvement Project in Nairobi City County. The study adopted a descriptive research method with a total sample of 120 respondents/households sampled from along the Nairobi-Thika Superhighway within the County. The key finding of the study is that despite high levels of public awareness about the project, there was low knowledge on the need to participate and low level of actual participation in the EIA process. The reasons for low participation were attributed to lack of time, lack of knowledge about the need for participation and lack of trust and transparency in the EIA process. The study recommends enhancement of public education about public participation in development projects. Project planners and implementers need to observe transparency in the EIA process for increased public trust, acceptability and support.

**Keywords:** *Public Participation, Environmental Impact Assessment, Public Education, Transparency, Trust, Acceptability*

### 1.0 Introduction

Public participation (PP) has increasingly become a significant and integral part of environmental governance. The global environmental instruments emphasize the need for public participation in environmental matters (Shelton, 2004, p.2). Public participation is defined as the process by which public concerns, needs and values are incorporated into governmental and corporate decision-making with the overall goal of better decisions that are supported by the public (Creighton, 2005, p.7). The 'public' or 'publics' potentially include everyone (Coffey, 2005, p.28). Public participation plays a key role in enhancing environmental democracy and there is an increasing recognition that environmental issues must be addressed by all, or at least a majority of those affected by their outcome, not just by the minority comprising the governments and leading private sector actors (Mumma, 1999, March). Public participation in decision-making is essential for local development in general and in the management of natural resources in particular (Okidi, 2008, p.30; Muigua *et al.*, 2015 and Pring, 2001).

Public participation is regarded as the cornerstone of Environmental Impact Assessment (EIA) and is critical in informing decision makers of the potential environmental harms of a proposed project or action (Zhao, 2010). EIA is defined as 'the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made' (IAIA, 2015). First introduced through the National Environmental Policy Act (NEPA) of the United States in 1969; it is now an internationally accepted aspect of decision-making processes on issues affecting the environment. This law also embedded in the process of EIA the concept

of public participation (Petts,2003). EIA should be undertaken for all major development projects in virtually all countries worldwide (Sujit& Vikrant, 2018, p.1). The EIA process consists of various steps namely; screening, scoping, impact analysis, mitigation, impact management and report writing and decision making. Public participation cuts across each of the steps of the EIA process (UNEP, 2002).

The EIA tool is a proactive way to identify and mitigate negative environmental and social consequences of rapid economic development (Zuhair *et al*;2016).EIA helps those involved in decision-making concerning development projects to make their decisions based on knowledge of the likely adverse impacts on the environment.EIA also gives individuals and communities a voice on issues that may bear directly on their health, welfare and entitlement to a clean and healthy environment (Angwenyi, 2008,p.167).Studies by Adomokai and Sheat (2004) and Wood (2003) reveal that in Bangladesh, public participation practice in government run EIA is much similar to many developing countries in Asia and Africa. The study on selected governmental projects suggests that public participation in EIA is very limited and stakeholders do not seem to have any noticeable influence on the decision-making process. The study further indicates that participation took place at late stages where the stakeholder potential to influence decision-making process is extremely limited (Hasan *et al*;2018). It is also noted that although public participation and involvement are essential parts of the EIA process, it remains a problematic issue in Sub-Saharan Africa and other developing countries (Kakonge, 1996; 1999).

In Kenya, the Constitution (GoK, 2010) and enabling legislation provide for public participation. Public participation is a mandatory requirement for projects that are subject to the EIA process (GoK,2017). The EIA is required to be undertaken by the developer or proponent when the lead agency, in consultation with National Environmental Management Authority (NEMA), is of the view that the project may have a significant adverse impact on the environment (Angwenyi,2008). Depending on the scale and possible effects of the proposed project, an environmental review, an environmental impact evaluation or an environmental impact study may be conducted. Even though for the EIA, the legal framework in Kenya is enabling, the public is still inadequately aware of their role and is unsatisfactorily involved in EIA practice (Okello *et al*; 2009). Similarly, Onyango and Namango (2005) observed that participation in EIA practice usually remains at the level of consultation and does not often reach higher ranks of citizen empowerment.

The importance of public participation in enriching decision making is recognized by various scholars and the same cannot be overemphasized. However, how to achieve effective participation still remains a challenge. In Kenya, several challenges hinder effective public participation in EIA process. These challenges need to be looked at with a view to encouraging public participation. This study was done between September and October, 2018 with the main objective being to examine key factors influencing public participation in the EIA process for the Nairobi-Thika Superhighway Improvement Project in Nairobi City County with a view to informing policy and practice to enhance effective public participation in the EIA process. Specifically, the study focused on the nature, level and challenges of public involvement in the EIA process for the project.

## **2.0 Study Site and Methodology**

The study was undertaken on the Nairobi-Thika Superhighway Improvement Project. This was a road project which was a dual carriage highway of about 45 Kilometers. The objective of the project was to improve road transport services along the Nairobi-Thika Corridor by reducing traffic congestion and enhancing mobility within the metropolitan area through better linkages to the immediate and distant suburbs. The expansion and rehabilitation of the said road was meant to alleviate perennial traffic congestion within Nairobi City, and between the City and the Satellite town of Thika. The project proponent or implementer was the Kenya National Highway Authority (KeNHA). The specific area of the study comprised the households along the said Nairobi-Thika Superhighway which covers



Several factors were found to influence the level of public participation during the EIA process for the Nairobi-Thika Superhighway improvement project. The main ones were gender, awareness of the process and channels of communication used to pass the message to the public.

### **3.1 Gender distribution**

The gender factor plays a critical role not only in public participation but in environmental matters. Out of the 90 respondents interviewed 76.6% of respondents who participated in the EIA were male while 23.1% were female. The demographic data on gender participation indicates that the male respondents who participated in the EIA process were high as compared to women. The reason attributed to this difference is that men were more willing to participate in the study as opposed to the female. The low participation of women in the EIA is attributed to social norms and low level of education. The finding confirms other studies with similar findings related to women participation in projects. Conducted by Syremon et al,(2016) and Sujit and Vikran,( 2018).

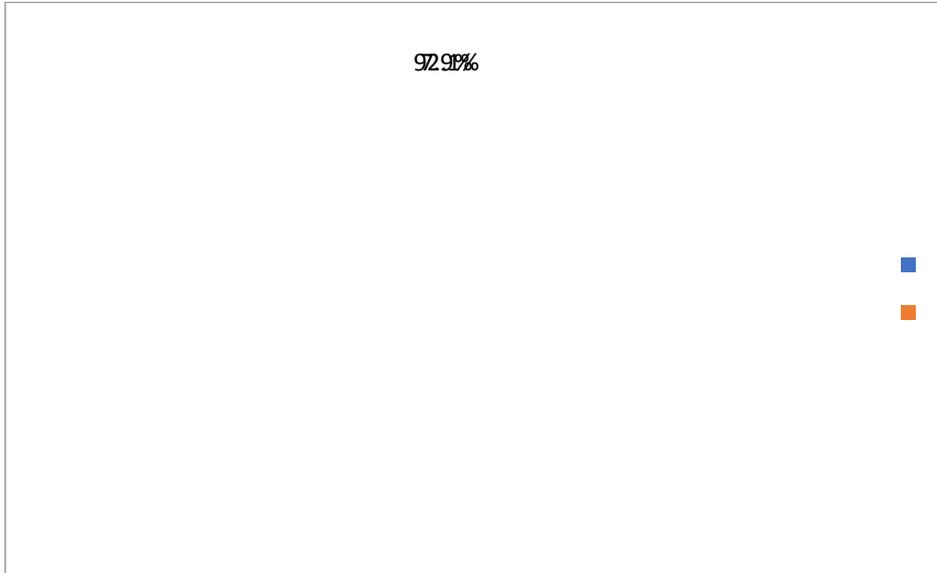
According to Syremon, *et al*, (2016) women participation in EIA is hindered by social norms which recognize men as household heads and community representatives, stereotypes, education levels, knowledge on the project and communication barriers. The situation is further confirmed by (Sujit and Vikran, 2018) on inclusion of gender in Environmental impact assessment study conducted in twelve countries including Kenya observe that despite the multiple roles women assume at the household level and society at large, their representation and participation in decision making processes remain abysmal. This can be attributed to strong patriarchal patterns and numerous gender-based assumptions in society.

### **3.2 Awareness and Participation in the Public Engagement in the EIA process**

Public awareness about a project is important in enabling the public engagement. From the study out of the 90 respondents interviewed, all were aware of the Nairobi-Thika Superhighway improvement project having received information about the project. However, despite the level of awareness of the project only 39.5% of the respondents participated in the actual EIA public deliberations. This indicates that awareness alone does not translate to public participation and more needs to be done to encourage public participation.

### **3.3 Channels of Communication used to Notify Respondents on Public Participation**

It is a requirement of the law that members of the public are notified of the project and their input is required during the EIA process. From the study 92.1% of the respondents indicated that the newspaper was the medium through which they became aware of the public consultation while 7.9% of the respondents indicated that they became aware of the notification for public participation by word of mouth. From the study, limited channels were used which were newspaper and word of mouth which is limiting in notifying the public about meetings. The finding is consistent with the study by Okello, (2008) who found that information on public participation remains inaccessible to many people and observed that there is need to improve access to information.



**Figure 2: Channels of Communication used to notify the respondents of the public consultations for the project (Source: Author, 2018)**

### **3.4 Reasons for non-attendance during public consultation**

There was low attendance for the EIA public engagement in this project. The respondents interviewed cited various reasons for non-attendance during the public participation in the EIA process. All respondents cited lack of time, 83.3% of respondents indicated that they lacked information about the project, 88.9% of the respondents cited lack of trust in the system, whereas 75% and 78% of respondents indicated lack of transparency and conflicts of interest groups respectively. Other barriers cited to have hindered public participation in the project include, reliance on one channel of communication, the choice of venue of the meeting and poor engagement of stakeholders by NEMA and project proponents and the nature of EIA reports and documents.

The findings on low attendance in public participation in EIA process is consistent with previous studies conducted which revealed inadequate awareness by the public of their roles and rights during the EIA. Okello, (2009) in studies on public participation in EIA in Kenya found that although the EIA legal framework was enabling, the public were still inadequately aware of their role and were unsatisfactorily invited in EIA practice. Similarly, studies by, (Kameri-Mbote,2001, Okello, Marara *et al*, 2011 and Mwenda *et al*,2012) confirms low level of participation in EIA process in Kenya which is attributed to various obstacles.

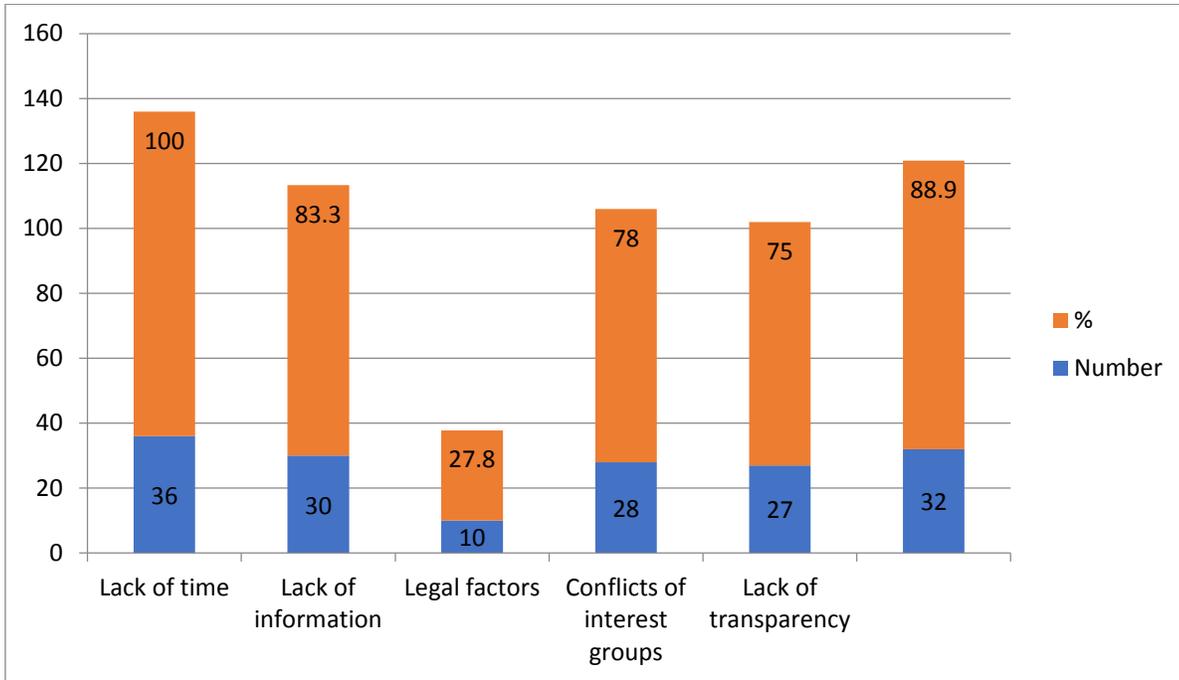


Figure 3: Reasons for Non-Attendance Public Consultation Meetings (*Source: Author, 2018*)

#### 4.0 Conclusion and Recommendations

The study concludes that low knowledge on the need to participate in EIA process led to low actual public participation by individuals during the EIA process for the Nairobi-Thika Superhighway improvement project. The study recommends the following measures to improve the level of public participation during the EIA process.

##### 4.1 Enhancement of public education and awareness

There is need to enhance public education and awareness on the importance of public participation in development projects particularly in EIA process. The National government, Ministry of Environment and Forestry, the County governments and environmental lead agency-NEMA should coordinate and develop civic education programs aimed at educating the public on their right and roles regarding public participation in development projects. A thorough understanding of public participation by the public is crucial for effective engagement in EIA process.

##### 4.2 Improvement on the channels of communication

There is need to embrace more channels of communication to notify the public apart from the newspapers. It is proposed that channels of communication such vernacular radio stations, posters, websites and social media should be used to give people more opportunities to access information and create awareness. These channels can be used also to notify the public about the participation venues, dates of meetings and explanation of the EIA Reports and documents.

##### 4.2 Enhancing Trust and Transparency in the Participation Process

The level of transparency should be increased. The project planners and implementers need to observe transparency in the EIA process for increased public trust, acceptability and support.

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## Advances in Sensor Technology in Determination of Polychlorinated Biphenyls in the Environment

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### Abstract

Industrialization witnessed in the last decades has seen introduction of chemicals that are harmful to human kind into the environment. In particular, the presence of polychlorinated biphenyls (PCBs), which were widely applied as plasticizers and dielectric liquids in transformers and capacitors, in the environment continues to be a global concern because of the carcinogenic, persistence and long-range transport properties displayed by these chemicals. As such, their monitoring in the environment is of particular interest so as to protect the environment and human life from adverse effects of these chemicals. In the past, costly technologies that involve gas chromatography coupled to either electron capture detector or mass spectrometry have been used in quantifying the level of these chemicals in the environment. Continued improvement has seen these technologies advance to formats that achieve high resolution and detection of these compounds at low concentrations. Their utilization for routine monitoring of PCBs is however limited by their cost and the need for a trained personnel. To bridge this gap, other technologies that are cheap and favour routine monitoring as well as offer opportunities for on-site determination of PCBs have been introduced. This review discusses sensors as novel technologies that have been applied in monitoring of PCBs in the environment and looks at the future prospects as far as sensor technology is concerned.

**Key words:** Sensors, polychlorinated biphenyls, molecularly imprinted polymers, environmental pollution

### 1.0 Introduction

Environmental pollution has continued to be of great concern especially in developing countries where the existing systems and regulations for waste management and disposal are very weak. Because of this loop-hole, chemicals in their free-state or bound to consumer products continue being released into the environment, where they have the potential to harm human and animal populations or cause ecosystem imbalance. Polychlorinated biphenyls (PCBs) are among the chemicals that have been reported in different environmental compartments, some at concentrations that exceed the recommended levels (Megahed et al., 2015; Ndunda & Wandiga, 2020). Their ubiquitous presence in the environment is attributed to their past widespread application as coolants, lubricants, hydraulic fluids, dielectric fluid in electrical equipment and as additives in pesticides, inks, dyes and paints owing to their attractive properties of chemical stability, low flammability and electrical insulating (Erickson & Kaley, 2011).

Though their use and production was stopped through various initiatives by individual countries and recently the global Stockholm Convention on persistent organic pollutants (POPs), their extraordinary characteristics of persistence, long range transport and bioaccumulation have contributed to their continued detection in the environment even in remote areas with no records of use or production of PCBs. In addition, PCBs continue to be released into the environment through illegal or improper disposal of PCB waste, such as old transformer fluids; leakages or releases from electrical transformers

containing PCBs; disposal of PCB-containing consumer products into municipal waste and burning of PCBs containing wastes in municipal and industrial incinerators (ATSDR, 2002). There is a worrying fact that PCBs will be in the environment for a long period of time and governments have to devise sustainable strategies for the protection of the environment.

The presence of PCBs in the environment has led to human exposure majorly through ingesting and inhalation, though occupational exposure has also been reported to contribute to PCBs body burden (Bell, 2014). Recorded health effects upon exposure to PCBs include potential to cause cancer, reproductive and developmental disorder (Carpenter, 2006), disruption of the endocrine system (Bell, 2014) and premature death (Lind et al., 2019) among others. There are no safe levels for exposure to PCBs because of their capability to accumulate in tissues and through the food chain where they are able to reach high concentration that are able to induce adverse health effects. Consequently, their determination in the environment is a key requirement towards ensuring a safe environment for all living organisms. Monitoring of PCBs, especially in human and animal foods is an efficient route to evaluate the risk of human and animal exposure. In addition, reports on levels of PCBs could provide relevant information on pollution sources with a view of eliminating these pollution sources (Verdian et al., 2019).

Techniques for their determination have involved the use of gas chromatography–electron capture detector (GC-ECD) (Ndunda & Wandiga, 2020), gas chromatography–mass spectrometry (GC-MS) (Lambropoulou et al., 2006), liquid chromatography–mass spectrometry (LC-MS) (Moukas et al., 2014) and state-of-the-art high resolution gas-chromatography combined with high resolution mass-spectrometry (HRGC-HRMS) (Cui et al., 2020). However, these techniques do not promote routine monitoring of PCBs due to the high cost of investment and the need for qualified personnel to operate the equipment. In addition, they require a sample preparation step, which is the rate limiting step due to the many steps involved, before a sample extract can be introduced into any equipment. In the spirit of overcoming these challenges and achieve routine monitoring of PCBs, techniques that involve immunoassays and sensors have been introduced and have achieved results that are comparable to the conventional standard techniques. The development of these new techniques have focused on meeting four main criteria for analytical techniques that include, validity in terms of accuracy and precision, simplicity, sensitivity so as to achieve low level detection, relevance and economical and technical feasibility (Chobtang et al., 2011). Therefore this review discusses in details the advances in immunoassays and sensor technology in monitoring PCBs and provides future prospects towards achieving selective and on-site detection of PCBs.

## **2.0 Immunoassays**

Immunoassays or bioassays are used to determine the toxicity of chemical substances by utilizing living materials (Christofi, 2005). Immunoassays which involve living organisms or tissues to sense toxic substances have been utilized for detection and quantification of PCBs in the environment. The earliest form of sensors is the chemical-activated luciferase gene expression (CALUX) bioassay that measures the ability of chemical mixtures to activate certain genes in biological fluids. CALUX bioassay was reported to provide comparable toxic equivalence (TEQ) similar to chemical analysis using GC-ECD (Pauwels et al., 2000). This type of bioassay is limited by a high level of expertise and equipment to carry out cell cultures, thereby creating room for the development of other bioassay formats like enzyme-linked immunosorbent assays (ELISA). Commercially available ELISA kit evaluated TEQs for dioxin-like (dl)-PCBs in retail fish reporting low detection limits ( $10 \text{ ng mL}^{-1}$ ) and results comparable to TEQs determined using HRGC-HRMS (Tsutsumi et al., 2006). Advantages of immunoassays include high selectivity and sensitivity, minimal sample preparation and high sample throughput, and low costs. For these reasons, immunoassays have been considered to be well suited for monitoring of environmental samples (Shimomura et al., 2001). However, their application is limited by the need for antibodies/enzymes that entail a high cost of production and are unstable in harsh conditions.

## 2.1 Sensor Technology

Sensors are gaining more attention as they are perceived to offer several advantages such as cost-effectiveness, simplicity and the possibility for real-time and on-site analysis. Thus, sensors provide the best alternative for the high-cost instrumentation techniques while achieving the required figures of merit. Concerted efforts have brought about sensors that can be used to detect pollutants in the environment achieving quantification of PCBs in different environmental matrices (Chobtang et al., 2011). Chemical sensors consist of chemically selective sensing layer (or receptor) integrated in a transducer that interacts with the analyte to provide a signal that can be measured. Based on the operating principle of the transducer, sensors are grouped into four major categories, i.e., optical, electrochemical, mass sensitive, electrical, magnetic and thermometric (Hulanicki et al., 1991), with the first three being the mostly commonly used for environmental pollution monitoring.

### 2.2.1 Chemical Sensors

#### 2.2.1.1 *Electrochemical sensors*

Electrochemical sensors apply electrode as the transducer to interact with the analyte. They are versatile tools that can be miniaturized for on-site and real time detection. Since the working electrode may not be sensitive or selective to a particular analyte, they are usually modified to increase sensitivity and selectivity through immobilization of recognition elements on the transducer surface via either drop coating or electropolymerization (Figure 1) (Sharma et al., 2012). The latter is the most preferred one as it has advantages of being able to control the film thickness, easy to operate and provides reproducible results. To this end, an electrochemical sensor based on working electrode modified with  $\beta$ -cyclodextrin polymer and reduced graphene oxide composite ( $\beta$ -CDP/rGO) achieved the detection of PCBs in form of Aroclors in sediment core. Due to the inactive nature of PCBs, the authors used ferrocene as the redox probe achieving detection limit of 0.0005 nM and a linear range of 0.001 - 10000 nM, providing similar results as GC-ECD (Zheng et al., 2016). Similarly, a thiol- $\beta$ -cyclodextrin-graphene/gold nanoparticles/glassy carbon electrode ( $\beta$ -CD-SH-GR/AuNPs/GCE) electrochemical sensor using methylene blue as the redox probe achieved detection limit of 0.028  $\mu$ M for PCB 77 and recoveries of 94-106% for canal and lake water (Chen et al., 2019). Further electrode modification using  $\beta$ -Cyclodextrin Hydrate/Tin Disulfide Modified Screen-Printed Carbon Electrode ( $\beta$ -CD/SnS<sub>2</sub>/SPCE) gave a linear detection range of 0.62 to 80  $\mu$ M and a detection limit of 5  $\mu$ M. Furthermore, the electrodes were as stable as 88% after 7 days' storage (Liu et al., 2020). An electrochemical impedance sensor for determination of PCB-77 based on a single-walled carbon nanotube/pyrenecyclodextrin (SWCNT/PyCD) hybrid has been reported to detect PCB-77 up to 1 nM (Wei et al., 2011). In all these cases  $\beta$ -cyclodextrin was applied to achieve host-guest complex and increase the selectivity of the analyte and graphenes and nanoparticles were used to increase the electrode conductivity to enhance the sensor signal.

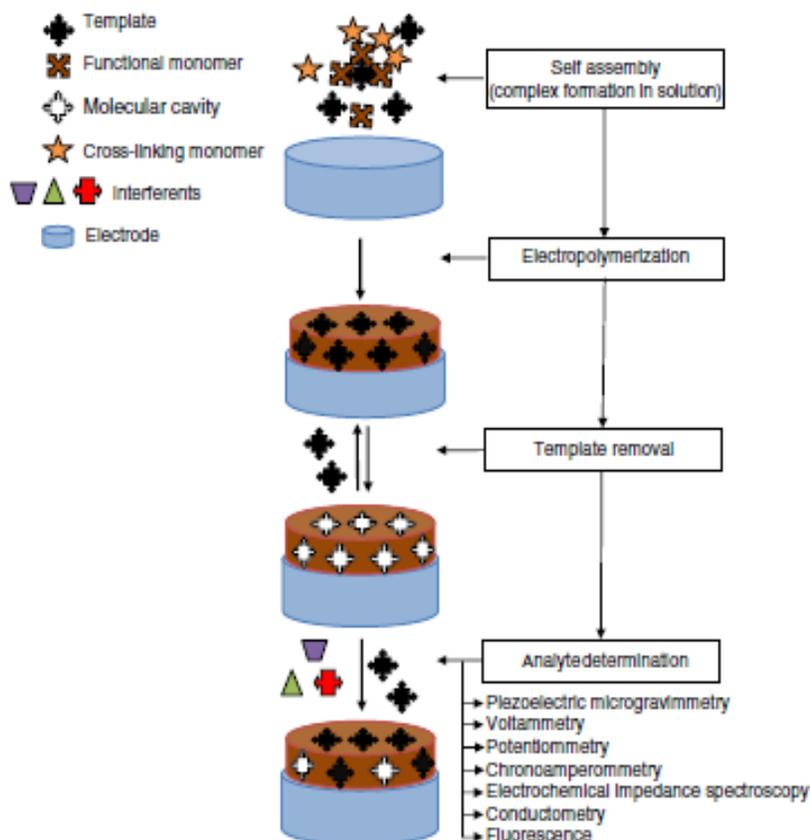


Figure 13: Graphical representation of electropolymerization of recognition element on transducer surface (adopted from (Sharma et al., 2012))

Advances in modification of the working electrode has seen the introduction of immunosensors or biosensors that explore the interaction between analytes and antibodies integrated with electronic physicochemical transducers. Immunosensors present one of the alternatives for PCBs detection because of their specificity and selectivity enabling detection of analytes in complex matrices and minimal requirement for sample pretreatment. This technique affords high selectivity of the analytes of interest because of the specific nature of production (Verdian et al., 2019), though it is limited by their instability in harsh condition, non-reusability and use of animals to generate the antibodies. A direct electrochemical immunosensor based on anti-PCB antibody reported lowest detection limit of  $0.36 \text{ ng mL}^{-1}$  for Aroclor 1254 with negligible cross reactivity from closely related compounds and recoveries between 100 and 103% in spiked real samples. Spiked environmental samples provided recoveries between 103 and 106% (Bender & Sadik, 1998). Even more attractive in sensing are the disposable sensors that apply screen printed electrodes (SPE) that are produced at low cost and offer advantages of single use overcoming the many steps in regeneration of electrodes (Herrasti et al., 2016). A disposable immunomagnetic electrochemical sensor, that benefits from faster reaction kinetics of magnetic particles, has been used for the detection of PCBs in spiked soil samples with detection limits of  $0.39 \text{ ng mL}^{-1}$  for Aroclor 1254 (Centi et al., 2005), detection of PCB 28 in milk samples at concentrations as low as  $5 \text{ ng mL}^{-1}$  (Silva et al., 2007) and detection of PCB<sub>7</sub> (28, 52, 101, 118, 138, 153 and 180) in sheep milk, bovine adipose tissue and bovine muscle reporting results similar to those of HRGC-LRMS (Laschi et al., 2003).

A silver functionalised polyaniline electrochemical immunosensor with anti-PCB antibody achieved detection limit of  $0.063 \text{ ng mL}^{-1}$  for PCB 28 (Khesuoe et al., 2016). Label-free and highly selective

electrochemical aptasensor based on NiHCF NPs/rGO hybrids demonstrated high sensitivity and selectivity for detection of PCB-77 in water samples at detection limits of 0.22 ng L<sup>-1</sup> with the results for analysis of environmental samples comparable to those of HPLC at recoveries from 88 to 104.1% (Fan et al., 2019). Most recently, an aptasensor based on BDD films coated with dense T-Au-NPs and aptamers by forming Au-S bonds for detecting PCBs has been reported. The sensor exhibited good linearity from the femtomolar to micromolar and a low detection limit of 0.32 fM for the PCB-77 molecule and recoveries between 98% and 106% for spiked samples. The sensor demonstrated its superiority to other sensors by achieving trace detection of PCB-77, being selective, and reusable (Yuan et al., 2020). It is indeed clear that aptasensors achieve detection in femtomolar range which is important for trace detection of PCBs.

### *2.2.1.2 Optical sensors*

Optical sensors explore properties of light such as fluorescence, phosphorescence, chemiluminescence, reflectance, Raman scattering colour change or refractive index (Rodriguez-Mozaz et al., 2004). Fluorescence sensors are based on quenching of fluorophore by the target analyte (Zarejousheghani et al., 2021). A fluorescence sensor based on hydrophobic interaction between PCBs and Benzo[ $\alpha$ ]pyrene enabled detection of selected PCBs in water demonstrating the potential of such sensor to be further developed for monitoring of PCBs (Ahmad et al., 2019). A fiber optic immunosensor, consisting of a quartz fiber coated with partially purified polyclonal antiPCB antibodies (Abs), was used to detect PCBs at detection limit of 10 ng mL<sup>-1</sup> and recoveries between 71 and 114% (Zhao et al., 1995). A fluorescent aptasensor for PCBs detection revealed a detection limit of 3.5 ng L<sup>-1</sup> and average recoveries of 93.4% to 109.7% and 83.2% to 118.5% for water and soil samples, respectively (Wang et al., 2018).

Surface plasmon resonance (SPR) is another optical technique based on transduction of change in refractive index due to interaction between an analyte and recognition element to optical signal (Hong et al., 2008). A labelled SPR using anti-PCB antibody reported detection limit of 2.5 ng mL<sup>-1</sup> in 15 min analysis time (Shimomura et al., 2001). Label-free SPR based on immobilized Cytochrome c (Cyt c) on an Au thin film for detection of PCBs reported a detection limit of 0.1 ppb in 10 min analysis time (Hong et al., 2008). Another optical technique that has been explored for detection of PCBs in surface enhanced Raman scattering (SERS) spectroscopy. SERS is a technique based on amplification of local electric field on the surface of precious metal nanostructures (substrate) as a result of the interaction of molecules with colloidal nanoparticles or rough metal surfaces. Several substrates have been utilized to achieve detection of PCBs, with silver nanorods achieving trace detection and recognition of PCB-77 and three monochlorobiphenyls at 10<sup>-8</sup> M (Zhou et al., 2010a, 2010b), silver dendritic nanostructures achieving detection of PCB-77 at 10<sup>-10</sup> (Yang & Meng, 2010), Ag nanosheet-assembled micro-hemispheres a reported detection limit of 3x10<sup>-6</sup> M for PCB-77 (Zhu et al., 2011), a composite consisting of ZnO Nanorods and Ag Nanoparticles achieved low detection limits of 10<sup>-11</sup> M for PCB 77 (Tang et al., 2012). Modification of either the substrate or the target molecule to increase the sensitivity of the sensor have involved decane-thiol modified SERS substrate achieving detection PCB -77 at 50 pM and ability to discriminate different PCBs (Bantz & Haynes, 2009), gold-capped silicon nanopillar substrate and modified PCB 77 to PCB-SCH<sub>3</sub> to enhance accumulation of the atom on metal surface through the formation of sulphur linkage at detection limits of 10<sup>-8</sup> M (Rindzevicius et al., 2017), aptamer modified SERS substrate for detection of PCB -77 at 10<sup>-8</sup> M (Fu et al., 2015). Based on a label-free approach for the SERS detection of PCB-77, Sun et al. achieved ultra-high sensitive detection of PCB-77 using the aptamer modified Ag-nanorod (Ag-NR) arrays as the SERS substrate at a detection limit of 10<sup>-8</sup> M (Sun et al., 2016). The MXene modified silver nanorods substrate was employed for the sensitive determination of 18 PCBs, with the LODs for PCB-77 and PCB-3 as low as 2.43 × 10<sup>-10</sup> and 2.14 × 10<sup>-9</sup> M, respectively and ability to distinguish PCBs (Fang et al., 2020).

### *2.2.1.3 Piezoelectric sensors (Quartz crystal microbalance, QCM)*

The QCM technique is an established technique that is applied in determination of mass and film thickness of materials, investigating molecular adsorption, and studying surface reactions in the monolayer range through monitoring changes in resonant frequency and dissipation of quartz crystal resonator. When substances are adsorbed on the QCM sensor surface the effective quartz frequency changes, which results in a detectable electric field (Syahir et al., 2015). Quartz crystal microbalance (QCM) is a simple and easy to operate technique that operates on mass sensitivity, where any change in mass leads to changes in resonance frequency of the quartz crystal resonator. Despite its simplicity and potential, few studies have reported on this technique in determination of PCBs. Quartz crystal microbalance (QCM) sensor with oligopeptides as recognition elements could easily distinguish between dioxins and PCBs providing a method for screening of PCBs before instrumental analysis using HRGC-HRMS (Mascini et al., 2005). A Piezoelectric immunosensors based on anti-PCB polyclonal antibody detected 4,4'-DCB and 2,4,4'-TCB at detection limits of 0.37 and 0.11  $\mu\text{g mL}^{-1}$  and comparable to other biosensors and ELISA technique (Přibyl et al., 2006). In addition the sensor provided promising results in analysis of real samples.

### **2.2.2 Biomimetic Sensors**

The production of biological recognition elements is costly and such elements do not survive harsh conditions necessary for laboratory applications. In view of this, recently within the field of biomimetic, materials that display key and lock, antibody-antigen or host-guest principles have been introduced. Molecularly imprinted polymers (MIPs) are tailored to bind to specific analytes and can survive in very harsh conditions in addition to being reusable (Ndunda & Mizaikoff, 2016). They have been integrated in transducers to form biomimetic sensors in determination of other chlorine based compounds including atrazine at detection limit of 0.028 nM (Zarejousheghani et al., 2021) and fabrication of very sensitive and selective electrochemical sensor for chlorpyrifos reporting detection limit of 0.93 fM (Nagabooshanam et al., 2020). The sensor gave superior results compared to the previously reported electrochemical sensors modified with other materials, showing the promise for biomimetic sensors. The potential for future application of MIPs in sensors is bright as the design of MIPs has shifted to routes that provide smart MIPs with high selectivity. In particular, different computational approaches based on molecular modeling, molecular mechanics and molecular dynamics have been applied in optimization of MIPs synthesis by providing the appropriate functional monomers, cross linkers and porogenic solvent and the optimal combination ratios for synthesis of high quality MIPs (Suryana et al., 2021). Several articles have reported that the template-functional monomer complex with the lowest binding energy in silico is also the optimal functional monomer when synthesizing MIPs in situ. Cleland et al., demonstrated that the results obtained by use of molecular dynamics were equivalent to those obtained in the laboratory (Cleland et al., 2014). In addition this approach has contributed to green chemistry by ensuring only optimal amounts of reagents are used and that MIPs synthesized are ready for immediate application (Marć et al., 2018).

### **3.0 Conclusions and Future Perspectives**

This articles demonstrated clearly that the performance of sensors almost matches that of analytical equipment in terms of sensitivity and selectivity but with additional advantages of throughput and minimal sample preparation. These results suggests the potential for widespread application of sensors for routine and on-site monitoring of PCBs. Sensors are cost-effective and offer opportunities for further modification to enhance their sensitivity and selectivity for the detection of components from trace to ultra-trace levels. Materials that include MOFs, graphene oxides, carbon nanotubes, and MIPs have been reported to demonstrate high adsorption capacities, large surface area and selectivity, thus putting them in the right position for their application as recognition elements in sensors. Development of smart recognition elements even places the sensor technology in the right path for advanced sensor platforms.

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## Conflict of Interest

The authors declare no conflict of interest.

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## Implications of Covid 19 on waste management and Natural Resources Management in Nairobi, Kenya

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### Abstract

Pandemics affect the very existence of human life and their effects going beyond human life to the environment. Nairobi River has been a pivotal natural resource serving the environs of Nairobi County. In the present covid 19 pandemic, disposal of face masks in the river has been witnessed illustrating the implications of waste management on natural resources and climate change. The risks associated and enhanced from improper waste management continues to add tolls on the state of Nairobi River further aggravating the previous conditions of pollution.

The covid 19 pandemic has had a positive effect on the environment in that the lockdowns resulted to reduced travelling hence reduced global carbon dioxide emissions from the transport sector thereby resulting in improved air quality. However, the pandemic has imposed a further strain on the municipal waste system of many developing economies whose waste management structures and frameworks are still straining from doubled waste generation. As part of the Covid 19 protocol, the world globally was advised to wear face masks, to protect oneself from the corona virus. There is no developed protocol in the management of the used masks, gloves and PPEs. Increased generation of used face masks and gloves has led to an indiscriminate dumping of these wastes not only in water bodies but also in dumpsites. Burning of these wastes will lead to increased production of greenhouse gases that have been cited as contributing to climate change.

Beyond the covid 19 pandemic, it is advisable for the Government to treat waste management as an essential service to avoid future foreseeable and unforeseeable adverse impacts on the environment.

### Key words

Covid 19, waste management, climate change, natural resource management, environment

### Introduction

The new corona virus has caused an unparalleled effect in most countries globally. This virus has affected close to all countries in the world, over 157.8 million people have contracted the corona virus and resulted in about 3.2 million deaths (WHO, 2021). In the wake of the Corona pandemic, little about this was known and neither researched. Of interest, Corona viruses that have been noted to cause severe respiratory, enteric and systemic infections in a wide range of animal hosts including man resulting in rapid fatalities if not promptly attended to (Ankit et al., 2021).

With unprecedented increase in human life loss, scientific interest on corona viruses has increased since the outbreak of COVID-19 that initiated in Wuhan, China and soon declared a 'Public Health Emergency of International Concern' by World Health Organization (WHO) (Shakil, Munim, Tasnia, & Sarwar, 2020). Currently, the strategy against this pandemic is prevention through regular hand and face washes, use of masks, gloves and personal protective equipment and social distancing. Globally, government have been tasked to perform as many tests as possible to identify corona virus infected people and to isolate them to avoid the uncontrollable spread of the virus among its citizenry (Islam &

Kibria, 2020). WHO has estimated that the needs of PPE for the health care workers per month as 76 million gloves, 1.6 million googles and 89 million medical masks (Prata et al., 2020)

Covid 19 might cause divergent indirect and direct effects on the environment (Zambrano-Monserrate et al., 2020). Handling of wastes in ways which are not sustainable in many developing countries makes them susceptible to the possibilities of increased spread of corona virus due to their waste management practices (Zand & Heir, 2020). The ongoing and future strategies against corona virus ensue an outlook for huge quantity of masks, plastic products (personal protective equipment (PPE) kits, face shields, etc.) and chemicals (chloroxylenol, chlorine, H<sub>2</sub>O<sub>2</sub>, etc.) which future increase the waste generated in the near future and further complicate the water resources which will increase per person consumption (Benson, Bassey, & Palanisami, 2021; Fadare & Okoffo, 2020). These effects can have unforeseen impacts on the environment and more so water bodies if proper waste disposal and management is not effected (Ankit et al., 2021; Arimiyaw, Abass, & Morgan, 2021; Islam & Kibria, 2020).

Like most countries globally, Kenya, through the Ministry of Health (MoH) has set out a myriad of several prevention and mitigation policies and interventions. Interventions and policies instituted include social distancing, hand hygiene policy, mandatory use of face masks in public places, dusk to dawn curfew, cessation of movement in and out of Covid-19 hot spot areas, international travel ban, isolation of infected and exposed individual and currently vaccination rollout in phase forms (Abdullahi et al., 2020; Arimiyaw et al., 2021).

The novel Corona virus has caused unprecedented impacts throughout the country at medical, social, economic and environmental levels and with its impacts settling in (Ankit et al., 2021; Aura et al., 2020).

Worth noting of the corona virus impacts is illustrated by shutdown of industrial facilities, power plants, decreased transportation and shipping which have resulted in decreased levels of pollutants such as carbon monoxide (CO), nitrogen oxide (NO<sub>2</sub>), methane (CH<sub>4</sub>), sulfur oxide (SO<sub>2</sub>) (Ankit et al., 2021; Rume & Islam, 2020). Due to a reduction in commercial activities and public transportation, air and noise pollution was also reduced significantly with international flights ban (Arimiyaw et al., 2021; Benson et al., 2021).

However, these positive effects were as a result of the imposed lockdowns and international bans in several countries during the initial phase of corona virus and the positive impacts taking a short term outlook (Arimiyaw et al., 2021; Rume & Islam, 2020). With the resumption of the various activities to normal levels, noted positive environmental effects have started to diminish rapidly (Benson et al., 2021; Rume & Islam, 2020).

As health measures against Covid 19, the single-use masks, wipes, bottles of sanitizers and gloves are critical for the safety of the frontline workers and Kenyans as a whole (Abdullahi et al., 2020; Benson et al., 2021; Selvaranjan, Navaratnam, Rajeev, & Ravintherakumaran, 2021). The safe disposal of plastics after use has become a matter of grave concern especially when this is emptied off in rivers and lakes (Adebayo Bello & bin Ismail, 2016; Al-Khatib, Kontogianni, Nabaa, Alshami, & Al-Sari, 2015; Aura et al., 2020). This has dealt a huge blow to the fight against plastic pollution with an increase of masks being found in the Nairobi River and unfortunately ending up in places where they must not be (Benson et al., 2021; Ferronato & Torretta, 2019; UNEP, 2020).

Additionally, the disposal of the face masks, gloves can easily be found on streets, parks, bus stops and open markets and more visibly on the shores of the Nairobi River (UNEP, 2020). The safe disposal of PPEs is also matter of concern more so of its negative impacts on environment (Benson et al., 2021; Selvaranjan et al., 2021). In general, land-based anthropogenic activities such as unregulated disposal of biomedical wastes have been regarded as potential sources of toxic, infectious and radioactive

pollutants when drained off in rivers, lakes among others (Fadare & Okoffo, 2020; WHO, 2018) Typically, COVID-19 pandemic has created more biomedical waste in the form of waste plastics which if not disposed correctly ends up in wrong places such as rivers (UNEP, 2020; WHO, 2018).

This paper seeks to elucidate the implications of improper waste management of face masks, PPEs on natural resources such as the Nairobi River. It seeks to shed light on continued pollution of natural resources if unabated and the need for robust waste management policies that address pandemics after effects. The research that has been done on covid 19 has majorly focused on human health, research on environmental impact of covid 19 is limited.

### Materials and Methods

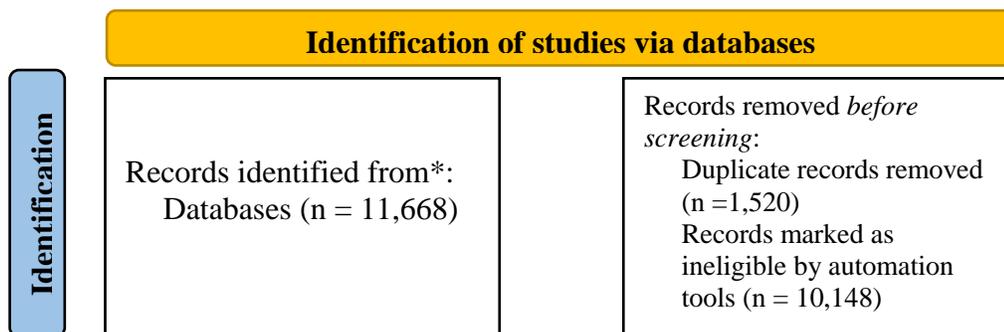
The study adopted a systematic literature review methodology. A systematic literature search was carried out in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines so as to increase the comprehensiveness as well as the transparency of reporting. The authors followed the following criteria in conducting the systematic literature review: formulation of the research question, setting inclusion and exclusion criteria, selection and accessing the literature, assessment of the quality of the literature included in the review and finally analysis, synthesis and dissemination of the findings.

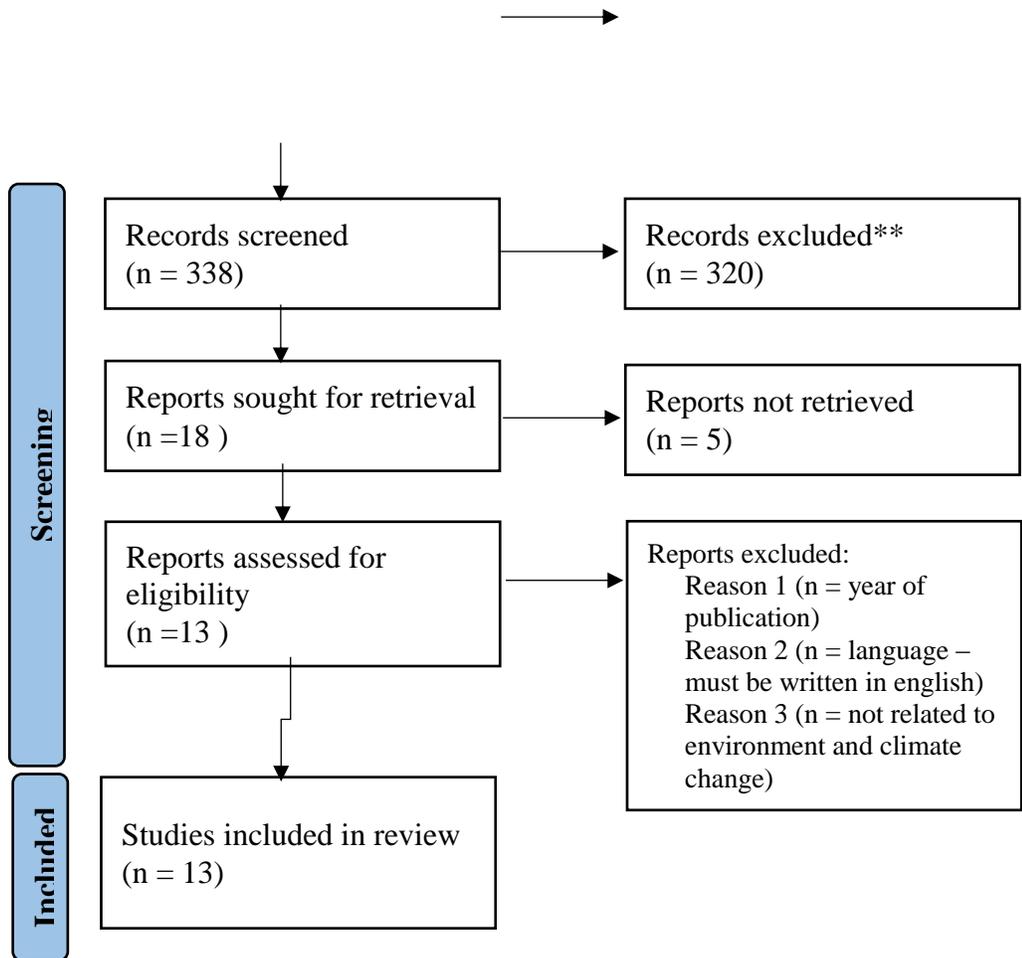
A through literature search was done in various databases such as dimensions AI, google scholar and scopus. Various search terminologies were used such as covid 19 and waste management, impacts of covid 19 on the environment, covid 19 and natural resource management, covid 19 and climate change. References cited in the included articles were reviewed and the those found relevant were searched for in the scopus, dimensions ai and google scholar databases; then their abstracts were accessed and included in the study if found relevant. The literature search was performed between January 2021 to May 2021. Eligibility criteria was defined and only articles focusing on effect of covid 19 on solid waste management as well as the environment was included in the study. The articles included were written in English.

#### Steps in conducting the Systematic Literature Review

1. The authors started by choosing a review topic (Cronin et al., 2008) thereafter performing a search in the scopus, dimensions ai and google scholar databases.
2. Searching and selection of articles was then conducted using the various identified search words and phrases so as to identify the articles that should be included in the study. An inclusion and exclusion criteria were formulated to help the authors in selecting the relevant articles. The inclusion and exclusion criterial included year of pulication – 2018 (when the corona virus was declared a pandemic) to 2021, only articles written in English were include in the review. Articles relevant to the research question were included; articles looking at impact of covid 19 on human health, business or any other area apart form the environment was excluded.
3. Analysis and Synthesis of Literature. Analysis was done for the selected articles and synthesis done to enable the author draw conclusions. The abstract of the selected articles was read through; also, the references cited in the included articles were looked up and included in the study if found relevant.

Figure 1: PRISMA





Source: <http://www.prisma-statement.org>

### Results and Discussion

There is no doubt that the corona virus has caused untold havoc on human life; however, the effect of the corona virus hasn't been researched in-depth. Few of the studies conducted that have analyze the impact of the covid pandemic on the environment have estimated a positive indirect impact on the environment (Zambrano-Monserrate et al., 2020). Climate experts on the other hand have predicted that emissions in greenhouse gases (GHG) might decline to levels that have never been witnessed before since World War II (Global Carbon Budget, 2020). One of the ways to stop the spread of the corona virus at the moment is social distancing and this has been adopted globally and has resulted to a decline in green houses gas emissions in the air globally (Zambrano-Monserrate et al., 2020) hence reduced effects of climate change.

The implementation of the strong social distancing measures by various governments globally has slowed down countries' main economic activities. Consequently, industrial facilities as well as power plants have been forced to stop their production activities. In addition, the use of motor vehicles declined notably. All of these resulted into a huge decrease in the concentrations of Nitrogen Dioxide (NO<sub>2</sub>) and particulate matter that have a diameter that is less that 2.5 um (PM 2.5) in the main cities of China (ESA, 2020).

In other parts of the world, like Europe there has been a notable reduction in air pollution following the government's directive to its citizens to stay at home as a containment measure to the corona virus pandemic. Similarly, usage of motor vehicles notably declined thereby leading to a noticeable decline in concentrations of nitrogen dioxide in countries such as Italy, Germany, Spain and France. The findings also indicate that there has been a high acceptance rate of face masks globally hence increased production of wastes from face masks and other PPEs such as plastic gloves. Figure 2 shows the amount of daily single use face masks generated per day with Asia leading in the amount of single use face masks generated per day.

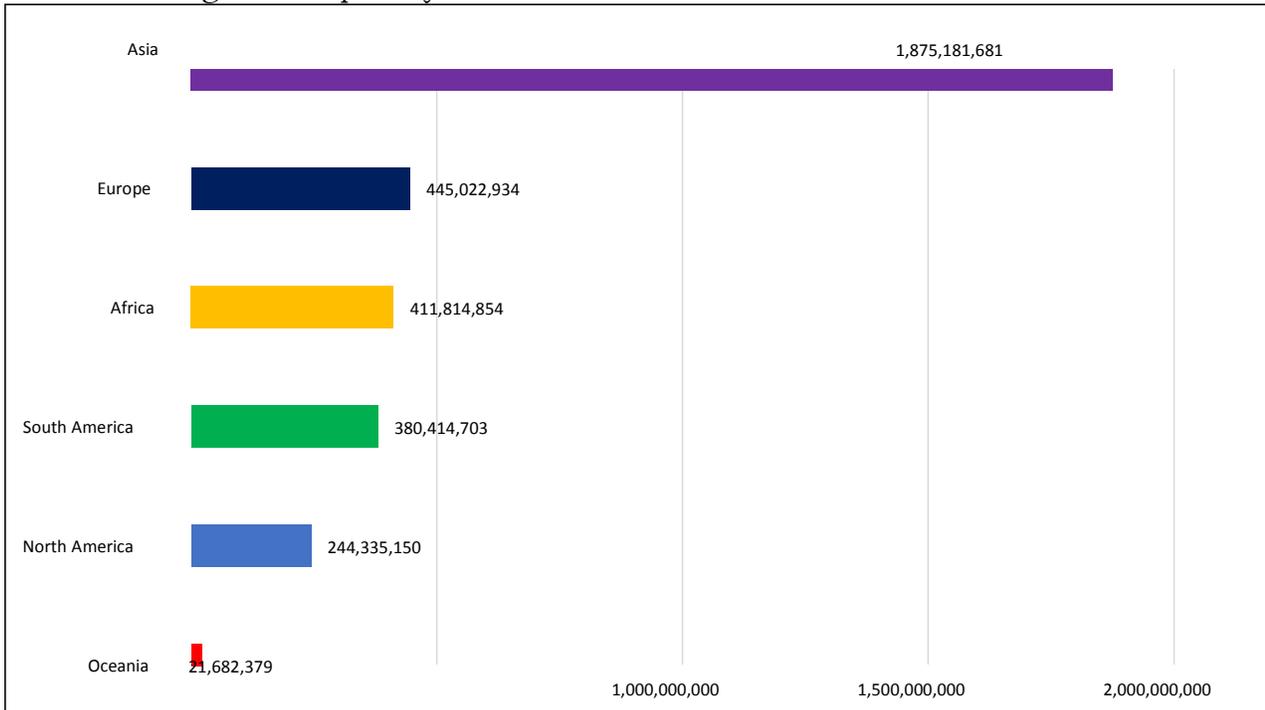


Figure 2: Estimated Quantity of daily single-use facemasks (face shields) used per population per day for each region of the world

This global health crisis has exerted increased pressure on the regular waste management practices thus leading to inappropriate waste management practices such as direct landfills, mobile incineration as well as local burnings (Patrício Silva et al., 2020). Covid 19 related plastics which are water logged have not only been sighted at the beaches but also in water bodies (Stokes, 2020).

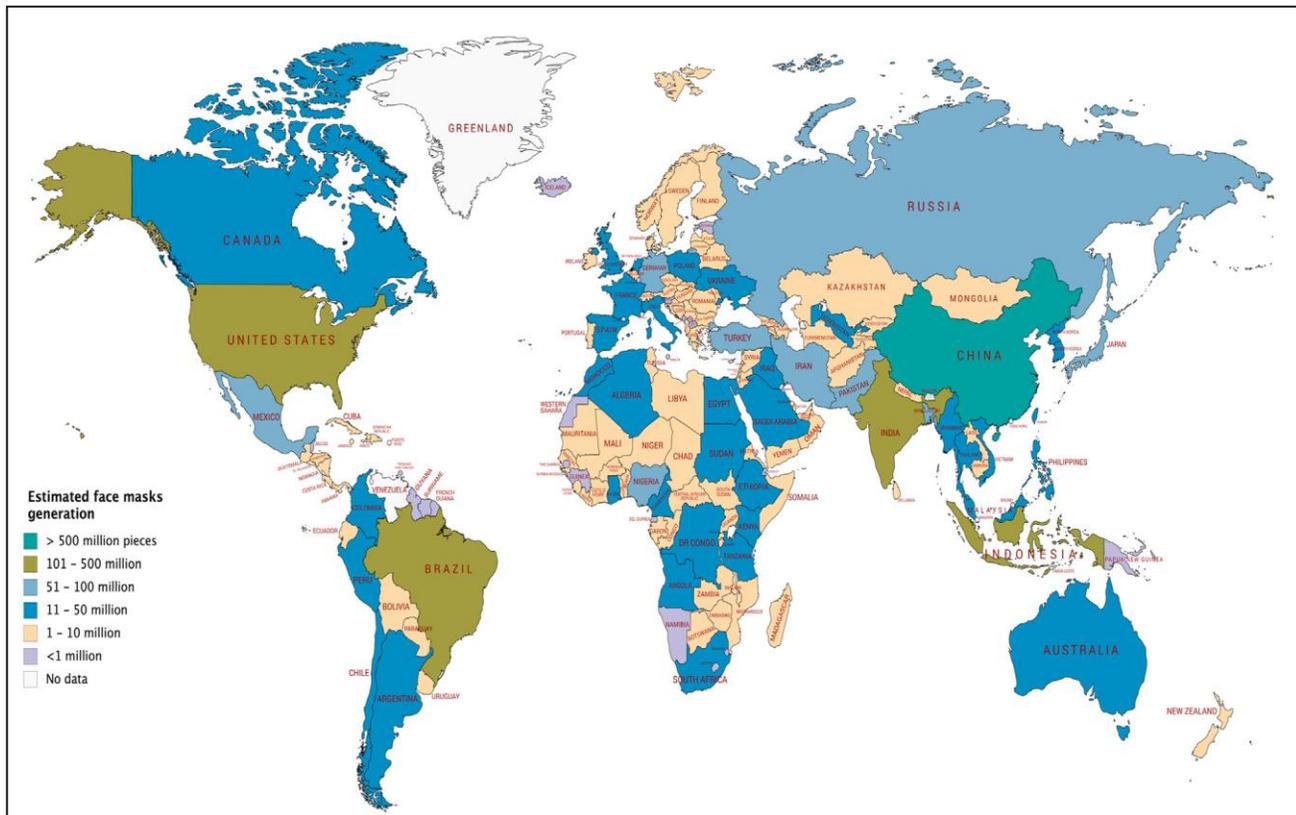


Figure 3: Estimated global share of face masks discarded as COVID-waste generated from a given Country. Map created with mapchart.net©.

The recent covid 19 pandemic preventive measures implemented to curb its spread includes a sudden increase in demand for as well as use of plastic products not only by the general public but also by the health workers as well as service workers. Human health has been placed ahead of environmental health, plastic waste management strategies and plastic reduction policies have either been recently reversed or temporarily postponed (Prata et al., 2020).

### Conclusion

The reduced greenhouse gas emissions that have been noted globally as a result from reduced transportation owing to the lock downs and more people working from home are only a short-term measure that will have a short-term positive effect on the environment. Once the covid 19 pandemic has been contained, the globe will go back to its business as usual approach thus increased generation of the greenhouse gases and consequently climate change.

Human health has been prioritized by the governments globally at the expense of environmental health. It is important that a balance be struck between the two; given that this pandemic has far reaching effects on the environment which can't be envisioned currently. As much as governments have taken a myriad of measures to curb the spread of this deadly pandemic, long term measures aimed at sustainable management of solid waste including the PPEs which have been used during and after the pandemic is insufficient. The gains that had started being seen from the ban of single use plastic will be lost given that the containment measures of the covid 19 pandemic involves the use of single use plastics in the form of PPEs. Its imperative that governments view municipal waste management as an

essential service so as to find a lasting solution to the management of solid waste management including the used PPEs to avoid adverse effects on the environment. Single use face masks are made from plastics such as polypropylene, polyacrylonitrile and polyurethane meaning that these masks will be in the environment for a while hence causing adverse effects on the environment as a result of their improper disposal.

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**SUB-THEME 5: MITIGATING THE IMPACT OF SOCIAL  
DISRUPTIONS IN A GLOBAL PANDEMIC**

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**New greeting habits amid Covid-19 pandemic**



**From physical conferences to virtual; “adjusting to new normal”**

## Origin, Spread and Impact of Islam on Nandi Traditional Religion and Culture: A Case of Nandi County, Kenya

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### Abstract

In recent times, Islamic religion has been expanding rapidly at the global, regional and local levels. The presence of this religion in Nandi County and its evidence of growth raises the need to comprehend, with comparative ease, its origin, spread and impact on Nandi traditional religion and culture from 1850 to 2012, which has not lately been the subject of scholarly research. The main objective of this research-related work was to investigate the origin, impact and spread of Islam in Nandi County; apart from analyzing other factors that contributed to the acceptance and/or rejection of the religion by the Nandi people, which further enhanced its subsequent spread. Cross-cultural and Islamization theories were applied in collecting data and bridging the gap in knowledge by utilizing both qualitative design and survey data collection methods to arrive at conclusive findings. It was revealed that the spread of Islamic religion in Nandi County involved various factors such as socio-cultural, economic, religious and doctrinal, among others. Quality information was delineated on proselytism in a cross-cultural context and promotion of inter-faith dialogue which government policy-makers, other stakeholders, students, researchers and professionals should find both stimulating and useful. This data is vital in addressing the developmental agenda for Nandi County; particularly in areas related to recently launched competency-based curriculum education, historical and cultural heritage, as well as indigenous religion.

**Keywords:** *Islam, Nandi, traditional and cultural religion, doctrinal proselytism, competency-based education.*

### CHAPTER ONE: INTRODUCTION

#### 1.1 Background to the Study

The study endeavored to cover the Nandi people of Kenya, their socio-cultural and religious values particularly those associated with the Muslims of Eastern Africa. However, as far as the Nandi people are concerned, it is difficult to give an exact figure of their population because they are scattered all over Kenya; few of them even live in Tanzania and Uganda. Although the Nandi, as an ethnic group, are not located in one geographical place, their culture and especially the religious rites are practiced universally. This study focused on the Nandi as a community, with particular reference to the sub-districts that make up the Nandi County; namely, Tindiret, Nandi East, Nandi North, Nandi Central and Nandi South.

The name “Nandi” originated from a Swahili word “mnandi” - meaning *kormoran*, because of their voraciousness. Initially the Nandi were called by a nickname “*chepng’al*,” meaning people who talk a lot. This was the name used by their fellow *Kalenjin* community comprising of the following sub-clusters the *Keiyo*, *Kipsigis*, *Marakwet*, *Pokot*, *Sabaot*, *Terik*, and *Tugen*, among others. Before British colonization, the Nandi were sedentary cattle-herders, sometimes also practicing agriculture. John Ludwig Kraft was the first to mention the name “Nandi” in writing in 1854 while H.M. Stanley first put it on the map in 1878.<sup>4</sup>

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<sup>4</sup>For more detailed history of the Nandi; see Myrtle S. Langley, *The Nandi of Kenya: Life Crisis Rituals in a Period of Change* (London: C. Hurst & Company, 1979), pp.3-5.

The Nandi people, who share affinities in matters of tradition, language and culture, are among the darkest skinned of the Sub-Saharan people, and bear only inferable physical semblance of the more African looking segment of the racially mixed Arabic speaking population of Egypt.<sup>5</sup> Nevertheless, no claim of the Egyptian origin seems more preposterous, until one looks at the drawings and carvings of the ancient Egyptians, depicting their own general physical appearance. Indeed, some of the Nandi sounding names are similar to some Pharaohs of ancient Egypt; such as *Tutankhamum*, *Amasis*, *Chephren*, *Cheops*, *Psamtek*, *Psamis* and *Isis*. Similarly, the Egyptian Coptics address God as “*paiyoot*,” which in Nandi means a respectable old man. Nevertheless, the link between the Nandi and Egyptians is still ludicrous and continues to remain a puzzle.<sup>6</sup> The Arabs, Islam and the Arabic culture came to Egypt at around 640 AD, immediately after the founding of Islam. This was spurred on by missionary zeal that was planted by Mohammed himself.

The Cushitic hypothesis has been taken to explain not only language groups, but also cultural features found in East Africa.<sup>7</sup> Matson and Sutton<sup>8</sup> contend that the Cushitic speakers were agriculturalists as well as cattle keepers. Sutton goes further to suggest that Caucasoid, who came from Ethiopia, as did Murdock and Ehret<sup>9</sup>, accept the culture attributed to these people. A number of authors’ writings attribute some of the features to people who were supposed to have come from the North; that is Egypt. If the *Kalenjin* ethnic group originated from Egypt as their history suggests, then the Nandi traditional religion, their language and culture ought to have some semblance of the corresponding ancient Egyptian culture, which in turn had been largely influenced by Islam.

### 1.1.1 The Islamic Religion and Its Spread in Kenya

Like Christianity and Buddhism, Islam is a major religion across the globe. It is estimated that about half of humanity professes one of these three faiths. As of the year 2009, Islam was considered the second largest of these faiths – with an estimated 1.2 Billion adherents all over the world, followed by Christianity with 2 Billion. Islam is a fast-growing religion, and it has been projected that by the year 2050 Muslims will constitute 25 percent of the world’s population.<sup>10</sup>

By the year 2000, Muslims were estimated at 5.4 million in Kenya. This figure constituted about 20 percent of the country’s population. Islam is mostly practiced in the North-Eastern (90-99 percent of the population) and the Coast provinces (80-85 percent).<sup>11</sup> Some Muslims are also present in Kenya’s urban centers such as Nairobi, Nakuru, Kakamega, Mumias and Kisumu. The spread of Islam into the interior of Kenya in the colonial period was mainly facilitated by Muslim traders.<sup>12</sup> This was mainly through the instrumentality of the long-distance caravan trade from the coast, following the suppression of the slave trade in the early decades of the Nineteenth Century. The establishment of urban centres in the early years of colonial rule enabled many such itinerant Muslim preachers to move into Nairobi. They later settled at Mumias in Western Kenya; consequently, settling and entrenching

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<sup>5</sup>Kipkoech araap Sambu, *The Kalenjin Peoples Egypt Origin Legend Revisited: Was Isis Asiis?* (London: Longhorn Publishers, 2007), p. 1.

<sup>6</sup>Ibid., p. 1.

<sup>7</sup>A.T. Matson, *Nandi resistance to British rule 1890-1906*, East African Publishing House (Nairobi, 1972), p.1. From, *His Africa: its People and Culture, History*.

<sup>8</sup>A.T. Matson, and Sutton, J.G., ‘Role of forts in Safeguarding the Uganda Road’, UJ, 29 (1965), pp. 163-184.

<sup>9</sup>T. Towett, ‘Traditional History of the Kipsigis’, MS. 1957, KNA; Murdock and Ehret, *op. cit.*, p. 176-179.

<sup>10</sup>D. Barrett, G. Kurian, and T. Johnson, eds. *World Christian Encyclopedia*- vol. 1. (New York, 2001). Retrieved from [www.bible.ca/global-religion-statistics-world-christian-encyclopedia.htm](http://www.bible.ca/global-religion-statistics-world-christian-encyclopedia.htm) on 25th September 2007.

<sup>11</sup>*Republic of Kenya*, (Moscow, 1991), p. 32.

<sup>12</sup>Arge Oded, *Islam and Politics in Kenya* (Nairobi, 1998), p. 2. Retrieved August 10, 2007 from [www.book.islam.kenya.com.htm](http://www.book.islam.kenya.com.htm).

themselves in some parts of the Rift Valley that included Naivasha, Kericho, Eldoret and Kapsabet in Nandi. This Islamic expansion continued from the period after the First World War.<sup>13</sup>

As to what constitutes religion, one can agree with Posnansky that there is no universally accepted definition.<sup>14</sup> For this study purpose, it will suffice to adopt the definition given by A.C. Coulson where religion is conceived as simply man's response to his environment.<sup>15</sup> The response is both individual and social. Thus, religion has a dual character. Various writers on the subject have emphasized one aspect or the other of this duality. A.N. White had for example argued that:

Religion is the art and theory of the internal life of man, so far as it depends on man himself and on what is permanent in the nature of things. Religion is what the individual does with his own solitariness – thus religion is solitariness and if you are never solitary, you are never religious.<sup>16</sup>

On the other hand, Coulson and others refer to religion as the “social attitude towards the non-human environment.” It is in this sense that one can begin to conceptualize the Nandi Indigenous religion. The historical forces acting upon it were similar to those that affected the religion of the Padhola as depicted by Professor B.A Ogot.<sup>17</sup> These include migration and settlement, physical and human environment as already pointed, and internal and external factors. These diverse factors produced diversity in social setup. In addition, and as F.W Smith has said, a “diversity in theology may follow upon diversity in social structure.”

The intellectual aspect of this theology involved an entity one may call God, but who in Nandi was known by various names as will be seen in the subsequent discussion. The author shall not go into what constitutes God except, but shall quote the view of one of the most famous Christian theologians concerning this issues; a view that serve as a definition of God.<sup>18</sup> In his commentary on the book of Daniel, Martin Luther in 1556 gave this as his conception of God: “A God is simply that where upon the human heart rests with trust, faith and hope. If the resting is right, then God is right; if the resting is wrong, then God too is illusory”.<sup>19</sup>

When the Nandi left *Misiri* (Egypt) they adopted the name *Isis* for their Deity (spelt and pronounced as *Asiis* or *Asiista* – the sun), while in the southernmost branch, the Barabaig of Tanzania, it is referred as *Aset*. As earlier mentioned, that particular Deity in the Egyptian context represented the Motherly qualities of Deity who, nevertheless, was still an excellent father, creator, among other names. It is therefore legitimate to compare *Asiis* to ancient Egyptian so-called gods and goddesses individually and collectively because she encompasses all of their attributes just as Isis of Egypt encompassed all the attributes of the other so-called gods and goddesses.<sup>20</sup>

### 1.1.2 The Nature and Works of God (Asis) among the Nandi

The God of the Nandi was known by various names, three of which were very common, ‘*Asis, chebo Kipkooyo*’ (the giver of blessings), ‘*Asis chepkelyen Sogol*’ (‘*Asis* of the nine feet’ – the symbol derived

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<sup>13</sup>Mohammed Bakari and Saad S. Yahya, *Islam in Kenya: Proceedings of the National Seminar on Contemporary Islam in Kenya* (Nairobi, 1995).

<sup>14</sup> See in Kimambo and Ranger, *The Historical Study of African Religion*, p. 29.

<sup>15</sup> A. C. Coulson, *Science and Christian Belief*. p. 105.

<sup>16</sup> See, Mwanzi, *A History of the Kipsigis*, p.12.

<sup>17</sup> See Kimambo and Ranger, op. cit. p. 122.

<sup>18</sup> Smith, In *African Ideas of God*, Introduction.

<sup>19</sup> Also quoted and commented upon by Coulson Op. cit. p. 53.

<sup>20</sup> Kipkoech araap Sambu, *The Kalenjin Peoples's Egypt Origin Legend Revisited: Was Isis Asiis? A Study in Comparative Religion*, Longhorn Publishers, 2007.p. 2

from the spreading rays of the sun at sunrise and sun set, the nine being figurative) and ‘*Asis Cheptalel*’ (The white lady). The derivation of the latter name is ambiguous. One account attributes its derivation to the whiteness of the sun at mid-day; another has it that it is the name of a deified legendary Nandi girl of noble character who was carried off into the heavens. It is the name for God used by the Roman Catholic Mission in Nandi.<sup>21</sup>

The Nandi maintain the notion of God as the Supreme Being. They consider God to be omniscient, that is, to know all things, to be simultaneously everywhere (Omnipresent), and to be Almighty (*Kiptaiyat* - Omnipotent). It is these and other eternal attributes discussed below that distinguish God from His creation and make Him not only the genesis but also the sustainer of all things.

The relationship between the deity and the sun is best explained by a statement, which Orchardson attributed to a Kipsigis old man, who equated the sun as God (*Cheptal*). *Cheptalel* is used interchangeably with *Asis*, who is personified as the sun; *Asiista* is the symbol of *Asis*, *Cheptalel* and *Chepkelyen sogol*. This conception of God portrays a sky-centered cosmology, a phenomenon common to most religious systems. This is as Plato explained:

A sage advised that no moralized men, they must be made afraid. Let them invent gods who could see and hear all things, cognizant not only of human actions, but of men’s innermost thoughts and purposes. They were accordingly connected with the source of the most terrifying and the most beneficial phenomena, the sky, the home of thunder and lightning, of shining sun and fertilizing rain, seat of divine powers helpful and hurtful to humanity.<sup>22</sup>

*Asista* is the far-off driving force behind everything, including the “balance of nature” between him and the living and the spirits of the dead (*oiik*). *Oiik* were considered members of the tribe, who mediate between man and God, and punish the living in order to prevent them from upsetting the balance of nature by their sins. However, the Spirits are generally friendly to the living, and come to visit them, both to see how they are faring and to get their share of food. There are no public acts of worship of *oiik*, but people offer milk and beer to the spirits when they come to their huts at night, travelling in the bodies of snakes, moles or rats. Snakes and rodents found in the huts at night must therefore not be killed. A post-harvest ceremony called *kipsundet* was held, which may be described vaguely as a harvest festival, with the objective of beseeching God to promote the well-being of people and cattle.<sup>23</sup>

The Nandi believe in one God “*Asis*” the creator and giver of all things. He has no father, mother or companion of any kind. He is considered a Supreme Being and referred to also as *Cheponomuni* because the being thus described cannot be perceived with ordinary mortal eyes. His work is done in solitude. He loves or hates people according to their behaviour. The creator lives in the sky, but has temporary homes on earth, situated on mountains, where he may rest during his visits. The visits are made with a view to his carrying out a kind of “general inspection” and to bring blessings and punishments to people.<sup>24</sup> He was taken to be a distant being and takes but little interest in the daily occupations of individuals.

Nevertheless, *Asis* was invariably called upon during crises and turning points of people’s lives. At the birth, initiation, marriage and death of every Nandi, communication is established with *Asis* on the person’s behalf. The family group always obtains the assistance from *orgoiyot*. No individual may directly supplicate the Almighty. The father is the key personality to approach *Asiis*. There are occasions

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<sup>21</sup>G. S. Snell, *Nandi Customary Law*, Kenya Literature Bureau, 1954. p. 3.

<sup>22</sup> Quoted and commented upon by Henry A. Mwanzi, *A History of the Kipsigis*, Op. cit. p. 117.

<sup>23</sup> A.C. Hollis, *The Nandi, their Language and folklore*, Oxford. (1909). p. 38.

<sup>24</sup> Ibid.

in each man's life, apart from the four main crises, when he/she requires spiritual assistance, for instance when one broke a taboo, it was usually attributed to some ill luck to such an infraction. The man's purification or absolution is achieved by means of the medicine man (*Orgoiyot*), who work by establishing contact with such ancestral spirits as may be thought to be involved.

In the Nandi ordinary way of everyday life, there are no organized prayers or religious ceremonies such as morning and evening "prayers"; so far as people and things go well and prosper, it is taken for granted that God is pleased with the general behaviour of the people and the welfare of the country. In this happy state, there is no need for prayers. It is only when humans are in real need that they must approach him; without fear of disturbing him and incurring his wrath. Nevertheless, the Nandi offer prayers for protection and guidance whenever people are gathered to discuss public affairs, to decide a case, or at public dances.<sup>25</sup>

Traditional religion is still a strong force in the minds and hearts of the Nandi people. While there is belief in *Asis* as Supreme Being, the active part of Nandi religion's heritage is the realm of ancestors (*Oiik*). The spirit world is believed to be underground and *oiik* live exactly the same way as the living – owning cattle, sheep goats and cultivating land. It is from this background that the institution of *Orgoiyot* (plural *orgoiik*) played a prominent role both in religious as well as societal affairs of the people. Apart from being sort of paramount chiefs, the *ogroiik* were also spiritual leaders of the community.

The sacred nature of the office of *Orgoiyot* among the Nandi is an ancient institution, which was centred upon the person of the *Orgoiyot* and regarded in a mystical way. It is a phenomenon accepted on the grounds of the nature of the office, and its origin is unknown. According to legends, the Nandi had no *orgoiik*, but it is told that one day the warriors found a small boy in the plains while they were looking after cattle. They took the child home and adopted him into the Nandi Community. As the child grew, he began to prophesy and perform miracles. Eventually he became the first leader of the Nandi people. Whatever the truth of the story, the institution of *Orgoiyot* came to play a significant mystical role in the Nandi community. It is believed that when a baby boy is born to the *Orgoiyot* family, he comes with either grass or blood in his hand. If he came with blood, he would become *Orgoiyot*.<sup>26</sup>

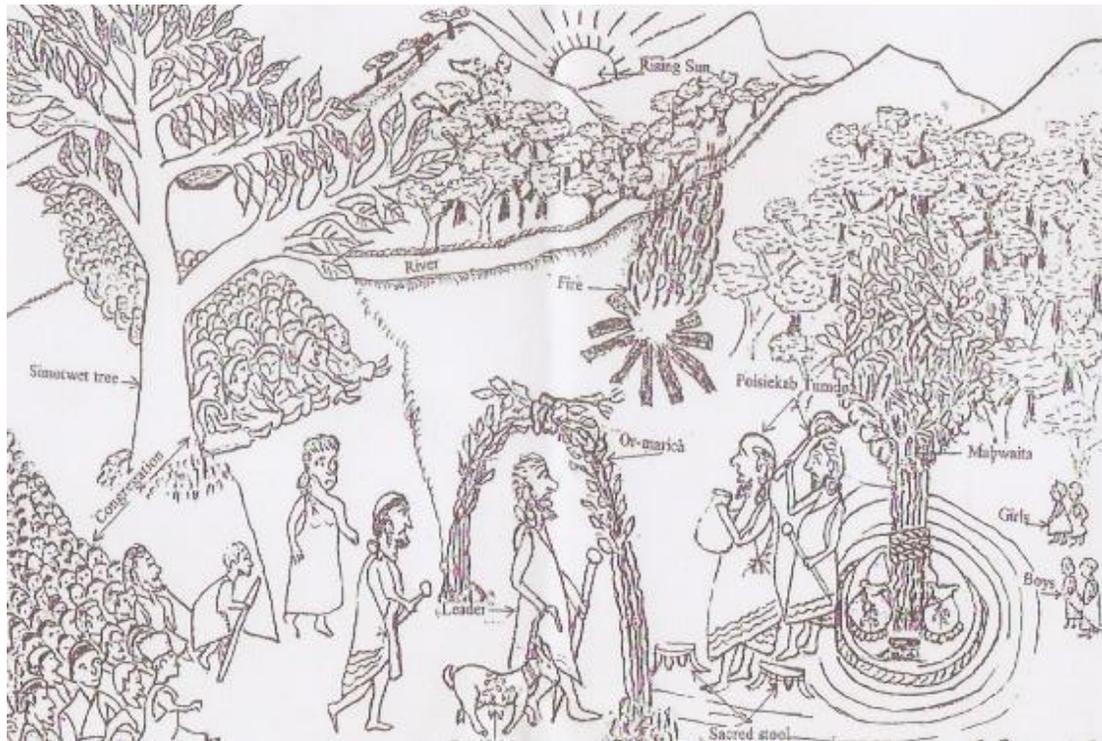
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<sup>25</sup>Geofry Parrinder, *African Traditional Religion*, London: S.P.C.K. 1968 – p. 142.

<sup>26</sup>Mwanzi, *In Imperialism and Collaboration in Colonial Kenya*, p.20.

In cultic activities of the people, the *Orgoiyot* is usually the head of the ritual leaders. He is a priest-ruler. The sacred character of a Nandi *Orgoiyot* was, besides, attested to in a number of oral traditions. His name is not casually mentioned. In religious matters, the *Orgoiyot* was the people's priest. He linked the people to the living dead and the ancestors.

Illust 1: Graphic presentation of a typical *Kapkoros* (Worship site) of the Nandi



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**Illustration 1:** Above shows how the *Orgoiyot* used to perform his duties in cleansing the sins of the Nandi people. A “sacrifice” was needed for the cleansing and is defined as the offering up of something precious for a cause or a reason. Making atonement is satisfying someone or something for an offense committed.<sup>27</sup> The shedding of blood was a substitutionary act. There was no remission of sins without the pouring of blood in among the Nandi. The Day of Atonement, also known as cleansing day, was the most solemn holy day of all the Nandi feasts and festivals, occurring any time the *Orgoiyot* calls for, particularly when a sinner comes and requesting. On that day, the *Orgoiyot* was to perform elaborate rituals to atone for the sins of the people.<sup>28</sup>

In the *Kapkoros* place of worship there were items which were a must to be there and used in the site, some of them were beside a tree called *Simatwet* this was a tree considered secret, the tree when cut contains water like milk. Milk according to the Nandi was very important and mostly used for sacrificial work. The clean he goat was also required. Fire was lit ten and the arrangement of the firewood was in a certain order as was prescribed by the *Orgoiyot*. This service was to done just before the sunset or early in the morning.<sup>29</sup> The following stages were considered.

<sup>27</sup> Ol. Araap Chepguor, 24 November 2008. Maateket.

<sup>28</sup> Ol. John Araap Tuwei, 24 November 2008. Kapsisywo.

<sup>29</sup> Ol. Araap Kirwa, 24 November 2008. Chepterwai.

**Stage 1:** The congregation was invited to witness the ceremony. The people invited were to be clean, in that, each should be sinless. Only those who were married were invited. The night before the ceremony the couple was not allowed to have sex and they were to come very early in the morning and sit quietly waiting for the function just before the sunrise on the very day of the function.

**Stage 2:** The two people standing over there, was an honorable family, who were chosen to escort the victim to the *Kapkoros*.

**Stage 3:** The man there with the goat was the victim or the offender of the sin. He is standing in the gate (*ormorich*) to the alter (*Kapkoros*)

**Stage 4:** There after the gate, are the two leaders called *Orgoik*, who were responsible in cleansing using the sacrifice in the alter.

**Stage 5:** The holy place, the cycle of lines was seen, and in the middle is two pots and the stool. The two pots were containing blood of the goat already killed in a very bad way to show that sin was a bad thing. Some of the blood was sprinkled and some pored in the place. The offender was to sit in the four leg stool in the middle of the alter.

### 1.1.3 The impact of colonialism and spread of Muslims in Nandi County

The rise and increase in the number of Muslims and their religion (Islam) in the interior of the Nandi County was related to the British Colonialism.<sup>30</sup> Although colonialism may not have directly played a major role in determining the spread of Islam in Nandi Sub-districts, it created enabling circumstances that exposed the Nandi to Islam. The arrival of Europeans facilitated early contact between the Nandi and Muslims. The first entrants into Nandi were the explorers, missionaries, scientists, farmers and agents of commerce and government administrators who came as travellers following the caravan routes into the interior.<sup>31</sup> As diverse as they were in their interests, these travellers, no matter how much experience they had or how widely travelled in the African journeys they had made, always-recruited Muslims as their porters, guides and guards to accompany them. These Muslims knew the interior very well for they had caravan experience. Although very few of them were known by name, their contribution cannot be ignored, for without them, possibly the European subjugation would have taken longer than it did. Biographies and other related notes made by these early Europeans acknowledged the role of the Swahili (Muslims) that accompanied them from the coastal region of Kenya.

Gregory, an explorer who left Mombasa on 23 March 1893 to explore the Rift Valley, had an impressive list of Swahili guides. He had the chance to pass through Nandi land. The prominent Swahili adventurers on the list were Omari and Fundi, who always replied *inshallah* after every act. Many places that Gregory visited are currently reputed to have Swahili names.<sup>32</sup> In the process of colonization, British officers used the Swahili to quell the Nandi. John Ainsworth and Francis Hall used to send Swahili soldiers on punitive campaigns. Therefore, by the close of the 19<sup>th</sup> Century, Muslim presence was evident among the Nandi.

Most Muslims, especially those from the coast, were members of Kikuyu and Kamba communities who rendered services to the colonial administration during its first establishment in Nandi. They became the agents of Islamic faith.<sup>33</sup> They served the British as administrative officers, domestic servants, clerks and headmen of the African groups who continued their role after they settled in the interior.<sup>34</sup>

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<sup>30</sup>Gavin, R.J 1970, Sayyid Said in Tarikh Vol. 1 No1, edited by J.B. Webster, London: Longmans, together with Van Zwanenberg, V.R.M 1975a (and Anneking) *An Economic History of Kenya and Uganda 1800 – 1970* (London: Macmillan press Ltd, 1970).

<sup>31</sup> Ol. Mzee Sala Magut, 21 November 2008. Kabiyeet.

<sup>32</sup>PC/NZA/3/32/4 Railway survey 1892 – 95.Ag. Secretary to Administrator Mombasa 15-7-1892.

<sup>33</sup> Ol. Mzee Too Abdi, June, 15, 2008, Kipkaren.

<sup>34</sup>Jackson , F ( sir ) *Early days in East Africa London Dawsons of pall mall* (London: 1930), pp 31 – 33

The Railway industry became a further agent of Islamic expansion into the Nandi, particularly around Muhoroni (along the way to Kisumu from Nandi). The area in between, known as Kibigori, became the first inlet of the Muslims to Kaptumo in Nandi. As the railway construction work advanced in 1896, the Nandi and Terik also joined the Kikuyu and Kamba in jungle clearing and earthworks between Mombwa and Muhoroni.<sup>35</sup> This provided a chance for the Muslims to interact with the Nandi.

Thus, the railway not only contributed significantly to the expansion of Islam into Nandi, but it also created opportunities for contact among them, culminating in the Islamization of the latter. This process assumed consolidation with the formal establishment of a colonial administration in Nandi. In the process of establishing the first colonial rule center in Kipture (Kapsabet), the British government enlisted the Swahili (Muslims) as porters, askaris, guides, cooks, house-help, *nyaparas*, scribes, artisans, interpreter, tax-collectors court clerks and administration clerks.

#### 1.1.4 Study Area

##### 1.1.4.1 Location

The present study was carried out among Nandi in the Nandi County of Kenya. Nandi County is located in the Western side bordering Kakamega-Vihiga Counties in western Kenya. It borders Uasin Gishu to the north and Nyando to the south (See Map. 1 of Kenya showing the Nandi County<sup>36</sup>)

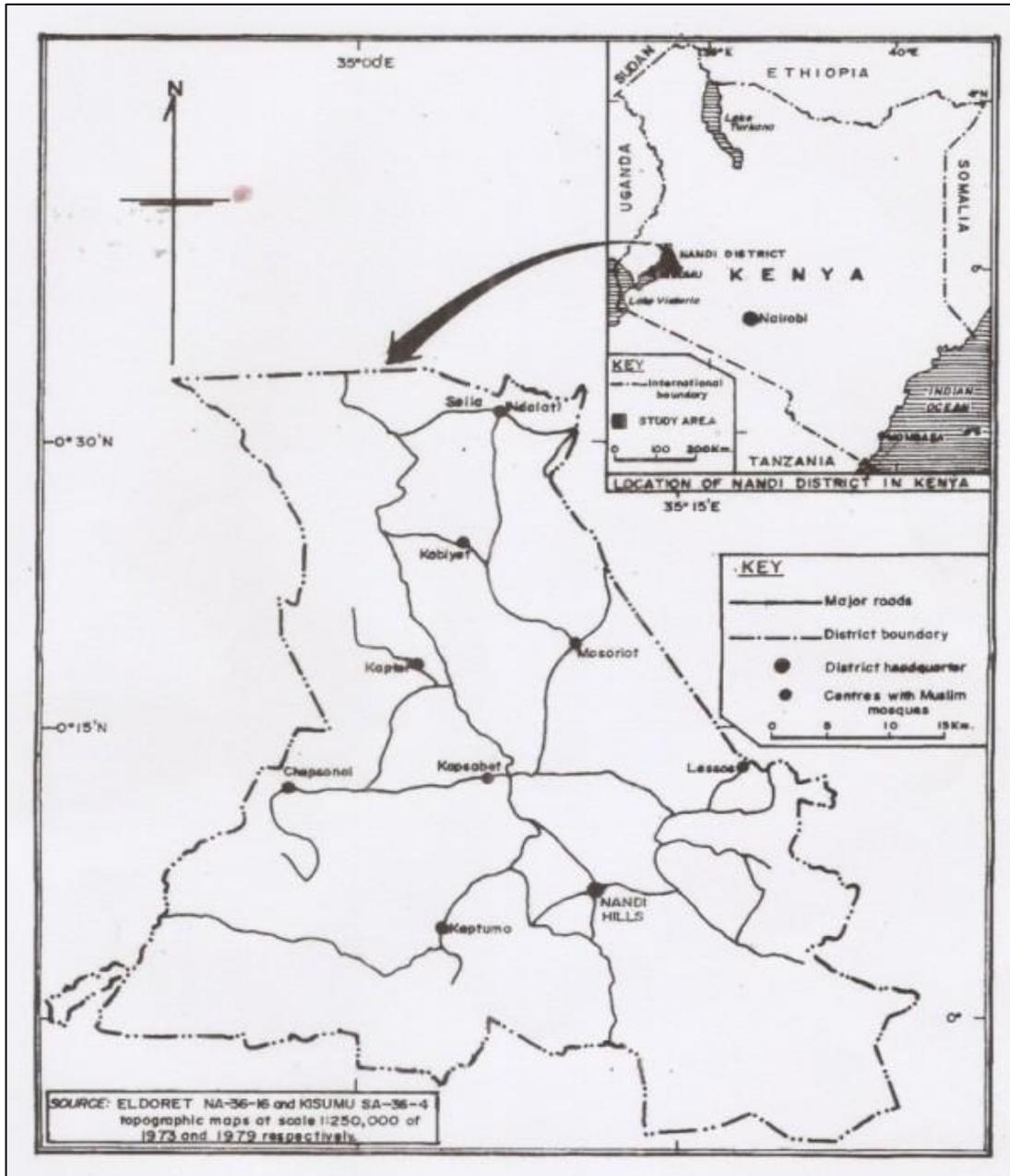
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<sup>35</sup>Pc/Coast/1/1/20 Uganda Railway 1895 – 1897. Chief Engineer Uganda Railway to C.H. Cranford Esq. Ag. Commissioner & Consul General E.A Protectorate Mombasa 21-12-1896.

<sup>36</sup> **Source:** Kenya Administrative Boundaries Map 1:1,000,000.



The following map (Map 2) shows the areas within Nandi County where Mosques are located and spread all over the areas shown.



Map 2:

Map

showing Nandi County Location of Mosques

(Adapted by Samuel A. Ojode – Chief Technologist, Department of Geography, Egerton University)

1.1.4.2 The Size

According to the present map, Nandi is approximately 5,000 Sq. Km. at the advent of British rule, the Nandi tribal area (known as *emet*) was divided into seven geographical locations comprising of *Aldai*, *Kapwareng*, *Chesumei*, *Mosop*, *Chemase Kamasia*, and *Emkwen*. The present Nandi County has been sub-divided into the following political constituencies: *Aldai*, *Mosop*, *Tinderet*, and the newly created *Emkwen* constituency, hived from the old locations.

1.1.4.3 The Population

The Nandi are part of Kenya’s forty-two (42) ethnic groups. According to the 2009 Population Census, the Nandi people numbered 752,965 in total consisting of 376,488 Male and 376,477 Female

persons.<sup>37</sup> Currently, they live mostly in the Nandi North, South, Central, East, and Tinderet Districts. They have also settled in the Uasin Gishu,<sup>38</sup> Trans Nzoia and Laikipia Districts, and there are some in other towns of Kenya. Hence the Nandi people contribute significantly to national development.

#### 1.1.4.4 Nandi People

The *Nandi* are a people of medium height and slightly built-in physique. In movement, they are agile and in character and temperament, they are independent, frank, truthful and ready to acknowledge mistakes, yet proud and independent. They are inclined to conservatism and are generally resistant to change.

The Nandi are related to other sub-clusters of the *Kalenjin* community, namely: *Keiyo, Kipsigis, Marakwet, Pokot, Sabaot, Terik, and Tugen*. Before the British colonization, the Nandi were sedentary cattle-herders, sometimes also practicing agriculture. Their settlements were more or less evenly distributed rather than being grouped into villages. The statistical majority of Nandi are nominally Christian, but many still follow traditional beliefs and practices while others are Muslims. Nandi is a cultural melting pot too; owing to the ethnic diversity of the inhabitants and the over 753,000 residents enjoy what is no doubt an eye-catching mix of culture, economic and socio-political menu. Nandi is home to such other groups as the *Ogiek, Luhya, Luo, Kikuyu, Kipsigis* and *Terik* – all living in harmony. To the Nandi, there is no distinction between religion, culture, politics, economy and social life; all these aspects are seen as part of religious activities; every bit of which is seen as a form of worship. It is, therefore, difficult to distinguish these aspects from other traditions, especially Christianity and Islam.

Historically, the Nandi are known for having resisted the British colonial invasion and occupation in 1895 to 1906, although the *Kalenjin* community was widely referred as “the Nandi-Speaking Peoples” during this colonial period. In addition, most of the famous pioneer athletes<sup>39</sup> are drawn from among the Nandi people.

### 1.2 Statement of the Problem

The historical processes involved in the history and spread of Islam into the interior of Kenya in the Nineteenth Century, through the colonial period and to date, as well as its impact, have not been the subject of special scholarly research in the case of the Nandi. The study aimed at assessing the influence that Islam has had on the Nandi belief systems and analyzing factors that accommodated or reject this religion among the people. The study further evaluated the Nandi cultural influences that the Nandi people imparted to Islam, and the challenges that each community has had in religious development.

### 1.3 Research Objectives

The general objective of the study was to trace the history of Islam in Nandi from its first arrival in the Nineteenth Century to the present. The specific objectives were as follows:

- a) To trace the origins of the first Muslims in Nandi and their role as agents of Islam;
- b) To find out the methods employed to win the first converts;
- c) To analyze the factors that contributed to the acceptance or rejection of the Islamic faith by the Nandi people;

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<sup>37</sup>Republic of Kenya, *Report of the Kenya's Districts Census Report* (Nairobi, 1999), p. 67.

<sup>38</sup>See, eg. Abraham K. arap Lagat, “The Historical Process of Nandi Movement into Uasin Gishu District of the Kenya Highlands: 1906-1963”. University of Nairobi, Department of History: M.A. Thesis, 1995.

<sup>39</sup>Cf. “Kenya’s World-Beating Athletes.” In: *Kenya: Land of Opportunity* (Nairobi, 1991), pp. 281-287.

d) To establish the problems that has affected the Nandi Muslims from the beginning of the Nineteenth Century.

#### **1.4 Research Premises**

In the process of research, the study was guided by the following research premises:

- a) That colonialism and its administration facilitated the spread of Islam into Nandi;
- b) That the similarity between Nandi and Islamic cultures made Islam acceptable to the Nandi people;
- c) That the Islamic practices of brotherhood and solidarity fostered conversion and rapid acceptance by the Nandi;
- d) That in the face of the current phenomena of globalization and Islamic revival, some Nandi Muslims face challenges affecting their freedom of expression of their faith.

#### **1.5 Scope and Limitations of the Study**

##### *1.5.1 Scope of the Study*

Geographically, this study focused on Nandi County. Though Focusing primarily on the history of Islam among the Nandi, the study has incorporated an analysis of the interaction of Islam with the indigenous African religion and Christianity. These religions had developed independently, but as a result of social interaction and political influence, they have both become entrenched and have remained in harmony in the history of the Nandi people. The period of study encompassed the Nineteenth Century to the present. This chronological limit was determined based on a preliminary reading into the literature of the subject.

##### *1.5.2 Limitations to the Study*

The limitations in this study included the scarcity of literature directly linked to the indigenous belief system of the Nandi people. The study ideally should have covered the entire Nandi populace, including those in Trans-Nzoia, Laikipia and Uasin-Gishu; however, due to the massive area of the areas occupied by them, it only concentrated in Nandi County. Some roads that led to the Muslim centres were almost impassable, particularly during the rainy seasons thus creating delays in transportation. The researcher endeavoured to arrange for local means of transport and consequently had to use relatively expensive taxis.

#### **1.6 Justification of the Study**

This research is timely because to date little research has been done by local historians on Islam. Though several case studies have been carried out at Mumius, Kisumu and Nairobi, no comprehensive work on the spread of Islam in Kenya exists. The case studies reveal the complexity of explaining the growth of Islam in Kenya, and the diversity of the cultural impact and heritage of Islam among the peoples of Kenya. These studies also show that research on the spread of Islam into Kenya's interior can be productive and rewarding.

It is clear that in order to complete our knowledge about the history of Islam in Kenya, further micro-studies are required. This study began as one such micro-study, with the express aim of looking at the history of Islam in Nandi, an aspect of social and cultural history of Kenya not researched or written about before.

It is hoped that this study will enrich knowledge and thereby contribute the historical background of the Nandi religious belief system, and that it will present new knowledge in the field of Nandi studies within the context of the historiography of Kenya. The study further adds to academic knowledge in the disciplines of Religion, Theology and History. In particular, the issues addressed have a significant bearing on the historical study of African religion, comparative religion, evangelism and the history of Islamic missions in Nandi. In addition, the results obtained from the study would enhance and promote

ecumenism that is, a process that encourages dialogue and mutual understanding among the two major world religions (Islam and Christianity). It also calls for respect and co-existence with other religions of the world. Finally, Government policy-makers and other stakeholders could utilize the findings adduced from this study to address the development agenda for Nandi society particularly in areas of education, transport and health, among others, which are essential to the success of any religion in the society.

## **1.7 Theoretical and Conceptual Framework**

### *1.7.1 Theoretical Framework*

In this sub-section, the author explores the nature of theory and provides an overview of resources for the study of history and conversion to Islam. Theory is valuable insofar as it illuminates different aspects of a phenomenon. Among the theories that have been advanced and which have been employed in this study in analyzing the indigenous belief system of the Nandi and Muslim were:

The functionalist theory of religion, which was formulated by Emile Durkheim and popularized by Radcliffe Brown and Bronislaw Malinowski. According to this theory, the unity of society determines the function of religion in that society. There are standardized cultural forms, which function positively to sustain this unity – including cultural institutions, economics, kinship, law, political structure and religion. These standardized cultural elements fulfil a vital function, and without them society suffers.<sup>40</sup>

Diffusionism is another theory that has been utilized in cultural anthropology to explain the spread of “cultural items” such as religions, ideas, styles and technologies between individuals within a single culture or from one culture to another. The theory refers to the borrowing of cultural elements by one society from another. This is in contrast to the independent invention of the cultural elements within the host society. According to this theory, most of the content of modern cultures would appear to have been gained through diffusion.

Another theoretical orientation considered in this thesis is globalization, which is defined as the spread of worldwide practices, relations, consciousness, and organization of social life. Globalization as a theory emerged as the result of real world concerns with the dramatic transformations of globalization as well as a reaction against the earlier perspective of modernization theory. Globalization can be analyzed culturally, economically, and politically. Across each of these foci, theorists are divided over whether globalization results in homogenization or heterogenization. Some cultural theorists see globalization as producing homogeneity as a consequence of cultural imperialism. Others see it as producing distinctive local forms. Among economic theorists, some assert that globalization produces homogeneity as a result of the spread of the market economy with the aid of international organizations such as the IMF. Others focus on the heterogeneity of local markets and the existence of flexible specialization (glocalization). Some political/ institutional perspectives focus on the growth of a single model of governance around the world. Others assert that globalization has resulted in intense nationalist retrenchment.

Post-colonialism (postcolonial theory, post-colonial theory) is also taken into consideration in the attempt to explain the spread of Islam among the Nandi. Post-colonialism is a post-modern intellectual discourse that consists of reactions to, and analysis of, the cultural legacy of colonialism. Post-colonialism comprises a set of theories found within the areas of philosophy, film, political science, human geography, sociology, feminism, religious and theological studies, and literature. The ultimate goal of post-colonialism is combating the residual effects of colonialism on cultures. It is not simply concerned with salvaging past worlds, but learning how the world can move beyond this period

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<sup>40</sup>Geoffrey Parrinder, *The World's Living Religions* (London, 1977), p.18.

together, towards a place of mutual respect. Post-colonialist thinkers recognize that many of the assumptions which underlie the "logic" of colonialism are still active forces today. Exposing and deconstructing the racist, imperialist nature of these assumptions will remove their power of persuasion and coercion. Recognizing that they are not simply airy substances but have widespread material consequences for the nature and scale of global inequality makes this project all the more urgent.

A key goal of post-colonial theorists is clearing space for multiple voices. This is especially true of those voices that have been previously silenced by dominant ideologies - subalterns. It is widely recognized within the discourse that this space must first be cleared within academia. Edward Said, in his book *Orientalism*, provides a clear picture of the ways social scientists, specifically Orientalists, can disregard the views of those they actually study – preferring instead to rely on the intellectual superiority of themselves and their peers.

Cross-cultural and Islamization theories were also examined to illuminate this study, especially given that almost all religious historians of Islam in Africa acknowledge the importance of trade, and the role of Muslim traders in spreading Islam. However, this may not fully account for why some peoples accept Islam more readily than others do.

All communities embracing new religion are affected or influenced by the new religion in a number of ways, and in this regard the Nandi are no exception. The socio-cultural influence of Islam among the Nandi is well examined through Bungers islamization theory and the “*change and continuity*” concept advanced by Bascom and Herskovits (1959:2-6) the latter’s concept states that whenever new influences impinge on any society, some of the pre-existing customs and beliefs are discarded, modified or retained. Hence, change and continuity are paramount to culture because culture is dynamic. Thus, the interaction between the Nandi indigenous religion and Islam resulted in some aspects of the indigenous religion being discarded, modified or retained.

For the purpose of this study, the study adopt the five participation theoretical frameworks discussed above because these theories in one way or another tend to complement each other, providing concrete conceptual frameworks on the understanding of the interaction between community religions and the growth of a religion. This is an appropriate approach to the conceptualization and understanding of the aspects and determinants of the spread of Islam as seen in our discussion. The above review shows that, where one theory is lacking, the other theory supplies the lack. In the following conceptual framework, only the relevant variables and determinants of Islamization are discussed, briefly analysed and the direction of relationship outline.

### *1.7.2 Conceptual Framework*

In the absence of clear theoretical guidelines, decision was also made to approach this study from a conceptual phenomenological point of view. It should be noted, “A concept does not need to be discussed to be understood”. When several interrelated concepts are used in a new way, however, the conceptual framework “must explain the relationship among these concepts”.<sup>41</sup>

In conceptualizing this study of religion,<sup>42</sup> four different approaches were utilized. The first, the functional approach, has already been evaluated and found wanting. The second, the personality approach, focused on the individual and his or her personal experience of religion. This approach proved inadequate for interpreting the history of religion at the level of the Nandi community. On the other hand, the normative approach addressed abstract questions about truth and ultimate reality.

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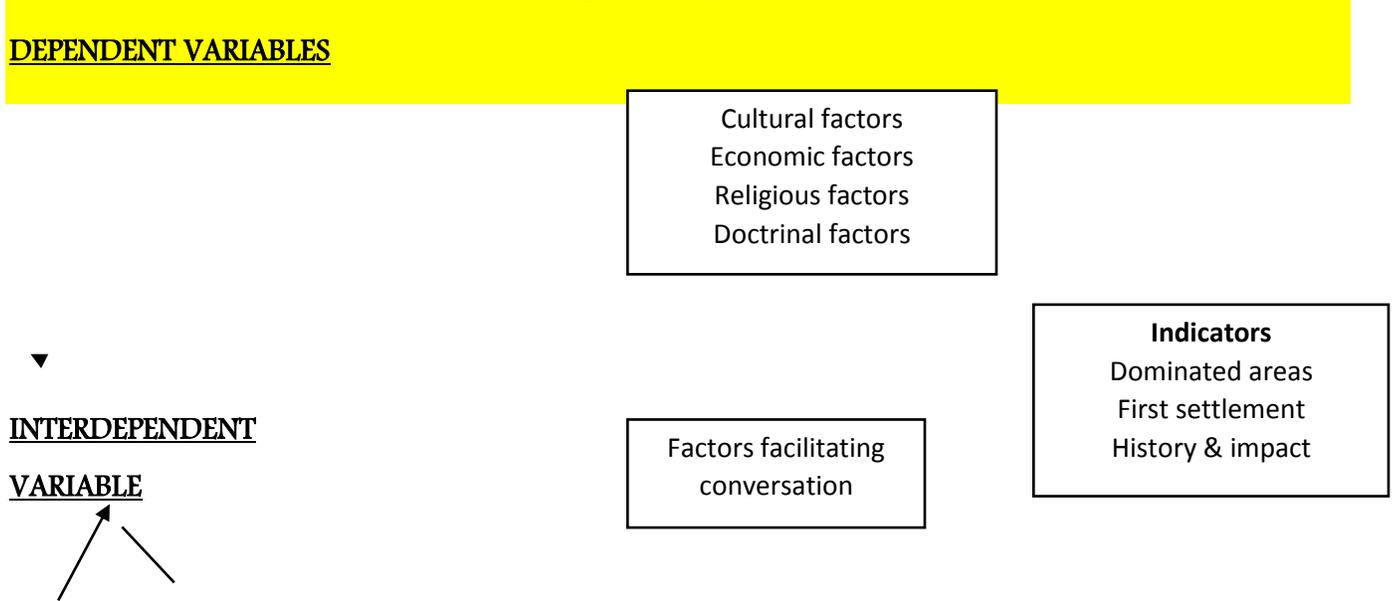
<sup>41</sup>Christopher L. Heffner, *Research Methods for Education, Psychology, and the Social Sciences* (London, 2004).

<sup>42</sup>See: *Major World Religions*. Centre for Extension Studies, Union Biblical Seminary (Pune, 1982).

Although it apparently suits the theologian’s concerns, it was not relevant to this study. The approach of the historical perspective of religion<sup>43</sup> has served as the preferred conceptual framework for the present study. This was applicable in respect to the coming and development of Islam in Nandi society. Almost all historians of Islam in Africa acknowledge the importance of trade, and the role of Muslim traders in spreading Islam, but there is less agreement on why some people accept Islam more readily than they accept others. Similarly, the historical study of African religion approach was used in reconstructing the indigenous Nandi religious system and the syncretism or symbiosis that marked its interaction with both Islam and Christianity. This approach was formulated in a series of academic conferences held successively in Dar es Salaam, Lusaka and Limuru in 1979. The significant studies published out of the proceedings of these conferences were utilized as the conceptual framework for the purposes of this study.<sup>44</sup> The approach was particularly relevant for the Twentieth Century, which is “a rich, perhaps the richest, field for historical inquiry into African religion, with all sorts of topics at hand for inquiry”.<sup>45</sup>

The following conceptual framework will guide this study. The dependent variables were the factors for and not for the conversion of Islam while the independent variable was the Islamic religion.

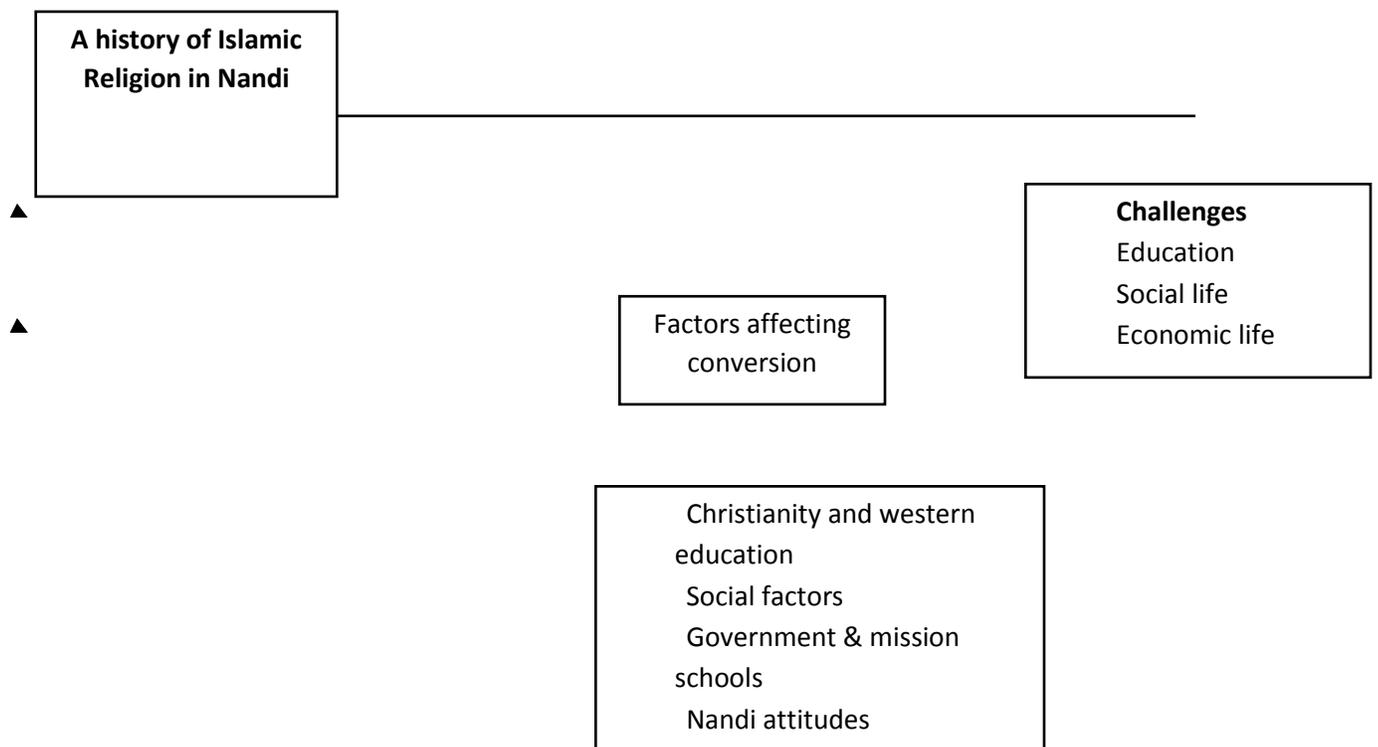
**Illust 2: A combination of factors Influencing Islamic growth and Development in the Nandi County**



<sup>43</sup> Ibid.

<sup>44</sup>T.O. Ranger and I.N. Kimambo, eds, *The Historical Study of African Religion* (Berkeley and Los Angeles, 1972).

<sup>45</sup> Ibid, p.21.



As highlighted and discussed in this chapter, the following chapter two discusses the applicable and relevant literature review of Islamization.

## CHAPTER TWO: LITERATURE REVIEW

### 2.0 Introduction

The literature review focuses on some books dealing with Islamic studies as well as other general studies about Islam in Kenya. However, studies dealing with the spread of Islam into the interior of Kenya were few and therefore inadequate for a full understanding of the subject, whereas the books dealing with Islamic studies were too general and lacked religious and cultural conquest. The review of available literature has been divided into six areas namely: Works specifically on the Nandi culture and Religion, Works specifically on the Islamic culture and Religion, Islam in Africa and East Africa, Nandi ethnic Group and their culture, the coming of Christian missionaries and their influence to Nandi Indigenous religion and Islam, Major World Religions in relation to African Traditional Religion, and the spread of Islam in Africa and to the interior of Kenya.

### 2.1 The Nandi culture and Religion

Specific ethnographic studies on the Nandi date back to A.C. Hollis's *The Nandi: their Language and Folklore*, which was researched and written between 1905 and 1908 and published in 1909. Hollis gave an exposition of the religious beliefs of the Nandi, and likened the *Orgoiyot* to the Maasai counterpart – the *Laibon*.<sup>46</sup> Hollis had lived among the Nandi people from 1890. He closely associated

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<sup>46</sup> A.C. Hollis, *The Nandi: Their Language and Folklore* (London, 1969), pp. 40-42.

with the Nandi and in many aspects became a member of the tribe. The book is written with insight and understanding that could only proceed from a long association, sympathy and impeccable knowledge of the language. It gives a first-hand account of the Nandi way of life as described by an eye witness to the ceremonies, many of which he took part in.

The book is only a portion of a larger manuscript on ethnographic description meant to assist colonial administrators to understand the Nandi tradition and institutions. It has sixteen chapters covering practically all aspects of the Nandi culture. Of these, only one chapter is dedicated to Nandi religious beliefs. But even then, some cultural aspects considered non-religious are included in the short chapter. It is evident from this work that Hollis was not able to distinguish between religious and cultural norms and/or customs of the Nandi. Moreover, religious beliefs are not organized in an orderly and logical manner. In several instances, major religious topics are handled in a shallow approach, in a way to suggest that Hollis was not specifically interested in the Nandi religious tradition per-se.

The book however provides immense insight into Nandi life, customs and ways of thought before the communal organization was disrupted by the change brought about by British Administration. Indeed, it is a source of comparison and confirmation of religious customs that have emerged and those that have persisted to date. This study has attempted to organize in a systematic and logical manner and in-depth the Nandi religious phenomenon.

*The Kalenjin Heritage* (1995)<sup>47</sup> by Burnette C. Fish and Gerald W. Fish is the latest book on Nandi culture. In the tradition of the Nandi culture like the predecessors, Fish and Fish have only devoted one chapter to the Nandi Religion even though the Nandi religion is disguised in the other chapters that cover ceremonies and customs.

Although their three hundred- and seventy-six-page work presents unmatched information on the Nandi, they do no value the work for its own sake. According to Fish and Fish, the value of their work lies in its ability to assist people to understand Christianity. They write:

It is to be understood that this study has not been made to encourage anyone to return to traditional religious practices. Rather, this may help everyone to understand that not everything in the traditional religion and culture was evil. We have come across some cultural practices, as we have with religious practices, which we and others can make use of as redemptive analogies or parallels in Christian ministry. In fact, we as Christians can learn from values of the past.

Because of this, Fish and Fish are biased towards the explication of some customs and ceremonies. They, for example, picked out only those elements in Nandi Religion which have an analogy in Christianity. In this study, the Nandi religious phenomenon is presented as it were and as objectively as possible.

Another study that has shed light on Nandi religion is Huntingford's *The Nandi of Kenya*, which was published in 1953.<sup>48</sup>In an earlier work of 1939 analogous to Huntingford's, J.G. Peristiany wrote about "Religion and Magic" among the Kipsigis who are considered cousins of the Nandi. He discussed the relationship of the Nandi with the Divinity, the Spirits, and "the evil powers of the magician". He further sought to draw a distinction between religion and magic; and he listed the *Laibon* and "the Orgoiyot

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<sup>47</sup> Burnette C. Fish and Gerald W. Fish, *The Kalenjin Heritage* (Kericho, Kenya- African Gospel Church, 1995), XIX.

<sup>48</sup>G.W.B Huntingford, *The Nandi of Kenya* (London, 1953.), p. 37.

witch-doctors” squarely under “Magic”.<sup>49</sup> The study found that there was more than magic in religious beliefs of the Nandi.

Matson has also written seminal works focused on the period of the Nandi resistance to British colonial invasion and occupation in the year’s C1895-1906.<sup>50</sup> In his studies, Matson has concentrated on the military aspect of the British conquest of the Nandi. From Matson’s study, it is difficult to obtain a life-like portrait of the *Orgoiyot*, Koitalel arap Samoei, who led the Nandi resistance or of any of his relatives. Matson similarly pays little attention to the particularities of the Nandi belief system and the relationship of the *Orgoiyot* to it.<sup>51</sup> Even in his survey of Nandi history for the colonial period, in which he writes copiously about Christian activities, Matson hardly mentions Islam, which was developing parallel to Christianity. More recently, however, D.M. Anderson has published a study in which the intervention of the *Talai* clan and the *Orgoiyot* in Nandi religious and other affairs has been characterized as a form of prophecy<sup>52</sup> thus going beyond what Matson had termed as ‘magic’ among the Nandi.

There are several other studies on the history of the Nandi. Two of them have been mentioned but not reviewed here since they deal with Nandi life outside the study area as defined. One is Luise White’s monograph on town life in colonial Nairobi in which Nandi women are depicted as engaging in such lumpen-proletarian misdeeds, prostitution, despite professing Islam.<sup>53</sup> The other study is Abraham Kibet Arap Lagat’s Master of Arts (History) Thesis submitted to the University of Nairobi in 1995. A perusal of the text reveals the author’s pre-eminent concern with land and related issues in the colonial situation to the exclusion of religious history.<sup>54</sup> Finally, in his contribution to the collection of essays titled *Revealing Prophets: Prophecy in Eastern African History*,<sup>55</sup> David M. Anderson characterizes the *orgoiik* as belonging in the writing of Kenya’s modern history as heroic prophets.

*The Kalenjin Peoples’s Egypt Origin Legend Revisited: Was Isis Asiis? A Study in Comparative Religion*, (2007),<sup>56</sup> by Kipkoech araap Sambu is a recent book dealing with the origin of the Nandi people. According to Sambu, the Nandi people are believed to have left Misiri with the name *Isis*, spelt and pronounced *Asiis* in their case. Others call her *Asiista* (the sun) while the southernmost branch, the *Barabaig* of Tanzania, call Her *Aset*. As has been said, that particular Deity in the Egyptian context represented the Motherly qualities of Deity who, nevertheless, was still an excellent father, creator, and others, under other names. It is therefore legitimate to compare *Asiis* to all ancient Egyptian’s so-called gods and goddesses individually and collectively, because she encompasses all of their attributes just as *Isis* of Egypt encompassed all the attributes of the other so-called gods and goddesses. This added life in this study in that by knowing the origin of the people it is possible to gain insight into their religion.

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<sup>49</sup>J.G. Peristiany, *The Social Institutions of the Kipsigis* (Chapter XI), London: Routledge & Kegan Paul Ltd., 1964.cf. I.Q. Orchardson, *The Kipsigis* (Nairobi, 1961).

<sup>50</sup> A.T. Matson, *Nandi Resistance to British Rule* (Nairobi, 1972). See also P.K. Arap Magut. “The Rise and Fall of the Nandi *Orgoiyot*, c 1890- 1957.” In B.G. McIntosh, ed, *Ngano: Studies in Traditional and Modern East African History* (Nairobi, 1969), pp. 90-112.

<sup>51</sup> “Reflections on the Growth of Political Consciousness in Nandi.” In B.A. Ogot. ed. *Hadith 4: Politics and Nationalism in Colonial Kenya* (Nairobi, 1972).

<sup>52</sup> D.M. Anderson, “Visions of the Vanquished: Prophets and Colonialism in Kenya Western Highlands,” In: David M. Anderson and Douglas H. Johnson eds. *Revealing Prophets* (London, etc., 1995); cf. Douglas H. Johnson, *Nuer Prophets* (Oxford, 1994).

<sup>53</sup> Luise White, *The Comforts of Home: Prostitution in Colonial Nairobi* (Chicago and London, 1990), passim.

<sup>54</sup> Abraham K. Lagat, “The Historical Process of Nandi Movement into Uasin Gishu District of the Kenya Highlands: 1906-1963”. University of Nairobi, Department of History: M.A. Thesis (1995).

<sup>55</sup> D.M. Anderson, *op. cit.*

<sup>56</sup> Kipkoech araap Sambu, *The Kalenjin Peoples’s Egypt Origin Legend Revisited: Was Isis Asiis? A Study in Comparative Religion*, Longhorn Publishers, 2007.p. 2.

According to A.J. Toynbee in his book *A Study of History*<sup>57</sup>, that environment plays a key role in the shaping of a people's way of life. He further contends that civilization owes its genesis to interaction between biological and environmental factors. On the other hand, P.A. Means puts it that if "environment is not the total causation in culture shaping; it is beyond doubts the most conspicuous single factor."<sup>58</sup> These remarks find ready application in the occasion depicted by Kipkoech araap Sambu. It shows clear interaction between human actors and physical environment. Resulting from this was the concept of *Asis*. It is also to be noted that the power of the curse arose together with the power of divinity, and both served the emergent society.

According to G.W.B. Huntingford in his book *The Nandi of Kenya*<sup>59</sup>, etymologically the term *orgoiyot* is made up of two words: *or* "which means road, path way or route and "*Koi*" which is confusing for it can mean long, or it could also be a word used when going to negotiate for a bride. Though a precise meaning is difficult to be ascertained, the latter is most probable. It could, also, be taken literally of *Orgoiyot* is complex and best be understood in the context of beliefs and customs of the Nandi people and other related peoples. He noted that *Orgoiik* played a pivotal role in the society.

According to him *Nandi* had a structure in which the actual fighting units (*siritiet* pl. *siritoiik*) drew men from a number of parishes. The number of men in one *siritiet* varied from 50-100. Each had a leader led by a commander called *Kiptaiyat* (pl. *Kiptaiinik*), two senior *Kiptaiinik* in each *pororiet* (clan council). In Nandi Hierarchy *Kiptaiyat* was below the *Orgoiyot*. It was the *Orgoiyot* who blessed *Kiptaiyat*. The office of *Kiptaiyat* is of less significance than that of *Orgoiyot*. The latter played no religious role nor would other significant use of the term *Orgoiyot*, in Huntingford's view, be a paradigmatic expression of *kiptaiyat* in Nandi context. The concept reveals new ways of looking at the Christian mysteries. The institution of *Orgoiyot* is often referred to as that of ritual experts or diviners. Perhaps this was a misunderstanding on the part of foreigners. Ng'eny argues in his book *Ngano*<sup>60</sup> that "The role of *Orgoiyot* in Nandi Society was one of diviner, foreteller of the future, interpreter of dreams and omens. He also averted ill-luck". Between the *Orgoiyot* and others whose function and role was purely destructive, respectable tradition maintains that only persons of the *Talai* lineage<sup>61</sup> could automatically belong to the *Orgoiyot* family. The one to rule must be a son an *Orgoiyot*, either his son or brother could succeed.

M.S. Leagley, in the book *The Nandi of Kenya: Life crisis rituals in a period of change*<sup>62</sup>, has posited that the sacred nature of the office of *Orgoiyot* among the Nandi, is an ancient institution. This institution is centred upon the person of the *Orgoiyot* regarded in a mystical way; it is a phenomenon accepted on the grounds of the nature of the office. No one knows the origin of this institution. According to legends, the Nandi originally had no *Orgoiik*. This changed one day when warriors found a small boy in the plains while they were tending their cattle. They took the child home and adopted him into the Nandi Community. As the child grew, he began to prophesy and perform miracles. Eventually he became the first leader of the Nandi people. Whatever the truth of the story, the institution of *Orgoiyot* played a leading mystical role in the lives of the Nandi people.

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<sup>57</sup> See A.J. Toynbee, *A Study of History* abridged by D.C. Somervell, p. 60.

<sup>58</sup> P.A. Means, *Ancient Civilization of the Anders*, pp. 25-26. Quoted and commented upon by Henry A. Mwanzi, *A History of the Kipsigis*, p. 234.

<sup>59</sup> G.W.B. Huntingford, *The Nandi Kenya: Tribal Control in a Pastoral Society*, p. 35.

<sup>60</sup> S, K Arap N'eny, in *Ngano*, p.109.

<sup>61</sup> The Nandi have many clans with different totems. The Talai clan's totem is the lion.

<sup>62</sup> See M.S. Leagley, *The Nandi of Kenya: Life crisis rituals in a period of change*, p.7.

Mwanzi, in his book, *The Kipsigis* from the topic “In Imperialism and Collaboration in Colonial Kenya”<sup>63</sup> added more information on how the *Orgoiyot* can be identified by saying that when a baby boy is born in the *Orgoiyot* family, the child disappears when he is coming back, he comes with either grass or blood. When the child comes back with blood in his hand, then he has been anointed to become *Orgoiyot*.

Mwanzi further notes that there is a religious tradition regarding the origin of the *Orgoiyot*. Though the myth has variations, certain issues are important as far as religious and cultural aspects are concerned, withdrawing from nature is important as a preparation for a new task. There are parallels in the Bible such as the story of Moses. The story shows that he arose in a time of crisis. Through magical powers he asserted and maintained authority in a supernatural way. He was never approached with weapons. The mystic veneration and once given to him filled a need. During war he was an invincible warrior. In cultic activities of the people, the *Orgoiyot* is usually the head of the ritual leaders. He is a priest-ruler. The sacred character of a Nandi *Orgoiyot* was, besides, attested to in a number of oral traditions. His name is not mentioned. In religious matters, the *Orgoiyot* was the people’s priest. He linked the living dead with the ancestors.

Mwanzi added many details about the *Kipsigis* and *Kavirondo* communities including the Nandi and plotted the northern caravan track which Thompson followed in 1883. He did not mention the *Nandi* district or people in the text of his book but introduced the name of his map to denote a mountain range running from North to South in approximating the correct position of Nandi, hampered only by the fact that he followed Wakefield in placing it much too far south.

The above accounts show that the caravan trade in Eastern Uganda was centred on two principal routes; the Northern through *Njemps* and *Kamasai Elgeiyo*, Uasin Gishu and North *Nandi* to *Mumias* and the southern from *Naivasha* over Mau and through *Sotik*, *Lumbwa*, *Sendeges* and *Kitotos* to the turning station at *Mumias*. It was a common practice for caravans to do a round trip by going up on the Southern *Mumias* apparently, the only place in Eastern Uganda where caravan leaders played a significant part in local affairs. They used *Mumias* village as the headquarters for raids into surrounding Districts such as Nandi and helped the Wanga against their traditional enemies. All this information through Mwanzi was of great help in the thesis in developing the background of the Nandi people as well as the history of their culture.

## 2.2 The Islamic culture and Religion

The text *what Islam stands for*, written by Abul Ala Maudoods (1976)<sup>64</sup>, has a lot of details on who Muhammad was, and he distinguishes Him (Muhammad) from other prophets found in other religions of the world. In this same book, the beliefs of Islam, especially the belief in one God ALLA, was elaborated to show the difference from other religions’ gods.

Islam is much more than a formal religion: it is an integral way of life. This is according to John L. Esposito who said, in *The Straight Path*, (1988)<sup>65</sup> that, Islam is in many ways a more determining factor in the experience of its followers than any other world religion. The Muslim (“One who submits”) lives face to face with God at all times and will introduce no separation between his life and his religion, his politics and his faith. Thus, with its strong emphasis on the brotherhood of men cooperating to fulfil the will of God, Islam has become one of the most influential religions in the world today.

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<sup>63</sup> Mwanzi, *In Imperialism and Collaboration in Colonial Kenya*, p.20.

<sup>64</sup> Abul Ala Maudoods, *what Islam stands for*, Islamic Foundation, *mfangano* from General printers, (California, 1976), 47.

<sup>65</sup> John L. Esposito, *ISLAM, The Straight Path*, Oxford University Press, New York, 1988, pp. 3-4

Due to a wide demand for a correspondence course in Islam, a modest effort was made whereby this book entitle *Introduction to Islam* came about through Dr. Hamidulla, I<sup>66</sup>. The book gives a general idea of Islam, its history and culture and its handling of the diverse aspects and problems of life. This book has been useful to the study especially in the topic of “Daily life of a Muslim”. It explains the daily life of a Muslim from birth to old age. This text was found to be useful since it explores how the spread of Islam is packaged and transmitted simply by the daily life of a person committed to the regulations of modesty and morality. This became an attractive side of Muslim associated culture to the Nandi.

Polygamy in the global community is common, normal and accepted. According to the *Ethnographic Atlas Codebook*<sup>67</sup> derived from George P. Murdock’s *Ethnographic Atlas* recorded the marital composition of 1231 societies, from 1960-1980. Of these societies, 186 societies were monogamous while 1041 were polygynous. According to Joseph Ginat, the author of ‘Polygamous Families in Contemporary Society,’ a third of the world’s population belongs to a community that allows it.<sup>68</sup>The Nandi also practice it.

The *Catholic Encyclopaedia*<sup>69</sup> notes that Islam did not introduce polygamy but among all Eastern nations of antiquity, polygamy was a recognized institution. Among the Hindus, polygamy prevailed from the earliest times. There was, as among the ancient Babylonians, Assyrians, and Persians, no restriction as to the number of wives a man might have. The Encyclopaedia further notes that, although Greece and Rome were not polygamous societies, concubinage was a norm.

Thus, the Washington Times of 13 Dec. 2000<sup>70</sup>. By Cheryl Wetzstein on the topic “Traditionalists Fear Same-Sex Unions Legitimize Polygamy”, Islam regulated polygamy by limiting the number of wives and bringing responsibility to its practice. In fact, according to him, polygamy is more common than monogamy. According to Cheryl, the primary purpose of marriage in Islam is regulating sexuality within marriage as well as creating an atmosphere for the continuity and extension of the family. This is in sharp contrast to growing trends on marriage in the West. He says, in recent decades, there are more alternatives to marriage than ever before. Cohabitation - living together outside of marriage - has greatly increased among young, never-married adults, as well as the divorced. More American women are having children outside of marriage, ignoring the traditionally sanctioned sequence of marriage followed by childbearing.

He further noted that, marriage and polygamy in Islam is a matter of mutual consent. No one can force a woman to marry a married man. Islam simply permits polygamy; it neither forces nor requires it. Besides, a woman may stipulate that her husband must not marry any other woman as a second wife in her prenuptial contract. The point that is often misunderstood in the West is that women in other cultures - especially African and Islamic – do not necessarily look at polygamy as a sign of women’s degradation. Consequently, to equate polygamy with degrading women is an ethnocentric judgment of other societies.

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<sup>66</sup> I. Hamidulla, *Introduction to Islam*, Islamic Foundation, (London, 1978), 218.

<sup>67</sup> See on the website, (<http://eclectic.ss.uci.edu/~drwhite/worldcul/Codebook4EthnoAtlas.pdf>).

<sup>68</sup> Peggy Fletcher Stack, “Globally, Polygamy Is Commonplace,” *The Salt Lake Tribune* 20 Sep. 1998.

<sup>69</sup> The Catholic Encyclopedia: (<http://www.newadvent.org/cathen/09693a.htm>)

<sup>70</sup> Cheryl Wetzstein, “Traditionalists Fear Same-Sex Unions Legitimize Polygamy,” *The Washington Times* 13 Dec. 2000.sss

An article by Jumah al-Kholy titled “Multiple Marriages in Islam & Its Wisdom”<sup>71</sup>, published in the *Journal of the Islamic University of Medina*, vol. 46, 222-231, posits that even though Islam does expressly permit polygamy, its actual practice is quite rare in many Muslim societies. Indeed, some researchers estimate no more than 2% of the married males practice polygamy. Since polygamy is tied with a lot more responsibility, most Muslim men feel they cannot afford the expense of maintaining more than one family. In addition, even those who are financially capable of looking after additional families are often reluctant owing to the psychological burden of handling more than one wife.

### **2.3 Major World Religions and the African Traditional Religion**

*African Traditional religion: A Definition* (1973)<sup>72</sup> by E. Bolaji Idowu is a popular book on the study of African Religion. Idowu is a thorough scholar backed with many years of experience in teaching and research into African Religion. In this book, Idowu discusses the study of Religion, the study of African Traditional Religion and concludes with some observations on the prospects of African Traditional Religion. Idowu focuses on several issues on African Religion in this work.

To begin with, Idowu is concerned that the world outside Africa has not recognized that African Traditional Religion is a religion. Secondly, he laments the fact that African Traditional Religion has been misunderstood and misinterpreted resulting in wrong descriptive terminologies. Finally, he observes that African Christians are finding the prefabricated theology imported into Africa inadequate.

This book is hence an attempt to answer some of the problems that face the study of Nandi Religion. Idowu argues that a serious study of African Traditional Religion is necessary for African Scholars to discover the values ingrained in their heritage. It is only then that a theology that bears the original thinking and meditation of an African will emerge.

The book is therefore relevant to this study, due to its background information which establishes the fact that African Religion is a religion indeed. It points out the erroneous terminologies labeled on African Religion and suggests the significant of African religion to theology.

*A guide to Religions* (1975)<sup>73</sup> by David Brown is a textbook intended for use in Christian schools of theology on studies of world religions. The book is one of a series of sponsored and subsidized works by the Theology Education Fund of the world council of churches. This was in response to a request to a request for text books to be used in Africa, Asia, the Caribbean and the Pacific. In this work, the Dinka, the Ga and the Maori Religions and Shamanism in Korea are classified together under “Traditional Religion. The author has defined traditional religions as “religions in which the priest and elders teach their beliefs and practices orally by word of mouth. They are associated with communities which follow traditional rather than modern ways of life.

E.B. Idowu (1973),<sup>74</sup> suggests that to argue that African Religion is “primitive”, polytheistic and its concept of god remote as wachi states elsewhere is an attitude of the 19<sup>th</sup> century, western scholarship which is subjective and prejudicial<sup>13</sup>. The implications here are that primitive religions are polytheistic in character and hence not part of the major world religions like Islam which are monoistic. This, in

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<sup>71</sup>Dr. Jumah al-Kholy, ‘*Ta’addud al-Zawjaat wa Hikmatuhu fil Islam,*’ (Multiple Marriages In Islam & It’s Wisdom), *Journal of the Islamic University of Medina*, vol. 46, 222-231.

<sup>72</sup>Fr. Bolaji Idowu, *African Traditional Religion: A Definition*. (London. SCM press, 1973), 79

<sup>73</sup> David Brown, *A guide to Religions* (1975)

<sup>74</sup> Fr. Bolaji Idowu, *African Traditional Religion: A Definition*. (London. SCM press, 1973), 79.

other words does not support Nandi indigenous religion as part of the religions. That according to me does not support this study.

*God's and men* (1972),<sup>75</sup> by B.W. Sherrath and D.J. Hawkin is a small book but very valuable book on religion. The work present's a complex diversification of ideas and practices impartially and in a straight forward manner. Its uniqueness is the contribution and the end of every chapter, of the profession of faith by a representative devotee of each religion. This has added an element of life to the work.

Finally, *A History of the world's Religions* (1990),<sup>76</sup> by David S. Noss and John B. Noss is a recent book which has dealt in great details on the eleven conventional religions of the world. Apart from these are the authors' of pre-historic and political cultures". It is here that the religion of the Bavenda people of South Africa is discussed in hardy three out of the 654 pages.

The Bavenda religion is portrayed as animistic, fetish, shamanism, witchcraft, the cult of the dead and spiritism. What they describe as the supreme spirit, Raluvhimba is discussing in one short paragraph as was done in man's religions by John Noss discussed above. In this study, attempt is made to explain that the term "pre-historic" and Traditional cultures" in reference to African Religion are unfair and derogatory. Similarly, the use of words such as animist, fetish, shaman, witchcraft and spirits in references to the entire religion is a bias approach to the study of a religion. One needs to understand the original meanings of some of these words to know how obnoxious they are in reference to African religion.

Finally, it needs to be mentioned here that there are a number of standard works on the general survey of traditional religion throughout Africa: I may mention some scholars who have undertake this task. They are B.B Idowu, J.S. Mbiti, J.B. Danguach, Christian Gaba, P.A. Dopanu, J.N Mugambi, Okot P' Bitek, O. Imasogie, E.G Parrinder, Newell Booth JR., Benjamin Ray and R.J. Gehman.

The majority of the works of the above scholars have a descriptive approach. Many of them are also analytical and interpretative lying bares the erroneous, biased and prejudicial approach and wrong assessment and classification of early writers. Since the approach and intention of these scholars are almost the same, I shall review only the works that have studied African Religion is broad terms. In my opinion, they are representative of this category. I shall also review specific works in the study of the Nandi people, which is core to this study.

Okot P' Bitek in, *African Religions in Western Scholarship* (1970),<sup>77</sup> has zealously argued for the recognition of African Religion. He complains that "Western scholarships have never been genuinely interested in African religion per-se" and that they have divided the population of the world into "one their own civilized, and the rest primitive". He has condemned the use of terms such as barbarian, savage, primitive and tribe, in reference to African societies. For this reason, P'Bitek was engrossed in a bitter quarrel with social anthropologists. He was also critical of African philosophers and theologians whom he attacks for Hellenizing and Christianity African Religion.

P' Bitek is convinced that African Religion can stand on its own and that one should not be embarrassed about it. He therefore, felt that African scholars should "endeavour to present the institutions of African peoples as they are.

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<sup>75</sup> B. W Sherrath and D.J. Hawkin, *Gods and men* (Glasgow, William's Collins & Co. 1969), 39.

<sup>76</sup> Noss, David S. and John B. Noss : *A history of the world's Religious*, New York: Macmillan Publishing Co. Inc. 1990.

<sup>77</sup> Okot P'Bitek, *African Religions in Western Scholarship* (Nairobi: Kenya Literature Bureau, 1989), 119.

J.S. Mbiti has written several books. In these works, Mbiti has made an effort to promote the positive investigation of African Religion. His work *African Religion and Philosophy* (1969),<sup>78</sup> is now considered classic by Scholars of religions in the studies of African Religion, African philosophy and Theology. This work has added a new dimension to the understanding of the history, thinking and life of Africa. The work is a systematic study of the attitudes of mind and beliefs which have evolved in the many societies in Africa.

Like other similar writers who give a survey of African Religion, Mbiti has attempted to demonstrate to the world that Africans possess religions consciousness and that African Religion is a living faith of the majority of the Africans. Mbiti's conviction in all his works is that even with the influence of modern life, African Religion will survive,

The belief in God will linger on in towns and villages even if acts of worship will increasingly become difficult, irregular and cultists, instead of being public, corporate and spontaneous.

Mbiti has, however, received much criticism from scholars of Religion for his generalization. He is criticized for treating African peoples as one of their thinking and reasoning, forgetting that there are over 800 ethnic groups, each of which has its own religious systems. This study differs in that it concentrates on the religion of one community, the Nandi.

#### **2.4 Previous Workers on Islam in Africa**

Trimmingham<sup>79</sup> has written several works dealing with Islam in Africa and particularly East Africa. The most important of these in relation to this study were *The Influence of Islam upon Africa* and *Islam in East Africa*. In the former, he portrays Islam as a religious culture, as he begins with an account of Islam's historical penetration into Africa. Although the book, does not mention the specific area of this study, it is important in the way it deals with the phenomenon of change. Trimmingham demonstrates that the distinctions between these cultural zones are due more to differences in African culture than to Islam. He observes that Islam flourished where there was some basis of urban culture, together with trading relations, which ultimately stemmed from the city.

The recent book by Quraishy<sup>80</sup>, *Text Book of Islam*, Book 1, which has been written specifically to meet the demands of the Islamic Religious Education (I. R. E.) syllabus in secondary schools, has been useful in this research. The author, apart from providing a good historical background of the Islamic faith, has gone further to mention the first Muslims responsible for the spreading of Islam in the interior of Kenya. This guided the study in first knowing some of the early Muslim settlers and the impact in Nandi.

#### **2.5 Spread of Islam in Africa to the interior of Kenya (Nandi-Mumias)**

Bowker has tried to explain the rapid spread of Islam among Africans. One reason he advances is that, Islam makes converts because its social demands are not too different from those common in African societies. Secondly, Islam's legalistic precepts provide a comprehensive basis for every social action. Furthermore, Islam offers social security and mutual support to its adherents in diverse areas of everyday life. Hence Islamic doctrines are easily comprehensible to Africans. Bowker's insights should assist in illuminating the reasons for the acceptance of Islam by the Nandi society.<sup>81</sup>

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<sup>78</sup> Mbiti, *African Religion and Philosophy* (1969).

<sup>79</sup> J. S. Trimmingham, *The Influence of Islam upon Africa*, (Longman, London, 1980).

<sup>80</sup> M.A. Quraishy, *Text Book of Islam*, Book 1, The Islamic Foundation, (Nairobi, 1981).

<sup>81</sup> John Bowker, *Oxford Concise Dictionary of World Religions* (London, 1997), *passim*.

Abdullah's research on Mumias in his dissertation "Some Aspects of Coastal and Islamic Influence in Mumias from the late 19<sup>th</sup> to early 20<sup>th</sup> Century", looks at the first Muslims to enter the area. The first Muslims were the Arab-Swahili traders who had gone to Mumias purposely for trade, out of which the spreading of faith came consequently. Most important in the work is the struggle for dominance between Christianity and Islam during the colonial period. Mumias became an important centre in the interior and played a role in the spread of Islam in the adjacent areas. Islam in Mumias serves this study with an insight into the history of Islam in western Kenya and beyond.

Sperling's Thesis "The Growth of Islam among the Mijikenda of the Kenya Coast, 1826-1933" is the most extensive and precise work on Islam related to a particular group of people in Kenya. He traces the background of Islam first at the coast and how it spread among the various people of Mijikenda. He notes in detail the process of conversions and the influence of Islam among the same people. The role of the elders of the society and the creation of Islamic institutions in these areas are also well explained.

As to what constitutes religion, one can agree with Posnansky that there is no universally accepted definition.<sup>82</sup> For this study purpose, it has sufficed to adopt the definition given by A.C. Coulson where religion is conceived as simply man's response to his environment.<sup>83</sup> The response is both individual and social. Thus, religion has a dual character. Various writers on the subject have emphasized one aspect or the other of this duality. A.N. White head for example argues that:

Religion is the art and theory of the internal life of man, so far as it depends on man himself and on what is permanent in the nature of things. Religion is what the individual does with his own solitariness – Thus religion is solitariness and if you are never solitary, you are never religious.<sup>84</sup>

On the other hand, Coulson among others, refers to religion as the "Social attitude towards the non-human environment" To see one of these two points without at the same time seeing the other, is to fail to understand religion fully. It is in this sense that one can understand the Nandi Indigenous religion. The historical forces acting upon it were similar to those that affected the religion of the Padhola as depicted by Professor B.A Ogot.<sup>85</sup> These include migration and settlement, physical and human environment as already pointed, and internal and external factors. These diverse factors produced diversity in social setup. In addition, and as F.W Smith has said, a "Diversity in theology may follow upon diversity in social structure.

Scholars like Trimmingharm (1964),<sup>86</sup> Maingi (1987),<sup>87</sup> Kabiri (1990),<sup>88</sup> (1995), Gimonde (1993),<sup>89</sup> and Nzibo (1995)<sup>90</sup> argue that the spread of Islam into the interior of E.A mainly depended on Muslim traders. However, from the primary and secondary sources, it was established that the main agent of the spread of Islam among the Nandi were Muslim traders from Mumias. The Muslim traders, major

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<sup>82</sup> See in Kimambo and Ranger, *The Historical Study of African Religion*, p. 29.

<sup>83</sup> A. C. Coulson, *Science and Christian Belief*. p. 105.

<sup>84</sup> See, Mwanzi, *A History of the Kipsigis*, p.12.

<sup>85</sup> See Kimambo and Ranger, op. cit. p. 122.

<sup>86</sup> Trimmingam, J.B., *Islam in East Africa*, (London: Oxford University press , 1964), p. 78.

<sup>87</sup> Maingi A.N (1987) "The diversity factor in the History of Islam in Nairobi 1900 –1963" M.A. Thesis University of Nairobi.

<sup>88</sup> "Kabiri, N., (1990) "Islam and colonialism in Kenya: A cask study of the Kenya African Muslims in Nairobi C. 1939".M.A. Thesis, KQ.

<sup>89</sup> "Gimode, A.E (1990), "Culture and History: The Religious Experience of the Avalogoli C. 1850 – 1945" M.A. Thesis . K.U.

<sup>90</sup> Nzibo , AY, Islamization in the interior of Kenya A General overviews in Bakari and Yahya eds. *Islam in Kenya: proceedings of the National Seminar on contemporary Islam in Kenya* , (Mombasa: Mewa publications, 1995) pp. 120- 161.

aim in Nandi land was trade in ivory and slaves. The traders were therefore not directly involved in the spread of Islam among the Nandi.

Islam was seen as a more simpler faith to convert or adhere to than Christianity in a comparative basis as it was noted by Kabiri.<sup>91</sup> It appeared that the two religions were competing for converts among the Kenyan up country people. This was seen in 1909, when officials in the colonial administration warned their colleagues that Islam was a serious rival to the spread of Christianity.<sup>92</sup> The archival data reveals that the acceptability of Islam by the interior people was seen as banking on the fact that it did not ask one to deny the self as opposed to the Christianity.<sup>93</sup> Therefore this rendered Islam more acceptable more attractive than Christianity. It is apparent cultural appealed that made Islam van Grumbauri cited in Alpers<sup>94</sup> to state that Islam allows the potential converts to carry over with them much of traditional way of life. For him this accounts for Islamism's amazing cross – cultural absorptiveness. The flexibility of both the indigenous religion and Islam facilitated the adoption of Islam by the Nandi.

## 2.6 Missionaries and their influence in Nandi and among Islam

The works of Christian missions in Nandi have constituted a running theme in this study. In this regard, S.K arap Ngeny explored the activities of the Friends Africa Industrial Mission which commenced work in Nandi in 1902- 1904 after opening a station at Kaimosi among the Abaluyia. Ngeny writes that it was in 1909 that the Church Missionary Society (CMS) sent two missionary couples to establish stations at Kaptumo and Chebisaas. According to him, the stations never expanded because the Nandi became suspicious and reluctant to receive missionary teachings.<sup>95</sup>

Ngeny further supplies information on other missions that operated in Nandi in the early decades of the twentieth century. He informs that in 1929, the Seventh Day Adventists (S.D.A.) opened a station at Kaigat where they faced opposition because of prohibition of tobacco, alcohol and the consumption of flesh from domestic animals, and opposition to female circumcision.

According to Ngeny, the missionaries of the American International Pentecostal Assemblies - who arrived in 1937 and established a station at Chepkumia preached against polygamy, traditional male and female initiation, and the accompanying rites and rituals. They were thus unable to convert many Nandi. On the other hand, the Roman Catholic Mission at Chepterit made converts within a short time after 1938. This was largely because the Catholics were more accommodative of Nandi culture and traditions in comparison to other Christian churches.

The core subject of this work is the study of the spread of Islam in Nandi, which expanded rapidly in the twentieth century. This phenomenon, according to Barrett's view, was that the community life based on *Shariah* favoured such a development.<sup>96</sup> Furthermore, as Parrinder further asserted, there was a facilitative similarity of Islam's prescriptions on personal and family life with polygamy, which was common in Africa and accepted under customary law. In Parrinder's summation, marriage of four wives

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<sup>91</sup>Kabiri, N (1995, "An evolution of an African Muslim Demography in Kenya" In Bakari and yahya(eds) *Islam in Kenya proceedings of the National senior of contemporary Islam in Kenya*, (Mombasa: Mewa publications, 1995), P. 189.

<sup>92</sup>DC/KBU/3/4 Dagoretti Political Record Book 1908 – 1912.

<sup>93</sup> PC/ COAST 1/1/20. – Uganda Railway 1895 –1897 chief engineer Uganda Railway to C.H. (Van ford Esg. Ag commissioner and Secretary General East African protectorate Mombasa, 21 – 12 – 1896.

<sup>94</sup> Alpers, E.A 1969 "The coast and the Development of Caravan trade" in A History of Tanzania edited by I.N. Kimambo and A.J Temu 35 – 56 (Nairobi: E.A PH), p 49.

<sup>95</sup>S.K. arap Ng'eny, "Nandi Resistance to the Establishment of British Administration, 1893-1906." In B.A. Ogot (ed.) *Hadith* 2 (Nairobi, 1970), pp. 104 –121.

<sup>96</sup>David B. Barrett, et al, eds., *Kenyan Churches Handbook* (Kisumu, 1973), p. 297.

as permitted in the Quran was one of the main attractions of Islam for Africans. This position should apply *a fortiori* in explaining the acceptance of Islam by the Nandi.<sup>97</sup>

## 2.7 Comparative religions and culture

Badru D Kateregge and David W. Slenk, on their book *Islam and Christianity*, (1980)<sup>98</sup>, were written to show how Muslims do their evangelism vis a vis Christianity. They said, Muslim witness in worship is profound, and that in them, right worship is a prominent Muslim cancer of whom many Christians who have Muslim friends are impressed by the sincerity and devotion of Muslim worship especially the Muslim discipline in prayer, fasting or misgiving was impressive while in Christians, their witness, invites all their true worshippers of God to move beyond the mystery of the forms of worship into an actual encounter with God, a personal fellowship relationship with the one, whom both forms and practices of worship are the same.

On the *journal of the American Academy of Religion* 53 (1985)<sup>99</sup>, Mazrui Alli a well known historian in the African culture wrote an article entitle "Religion and political culture in Africa", in this article, he showed how Christian were negative over medicine and healing practices by viewed those practices as being based on magic and not on science. According to Mazrui, these judgments were based on a misunderstanding of African Traditional Religion views on disease and healing. Indeed, like "western" medicine, African Traditional Religion healing was based on close observation of the patient and his or her disease and on the use of remedies-medicines-that have a track record for successfully treating a particular ailment. However, Muslims agree with the medicine and healing practices of the Indigenous religions.

Thus, Mazrui comments that during the past thirty years, Western trained doctors have gained a greater appreciation for African healing techniques and practices. Indeed, throughout Africa it is now fairly common to have Western trained doctors working with traditional healers in the treatment of patients. In addition to treating specific illnesses, African Traditional healers-herbalists and diviners- also practice preventative medicine. Patients may come to the healer seeking protection from misfortune. Or a person undertaking a long journey may want a remedy that will provide safety on her trip. Another patient may want a remedy that will provide wisdom and clarity in making an important decision. In understanding how Muslims and Christians response to the African religion and culture, Alli Mazrui has contributed allot to this thesis to shade greater light.

According to Jane T. Stoddard in her book *The Case Against Spiritualism*, (1919)<sup>100</sup>, The living dead in the Nandi Indigenous Religion (NIR) become Islamic intercessors' between man and God. Christianity was unable to accept this idea, mainly among the Protestants. According to the Protestants it was termed as Spiritism: the theory that mediumistic phenomena are caused by spirits of the dead. The word spiritualism was not found in the Bible, but there was a general accord that spiritualism is based upon the belief in the natural immortality of man, and that the spirit, which left the fleshly body at death, can and does return to communicate with the living through "the medium" and "the control." The Christians believe that "the living knows that they will die; but the dead know not anything" and that

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<sup>97</sup> Geoffrey Parrinder, *Africa's Three Religions* (London, 1976), p. 216.

<sup>98</sup> Badru D Kateregge and David W. Slenk, *Islam and Christianity*, Daystar press, Ibadan, Nigeria: 1980.

<sup>99</sup> Mazrui A.A., "Religion and political culture in Africa," *journal of the American Academy of Religion* 53 (Nairobi: 1985), pp, 817-839.

<sup>100</sup>Jane T. Stoddard, *The Case Against Spiritualism*. Hodder and Stoughton, 1919, p. 128.

“the breath goeth forth, he returned to his earth; in that very day his thoughts perish.” Also in the dead, “their love, and their hatred, and their envy, is now perished; neither have they any more a portion forever in anything that is done under the sun.”<sup>101</sup> With this position of Christians, it was difficult to convert Nandi from their indigenous religion than the Muslims who were flexible and accepting the ancestors believes over the living.

M.A. Quraishy, in his *textbook of Islam*, (1981)<sup>102</sup> where he did a lot in bringing the Islamic students understand the foundation of the Islamic faith that the formula “*La ilah illa Allah, Muhammad rasul Allah*” (there is no god save Allah and Mohammad is His Prophet) is the most concentrated profession of faith of the Islamic belief in one God. It is called the *shahada*. For the Muslims, God (Allah) is the one and only the deity. They say right from Quran and Mohammed preaching to this day, Muslims worship only one Supreme Being who is the creator of heaven and earth.

Quraishy discussed in length on the nature of God in Islam, in his exposition he explained that, it is not enough that people believe that "God is One", but they must actualize this belief by proper conduct. In short, he said, in the Islamic concept of God, which is completely based on Divine Revelation, there is no ambiguity in divinity - God is God and man is man and that this is not in among the Christians. The Muslims beliefs Christians to be worshipping three gods, God the Father, the Son and the Holy Spirit (Doctrine of Trinity). This thought contributes to this thesis in that the Indigenous religion especially the Nandi they worshipped one Deity – *Asiis*<sup>103</sup> and according to B.D. Kateregga & D. Shenk, *Islam and Christianity: A Muslim and Christian in Dialogue*. (1980)<sup>104</sup>, on their case studies, it was noticed that only a small number of Muslims accept Christian monotheism. Muslims say that Christianity had a true monotheism in the past but with the dogmas of the Trinity and the incarnation, it has deviated from what was preached by Jesus Himself. Christianity, according to Islam is essentially the form of the unique religion, eternal and immutable, which God willed to be valid for the children of Israel at a particular moment in history. Jesus preached it, but little by little his disciples moved away from his message and God sent Muhammad to remedy the situation.

*Comparative Religions: A Modern Textbook*, (1982)<sup>105</sup> by Pancholi, N., is a very recent and modern book of comparative religions it was useful for this research in that it gave a clear comparison of the major world religions mainly on the side of the Deity. He said though other religions seem to be worshipping many gods but they worship a true God. Hindu religion for example, is often believed that they worship 330 million “gods” but to a Hindu, the millions of “gods” are really the manifestation of the many aspects of one truth Brahman, “God”. From this context, the indigenous religion has been misunderstood to be worshipping objects such as trees, stones, mountains, sun, moon and stars. According to the Nandi one among the indigenous religion those were also manifestations of *Asiis* the Deity the only true God.

*Religious ethics in Africa*, (1998)<sup>106</sup>, by Peter Kasenene, has been also a helpful book in understanding how the major world religions value their ethics in the society. The book was so much concern with Alcoholism. Kasenene P. refers Alcoholism as a serious health and social problem in Africa, which raises a concern in various circles in the society. In this book, Alcoholism means addiction to alcohol and loss of control over ones drinking habits and that, it is a mental and physical illness with complex social and

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<sup>101</sup> See on the Bible (NIV): Ecclesiastes 9:5; Psalm 146:4 and Ecclesiastes 9:6.

<sup>102</sup> M.A. Quraishy, *Textbook of Islam*, Book 1, *The Islamic Foundation*, (Nairobi, 1981), p. 28.

<sup>103</sup> Ol, Hassan Ngeny, 28 July, 2008, Kaptumo.

<sup>104</sup> B.D. Kateregga & D. Shenk, *Islam and Christianity: A Muslim and Christian in Dialogue*. (Nairobi: Uzima Press. 1980), p. 78.

<sup>105</sup> N. Pancholi, *Comparative Religions: a Modern Textbook*, 1982, (West Street, Dorset, UK.: Bland ford Press), P. 25.

<sup>106</sup> Peter Kasenene, *Religious ethics in Africa*, Fountain publications, 1998. pp 25-34.

psychological dimensions which originate from excessive and continuous consumption of alcohol. Islam's holistic approach to health and well-being means that anything that is harmful or mostly harmful, is forbidden. Therefore, Islam takes an uncompromising stand towards alcohol and forbids its consumption in either small or large quantities. Alcohol is undoubtedly harmful and adversely affects the mind and the body. It clouds the mind, causes disease, wastes money, and destroys individuals, families, and communities.

Likewise, the Christian church followed the same route that was used by Muslims, only the indigenous religion never prohibits so much, like in the case of the Nandi, Alcohol is in various forms. It is often served and consumed moderately at social functions. These forms of drinking are not harmful to health or society. In fact, it is perhaps correct to say that the majority of adults in Nandi society take alcoholic beverage without becoming alcoholic. Nandi religion accepts alcohol consumption because it plays a very important part in religious life. In almost every important occasion beer or wine is served; ceremonies, festivities, marriage negotiations, land contrast, wedding parties, or social visits are all occasions for drinking. Alcohol is a symbol of friendship, communion, oneness and acceptability in the community.

From time to time wine or beer is used to pour libation for the ancestors or to give them a drink. On those occasions when wine or beer is served to ancestors, it is left in the shrine overnight and the following day the family drinks what the ancestors have "left over". Although alcohol consumption is accepted and alcohol is served on many functions, drunkenness is discouraged and condemned. A person is expected to drink moderately and at the right time with the right type of people. All children preferably uncircumcised were not allowed to drink alcohol. Responsibly current youth misuse alcohol for it has become commercialized. Any youth can freely misuse his hard-earned money to over indulge in alcoholic drinks.<sup>107</sup>

The following chapter on methodology described how we obtain, analyze and interpret the data used in this study. It focuses on the research and procedures used in analyzing data, and further discusses major challenges faced in the field during data collection.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.0 Introduction**

This chapter outlines the research methodology used to obtain, analyze and interpret the data used in this present study. It focuses on the research design, validity and reliability, population and sampling, methods of data collection, ethical considerations, and procedures used in analyzing data, as well as discusses major challenges faced in the field.

### **3.1 Research Design**

This study was a qualitative research involving the search and use of participants' live experiences to depict the scenarios surrounding the spread of Islam in Nandi. This study opted for a qualitative research design because literature suggests that qualitative research is recommended when one seeks to analyze the way humans behave, as well as their culture and attitudes. A qualitative approach was considered appropriate to study the variables under consideration because the study sought to explore how Islam was presented to the Nandi people and how the Nandi, in turn, reacted to this religion. The human response to religion is part of human behavior; it is a psychological phenomenon and is best studied qualitatively.

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<sup>107</sup> Ol, Luka Kebenei, 15 July, 2008, Chepkober.

By using qualitative approaches, such as interviews, the researcher was able to obtain detailed information on the phenomenon under consideration. Thus, the use of a qualitative design permitted the researcher to probe into the respondents' behaviors, feelings, attitudes, influences of religion, and influences of culture. It allowed the respondents to provide descriptions and accounts of the processes of social interaction in natural settings, which was appropriate since the study sought to focus on describing processes rather than outcomes.

### **3.2 Validity of the study**

The purpose of any researcher is to produce a good research paper, and this work is not an exception. Every effort was made to ensure the validity of the data for the purposes of this study. In this research, the fundamental rule of thumb was that all the information collected be accurate. To this end, information about history of Islamic religion and its impact needed could only be accurate if obtained from appropriate respondents using appropriate tools. This concept of accuracy is what is usually referred as validity, which is usually taken to refer to the extent to which a procedure or an instrument (tool) used in the research is accurate, correct, true, meaningful and right. Pre-testing of the interview schedule was done in order to obtain information that was then used to determine, at face value, whether the tool would gather valid information. Face validity was used to gauge the tool. A panel of four Muslims competent in the Islamic doctrine and history in the field was used to assess the relevance of the content used in the interview schedule. Each of the members of the panel individually examined the schedule and provided feedback to the researcher. Their feedback was used to make improvements to the schedule in order to better the tool.

### **3.3 Population and Sampling Procedure**

#### *3.3.1 Target Population*

As per the 2009 Population Census, the people of Nandi County, which was the study area, numbered 752,965.<sup>108</sup> As such, it was impossible to study the whole of the population, the researcher therefore, had to identify and define an experimentally accessible population out of the target population. The accessible population of this study was arrived at by taking into consideration different strata (groups) in the population that would best provide the data required to answer the research questions. Thus, the present study dealt with subgroups in the population which comprised three groups; namely, followers of Nandi indigenous religion, Christians and the Muslims.

#### *3.3.2 Sampling and sample size*

Even given the accessible population, it was still impossible to interview all the Nandi in the three groups in the study area, and so, the study opted for a smaller number – a sample. This was based on the premise that it was possible to reach an accurate conclusion by examining only a small part of the group. This assessment of only a small group is commonly used in natural sciences as well as social sciences.

Sampling was important to determine the participants that would best represent the population; a sample that was least biased so as to allow for an accurate generalization of results. A sample of respondents/ interviewees was therefore obtained from the accessible population. In this study the respondents were from Nandi traditional religion, Christian and Muslim leaders or teachers. To arrive at this, purposive sampling was used because it offered the researcher the opportunity to select samples based on a purpose. In this case the researcher chose to use Nandi religion adherents, Christian and Muslim leaders or teachers in Nandi since they would be able to provide the information required to meet the objectives of this study.

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<sup>108</sup>Republic of Kenya, *Report of the Kenya's Districts Census Report* (Nairobi, 1999), p. 67.

Non-probability sampling techniques were used in this study. These were considered appropriate given the purely qualitative orientation of the study. Both snowball sampling and purposive sampling were used to arrive at an appropriate sample for this study. Purposive sampling was used to determine the age range of the participants. In this study, which was more or less historical, elderly and experienced respondents of over (60) sixty years with sound mind formed the age target that was purposively sampled to get the necessary data for this study. These people were drawn, purposively, from the three religions – Nandi Indigenous Religion, Christianity and Islam. The interviewees thus comprised the indigenous religious specialists, Christian leaders and Muslim leaders from the study area. The religious leaders consisted of cultural and religious specialists such as traditional priests and religious elders. The Muslim respondents were purposively selected from around major mosques because the Muslims living around the Mosques were assumed to have a thorough and reliable history, which enhanced the validity of the data used in the study.

Snowball sampling was utilized to actually identify the respondents since it proved to be the most suitable method to reach people who shared similar characteristics. Thus, a few respondents who had the requisite characteristics (for instance those who practised Islam) were selected for the initial part of the research and as they participated in the study, they in turn directed the researcher to others who had information on the subject. The process was repeated until the researcher had obtained the desired number of respondents. This meant that the sample size grew larger as those identified named others. These respondents were used to represent the larger population, even though it was difficult to know the extent to which the sample was truly representative of the larger population. This is one limitation of the snowball sampling. Nevertheless, snowballing remained the most efficient way of identifying respondents relevant to the study under investigation given the vastness of the study area and the nature of the variables under consideration.

The researcher purposely chose (4) four respondents from each of the (8) eight mosques in the study area. Among the thirty two (32) chosen, eight were religious leaders (Imams) and eight were the pioneers of their respective Mosques. From the Christian community (8) eight respondents were purposively selected to aid in the comparison of conversion techniques in the two religions thus providing insight into factors that motivated Christians to change their faith into the Islamic faith. Thereafter, (15) fifteen Nandi elders, mainly religious specialists, and government leaders were again purposively selected and/or chosen as respondents to the study. Thus, a total of (55) fifty five respondents were sampled.

### **3.4 Instruments of data Collection**

It was necessary for this study to develop research instruments with which to collect the relevant information. The study sought to make use of both primary and secondary data. Primary data were obtained from practising Muslims, Christians, adherents of Nandi religion, and other participants by means of interviews while secondary data were taken from historical documents. The following instruments were used to obtain this information.

#### *3.4.1 Interview Schedule*

An interview is an oral administration of a questionnaire or an interview schedule. This was considered best for this study because it encourages face to face encounters between the researcher and the informants and furthermore helps the researcher to obtain rich, detailed and accurate information. However, the researcher needed to obtain the maximum co-operation from the respondents. The majority of respondents were interviewed singly, but whenever possible focused group discussions were also used. Interviews enabled the researcher to probe where respondent when an answer was not clear. This was done after asking for their acceptance and subsequently requesting others for their pictures to

However, tape recordings proved the best to the researcher since the researcher would play back the questions and responses and study them more thoroughly at a later time. This also helped to speed up the interviews because there was no writing involved and the flow of questioning was not interrupted.

### *3.4.2 Documentation and the Historical Method*

Research into secondary sources – including reference materials, books, scholarly journals, theses, dissertations, conference papers, newspapers, periodicals and magazines – were obtained from various sources and libraries across the country and over the internet. Together with secondary sources was collection from the holdings of the Kenya National Archives and Documentation Service (KNA). This was mostly public or official records of the colonial period and the years after independence. District and provincial records in Nandi and neighbouring areas were referred to in order to glean information on the various events that had taken place and which had had a bearing on the spread of Islam in Nandi. In addition, an effort was made to trace any extant contemporary accounts. Similarly, pertinent private collections belonging to individuals as well as religious organizations were combed to provide a view from within.

### **3.5 Ethical Considerations**

What makes the social sciences unique from the natural sciences is that the subject matter of the social sciences is people – living, sentient beings with feelings and thoughts of their own. Because the objects of this study were humans, the researcher had a special obligation to safeguard their rights and dignity.

In this study, it was understood that the informants needed to be told something about the study. It was their right to know: a) who was sponsoring the study, b) what area is being investigated, c) how much of their time it would take, d) whether the results would remain confidential so that their answers could not be traced back to them, and finally e) how the results would be used. All this information was availed to the informants prior to their participation.

However, several problems arose in providing this information. Some of the Muslim informants tended to shun the investigator on the assumption that the government has him to do some investigations on them. This is because much had been said about the Muslims in relation to terrorism, and they were therefore reluctant to give information. However, since this was well known, they were informed in advance about the said study in the university and its objective, and this made them respond positively.

A high level of privacy was maintained in interviewing individuals and when consulting the third party. During the interviews, the investigator also endeavoured to avoid asking embarrassing and threatening questions such as asking a woman asked about her relationship with the husband, may not want to answer but feel that she must because she agreed to be interviewed.

There were some topics that Muslims preferred not to discuss openly with strangers. To counter this challenge, a research assistant of Islamic faith, who was well known to the faithful, was hired. To avoid possible risk to the community or individuals that could arise out of the study findings, for instance, being branded anti-government, the researcher took time to delay the thesis or to write generally about the issues until the information was discussed with the Muslim community of leaders to see what points they would view as controversial. It was also ensured that the community got a copy of the reports as soon as possible.

Making unrealistic promises to the informants was avoided, and they were treated in ways that neither raised their expectations nor lowered their dignity because it was known that doing this might lead to people's refusal to cooperate in any future research. While presentation of drinks or other gifts to community leaders was sometimes necessary to get permission to proceed, the researcher tried his best

to minimize this and presented himself as a pastor coming from a poor background as well as a self-sponsored student. In this study, it was imperative that the public image of scholarship be upheld, and to this end the researcher tried his best to be courteous, truthful, honest, obedient and faithful.

In this study therefore, proper conduct was maintained as the data were garnered from the different sources. The researcher secured informed consent, ensured honesty and accuracy in the responses solicited, and assured the privacy and confidentiality of the respondents.

### **3.6 Data Analysis**

For the purpose of data reduction or condensation, two methods were employed. One is criticism – that examined and evaluated the data gathered critically. The other was the rationalistic method. This entails the systematic and logical analysis of the data to avoid making erroneous conclusions.

The researcher chose to use interviews because literacy was not necessary, so the sample was much less limited than for questionnaires. The advantage of this was that the researcher was able to ensure that questions were understood and answered in full and in a consistent manner. In this way, he was able to use supplementary questions to get more additional information and to understand what an answer means and to ensure that the respondent was not “making it all up”.

A large corpus of information was obtained from the huge data collections, interviews and discussions from the respondents coupled with those collected from the Kenya National Archives. Given the qualitative nature of the data obtained, the researcher soon realized that analyzing and interpreting data, called for patience, tolerance, disciplined study, creative insight and careful attention to the study objectives. Thus, the process of organizing information obtained and then manipulating it required the researcher to manage and meticulously interpret accordingly.

The researcher used content analysis to organize the data into patterns which enabled one to read field notes and interviews and thus polish them for presentation as pure description in the research report before putting them in categories and basic descriptive units.

From the data analysis, the researcher described the major characteristics of indigenous Nandi religion before in comparison with those of Christianity and Islam. The development of Islam in Nandi County from the late Nineteenth Century to the present, while focusing on the Islam’s interaction with Christianity and the indigenous belief system, was also analysed. The findings were also examined to establish threads in the leadership aspect of the Islamic faith in Nandi as well as impact on their lifestyles. Finally, the researcher examined the interpreted data to assess the extent, if any, to which contemporary issues affecting Islam worldwide have influenced Nandi indigenous Muslims.

### **3.7 Challenges faced in the field study period**

To minimize challenges in the field, several precautions were taken such as:

1. The engagement of a research assistant who must have been chosen from the area of study; where they were well known to the respondents. This made easy the respondents to familiarize and give the needed information without wasting time.
2. The researcher visited in advance the key people such as District Officers and Chiefs in their respective areas and gave them a copy of the authorization letter from the ministry of Higher Education. He also attended local meetings (*Barazas*) where he took the opportunity to explain to the authorities and the people what the study was all about.
3. Since the majority of respondents were illiterate, the interview schedule was written in both English and Nandi languages.

## CHAPTER FOUR: RESEARCH FINDINGS AND DATA ANALYSIS

### 4.0 Introduction

This chapter presents the findings about the Muslims' spread in Nandi County as well as the agents and factors that facilitated and hindered the penetration of Islam among the Nandi. It uncovers the Nandi indigenous religion and its interaction with Islam. This is based on the premise that both Muslim agents and indigenous beliefs and practices played a role in enhancing the spread of Islam in the Nandi land.

It is important to stress here that, Islamization as a whole, whether in the initial stage of conversion, or later stages of consideration, depended entirely on the personal contacts between the Muslims with the non-Muslims. Therefore, the agents and factors that facilitated the penetration of Islam among the people determine the “contact situation” between Islam and the Nandi indigenous religion.

### 4.1 The History of Muslims and Its Impact in Nandi

According to Kiplagat<sup>109</sup>, who was among the first secretaries to the British (*wasungu*) Administration Colonialist, the Arab Traders of various backgrounds became the first Muslims to visit Nandi. He further noted that this group played a major role in converting indigenous Kenyans (not only Nandi) but also a big part of the Sub-Saharan Africa into Islam. He accepted the fact that during the Kenya-Uganda Railway line construction, the Arabs were not new or strange to the natives. There had been an attempt by Arab Slave Traders long before the arrival of the British to convert the Nandi into Muslims, in the late 1870s; when the Nandi political and military supremacy was at its peak after the decline of the *Maasai* power in the region.

Mzee Kipserem<sup>110</sup> also concurred with Mr Kiplagat, that during the same period some Arabs who were riding horses met the young Nandi warriors (*Moran*) at a place called *Kabutie*, who later took them to their *Orgoiyot* – their spiritual and political leader of the time. The *Orgoiyot* lived at a place called *Kamatargui*, near Kapsabe, just across *Amai* River (stream) towards Baraton University. The Arabs gave the leader, some gifts, which included clothes, mirrors and tobacco containers before requesting the *Orgoiyot* to settle in the area. Therefore, the *Orgoiyot* allowed them to build tents and settle in the proximity of his premises, the current location of Kapsabet Boys' High School and ACK St. Paul's Theological College – Kapsabet, so that he could be monitoring them and their activities. The Arabs who used to hunt using strange weapons (guns) around their homestead began attracting the young Nandi men who used to graze their livestock around their tents. The visitors (Arabs), also gave them delicious sweets, later began offending the young warriors by sexually defiling their girls, and to make it worse, they also cut the warriors' pigtails. This incident was reported to the *Orgoiyot* who called their leaders and warned them not to offend the community through those heinous acts, but they instead continued despite the caution.<sup>111</sup>

This encounter of age-set group with the Arab traders was associated with the period when the age generation called “*Sawe*” was warriors in the 1880s. The *sawe* sub-set (*marmar*) was commemorated from this major event in the Nandi tribal history when the Arabs were fought and defeated by the warriors at *Kipsobo*; and were subsequently expelled from Nandi District. The sub-set name *marmar* originated from the word “*marmar*,” which denotes ornamented dress of many colours. During this time the Nandi women began artwork by using beads and cowry shells, stolen from the Arabs to bedeck their leather garments.<sup>112</sup>

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<sup>109</sup> OI, Kiplagat Karan Chemokotion, 9 August 2008.

<sup>110</sup> OI, Mzee Kipserem Sogon, 13 August 2008.

<sup>111</sup> Ibid.

<sup>112</sup> Ibid.

The *Nandi* first came into contact with the Arab Caravans (*foreigners*) when they came to Nandi to trade (barter) using ivory items from the coastal part of Kenya, thus introducing a new *Nandi* economic factor, which had never been entered by *Kavirondo* traders (*Kariba* and *Wanyamwezi* traders). Apart from these sporadic trading operations, the study area experiences a hiatus of this activities with other tribes for centuries, and it was not until 1899 that the first African-sponsored Caravans entered *Nandi*, after the Pax Britannica establishment made it safe for the *Baganda* chiefs to send trading parties through eastern Uganda up to the coast.<sup>113</sup>

The Arabs had a difficult time to penetrate the ferocious Nandi people areas unlike the other neighbouring tribes with whom they traded easily. They could only approach Nandi from the northeastern *Uasin Gishu* route, although it took them a long time before reaching the principal *Nandi* settlements, overlooking the *Nyando* Valley in *Kavirondo*, where there was abundant food. This trek of the barter traders was confirmed by the Paramount Chief *Arap Kirwa* of *Chepterwai*, who noted that the Arabs entered Nandi from *Mumias* and *Kibos* River to the west and south, respectively.<sup>114</sup> The Caravans seldom entered and camped in Nandi, but preferred to exchange trading goods for ivory at places near the Nandi South Escarpment (East Kabras and Kakamega)<sup>115</sup> in the late 1850s, during the “*sawe*” epoch. This *Nandi* trading business of bartering beads, clothes and ornaments for ivory, sheep and goats was greatly established at *Kimatke* which is located between *Kibigori* and *Chemelil*, *Kipsoboi* on the south escarpment overlooking Chemase, and at *Kobuji* in the *Chesumei* forest. The business flourished and firmly got established at the escarpment in *Kipsoboi*, as alleged by Bot Cheplaitich from Tinderet.<sup>116</sup>

#### 4.2 The first place Muslims Settled in Nandi

The rise of Muslim settlement in *Nandi* as Chesingaga noted was directly related to *Kipture* centre. From center *Kaptumo* was established as a military base. Mr. Hassan Ngeny noted that the present-day site of *Kaptumo* used to be a trading centre also for the Arab traders. This caravan route passed through *Kaptumo* where the *Wanubis* camped as they worked for the British Army. The caravans’ route used to get goods from the local markets; mainly from *Kibigori* -but these traders did influence the rise of *Kaptumo* as narrated by Mrs. *Bot Surtan Jamaa* - the only remaining *Mnubi* in Kaptumo.<sup>117</sup> The people indirectly responsible for the establishment of Kaptumo were then rebellious Nandi people. In an effort to punish them, Colonel Meinertzhagen in 1902 sent a punitive expedition from *Kipture* to *Kaptumo*. In consultation with the local elders of the Nandi region, the British established an administrative centre at Kaptumo, which also acted as a marshalling yard. This area later became a good place from which to carry out future military operations. Its location afforded a central place from which expeditions were executed. After the settlement, *Kakiboch* and *Kamelilo* Nandi areas became the first places to be attacked from Kaptumo base.<sup>118</sup>

The colonization of Nandi began soon after the dead of *Koitalel Arap Somoei*. The elders of Nandi visited the new station that had been erected (*Kaptumo*) and submitted to the administration of the British and as well promised to construct the *Kapsabet* road. Thus ending frequent harassment of travelers.<sup>119</sup>

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<sup>113</sup> A.T. Matson, *Nandi Resistance to British Rule 1890 – 1906*, (Nairobi: East African Publishing House, 1972), p.39-85.

<sup>114</sup> OI, Paramount Chief Arap Kurgat, 6 Feb.,2008 Kaptel.

<sup>115</sup> A.T. Matson, *Nandi Resistance to British Rule 1890 – 1906*, (Nairobi: East African Publishing House, 1972), p.39-85.

<sup>116</sup> OI, Bot cheplaitich, 8 Feb. 2008, Tinderet.

<sup>117</sup> OI, *Bot Surtan Jamaa*, February 21 2008. Kaptumo.

<sup>118</sup> KNA/PC/NYA/1/1/1 Provincial Record Book, Kenya Province, 1901 – 1924.

<sup>119</sup> OI. Hassan Ngeny, 20 January 2008. Kaptumo.

After construction of the road from *Kaptumo* to *Kapsabet* was completed, the nucleus for the present town took shape. Then *Kapsabet* town gradually grew into an administrative and commercial centre soon after the offices from *Kipture* were moved. The station had a good supply of water, which came from the *Amai* River where the camp of the British was first located.<sup>120</sup>

By 1907, Nandi had begun to assume the character of a colonial administrative centre in the region. At the beginning of that year, the population consisted of an Assistant District Commissioner and 47 armed *Wanubi* police. In the first six months of that year, two prisons guardrooms, an office and an officer's house were built. Four Indian shops and butchery were also constructed. The butchery was owned to a Somali called *Gulled* who used to serve the new *Nubi* Community.<sup>121</sup> A few European settlers were among residents, as officers, apart from the military and administrative officers.

After the pacification of the coast, the British had enlisted Coastal people as *askaris* in their drive to bring the interior under their control. As a result, most the early soldiers and porters were recruited from the Swahili population of the coast. In addition, the British enlisted *Somali* and *Nubian* people, who together with the *Swahili* were to dominate the King's African Rifles (K.A.R.) up to the beginning of World War I. On retirement or discharge, many of these soldiers and porters settled in the interior and started a new life.<sup>122</sup> The British colonial administration enlisted the assistance of the Muslims as interpreters and scribes, as they were the only literate natives with some experience in administration and a working relation with the peoples of the interior.<sup>123</sup> This was accepted and commended strongly by Mr. *Sala Magut* who said through this means our forefathers accepted the Islamic faith in search of job opportunities to out way the dominance of the people from the coast.<sup>124</sup>

The first settlement of Muslim at Nandi occurred at the end of 1906 in Kaptumo and Kapsabet. This consisted of *Nubi* and Swahili soldiers employed by Meinertzhagen to guard the new station of Kaptumo and other individual Swahili traders and Somali, who were wandering in Nandi region in search of goods.<sup>125</sup> They settled in Kaptumo first because of their security and later scattered themselves along areas adjacent to the station; first to Kapsabet in a place that was situated at the Ministry of works' office where Jamia Mosque of Kapsabet is presently built, then to Nandi- Hills and other small centers like Tilalwo Kabiye, Chepsonoi, among others.<sup>126</sup>

The two groups, soldiers and traders, formed the first Muslim settlers in Nandi. They worked together in constructing the first structure of Mosques in both Kaptumo and Kapsabet. They built in the traditional Nandi way of constructing houses, which had no partition, though later they used tins for roofing and improved the partition to accommodate genders. The Mosques before did not needed a partition, because women did not feature in the prayers.<sup>127</sup>

This was a clear reflection of the mind of Sir Arthur Hardinge, the British Commissioner and Consul-General at the coast, who held a high opinion of Muslims, having served in Cairo, although his proposal came only a year after British and Indian forces had crushed a coastal rebellion led by *Mbaruk bin Rashid*. He stated with reference to the Muslims, "They are the only element with comprehension of

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<sup>120</sup> Ibid.

<sup>121</sup> Ol. Hassan Ngeny, 25 April 2008, Kaptumo

<sup>122</sup> A.Y Nzibo, "The Swahili-Speaking Community of Nairobi, Kenya, 1895 – 1963," Department of History, University of Nairobi, 1986, p. 11.

<sup>123</sup> Ibid.

<sup>124</sup> Sala Magut 20 April 2008, Kabiye

<sup>125</sup> Col. R. Meinertzhagen, Kenya Diary 1902 – 1906, Oliver and Boyd, London, 1957, p.10.

<sup>126</sup> Alli Arap Chumo. 20 April 2008, Kabiye

<sup>127</sup> Ol, Hasan Ngeny, 25 April 2008, Kaptumo.

politics, justice or government,”<sup>128</sup> This background saw many Swahili enlisted in the service of Europeans. These workers, together with traders, fortune seekers and visitors, migrated up-country into the newly established areas where they set up new homes. Janet Bujra summarizes this movement thus:

Each of the early settlers obviously had his own individual motives for leaving home. Some had left after family quarrels, as a result of economic difficulties at home due to land shortage, famine, drought or epidemics, whilst others had been forcibly recruited into the service of the British or had left in the pursuance of trading opportunities...all were caught up in the network of the expanding colonial system...a system from which they were able to profit, albeit at a discount.<sup>129</sup>

#### **4.3 Muslim Dominated Areas in Nandi**

This study involved an examination of the penetration of Islam among the Nandi. The methods of analysis adopted entailed an investigation of the agents and factors that led to the penetration of Islam among the Nandi, the socio-cultural impact of Islam on the people, and factors, which have facilitated the persistence of Islam among the Nandi, were examined. In the analysis of these factors, an attempt was made to highlight the role played by Arab Muslims as the major agents of Islamic expansion among the Nandi. The impact of Islam on the Nandi especially in the socio-religious and cultural realms was examined. The role-played by the Da’wah and the interrelationship between faith and practice, among others, by the Nandi Muslims in enhancing the persistence of Islam among them was emphasized. As a result, certain conclusions were drawn.

These dominated areas were chosen after the survey was done by the researcher. The findings showed that these centers were dominated by Islamic religion. Most of these centers were located along or near the roads; afterwards, they grew as trading centers such as Kapsabet, Kaptumo, Tilalwo, Kipkaren, Chepsonoi, Kabiyeet, and Kamobo, where we could easily get relevant information from inhabitants about the history of how Nandis were converted from other religions to Islam (Plate 1, a Kaptumo mosque)

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<sup>128</sup> Q.W. Furley and T. Watson, *A History of Education in East Africa*, (New York: Nok Publisher, 1978), p. 73.

<sup>129</sup> A.Y. Nzibo, op.cit., p.22, Quote from Bujra, J. M., “Pumwani”: The Politics of Property. A study of an Urban Renewal Scheme in Nairobi, Kenya, “ Report on project sponsored by Social Science Research Council, 1973.



Plate 1:

The Modern Mosque of Kaptumo

For a long time, the Nandi people were conservative in terms of accepting leadership in the mosque even after being converted to Islam. However, Kaptumo center became so instrumental in spreading the Islamic faith all over the entire Nandi.

#### 4.4 Factors That Facilitated conversion of the Nandis to Islam

There were a number of practices in Nandi society which could in some respect be said to conform to some aspects of Islamic culture and which might have facilitated conversion to Islam. Among these are polygamous marriage and circumcision. These practices have been accepted as Islamic in many African Muslim societies, such as the Buganda Muslims and others. The practices fall among those that have been popularly held to facilitate the spread of Islam in Africa. Where these practices occur in African traditions, it is assumed that Islam will be definitely be at home. This may or may not be true to the rest of Africa, but among the Nandi it is the case.<sup>130</sup>

Islam's approach to non-Muslims made many people consider it as an indigenous religion, thus spreading throughout the entire Nandi County areas and facilitated the Nandis conversion to Islam. This was cited by a good number of respondents such as Ali arap Chumo and Bot Surtan Jamaa,<sup>131</sup> Polygamy was a common aspect of life. This was so mainly because the Nandis believed that many children were a source of wealth and security to a family. And given that Christians were not allowing polygamy, Islamic was the best place to be. Islamic religion according to them proved to be practicing the best polygamy since instructions were given from the holy Quran which demanded justice to wives in terms

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<sup>130</sup> Ol, Arap Tuwei, 11 July, 2008, Kapsisiywo.

<sup>131</sup> Ol, Bakari Juma and Aisha Muhammad, 10 May, 2008, Chepsonoi.

of companionship, provisions, considerations and such controllable aspects of life. Equity was a prerequisite to polygamy in Islam.

The holy Quran in surah 4:3 states:

If you fear that shall not be able to deal justly with the orphans, marry women of your choice, two, three, or four; but if fear that your right shall not be able to deal justly (with them) then only one or (captive) that your right hands possessions that will be more suitable to prevent you from doing injustice.<sup>132</sup>

Among the Nandi, the number of wives was not limited provided one has the ability and means of maintaining them. Polygamy among the Nandi is practiced in order to get heirs who are supposed to be boys for protection and as a source of wealth.

Therefore, polygamy enabled Nandi men to embrace Islam while maintaining their wives whichever the number, initially, but today it is restricted to a maximum of four. Sala Magut expressed this in words: “Since Islam does not prohibit polygamy, we felt it is the right religion.”<sup>133</sup> One of the *wazee* (Elders) in Kipkaren Selia, Abdi Too, was among the first converts to join Islam, because he wanted to have many wives to be accommodated by his wealth which he inherited from his parents. Many women also embraced this new religion.

The Islamic religion in Nandi demanded that for one to become a Muslim, one had to undergo circumcision. Although the Nandi were religious as well as a social and political community, circumcision was an obligation for every member in the society. J. Tuwei was quoted as saying that the “Nandi attitude towards circumcision was embedded in Nandi culture and traditions, which had more relevance to Islam or the Muslim practice of circumcision”. The Nandi gave circumcision a special recognition as the key ceremony of initiation. During this period, a person underwent a physical, emotional and psychological changes, which took him from childhood to adolescence and then to adulthood. This is a revolutionary change for the concerned individual.<sup>134</sup> During initiation, the initiates were instructed in tribal lore.

Quite often marriage between Muslims and non-Muslims was cited as a factor facilitating conversion. Mwanaidi Chebor accepted the fact and further acknowledges that nearly all Muslims in Nandi are related in one way or another.<sup>135</sup> According to Muslims, one cannot marry any other person of a different faith until one was converted into the religion. Mrs. Issa<sup>136</sup> opined that the Nandi women were tempted, and some were even converted to Islam, because they envied those who had been married to the hard working Muslim men, who courteously treated them well, as well as giving them gifts of ornaments and clothes after marriage.

Besides the Nandi women getting married to Muslim men, the Nubi Muslim women in Kaptumo similarly influenced the Nandi women to embrace Islam. The Arabs and Nubi teachers in Kaptumo division also married Nandi women, thus increasing the Muslim population in Kaptumo and hence Nandi County as a whole. Therefore, marriage of Nandi women by Muslim men and vice versa facilitated conversion to Islam among the Nandi. The only difference between Nandi indigenous marriage and Islamic marriage is in the wedding ceremony, which is emphasized, in Islamic faith.

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<sup>132</sup> Surah 4:3.

<sup>133</sup> Ol, Sala Magut, 15 May, 2008, Kapsabet.

<sup>134</sup> Ibid

<sup>135</sup> Mwanaidi Chebor, 18, May 2008. Mosoriot.

<sup>136</sup> Ol, Issa, personal communication

Dowry in Islam is given to the bride herself. It entails what the bride herself demands. This is unlike the Nandi indigenous practice of giving dowry to the father or family of the bride. Even though there was such disadvantage, the parents of the bride would later get more gifts.

#### 4.5 Socio-Economic Factors

In the study, a number of factors contributed to the spread of Islam to Nandi and other peripheral parts of Nandi. These factors ranged from cultural, socio-economic, socio-religious and doctrinal. There were also factors which work against the spread of Islam in Nandi, and those were Christianity and Western Education, Social Factors, Public or Government schools, Nandi Attitudes towards the Swahili and Nandi Muslim Converts. Economic benefits attracted some Nandi to the Islamic faith. It was observed by Sheikh Ayub<sup>137</sup> that the most evident contribution of Islam to the whole society was in the Butchery business. This became the official prerogative of Muslims and they came to dominate the butchery business. Even to date, all meat for public consumption has to be slaughtered by Muslims (Examples in Kapsabet). Besides running of butcheries, Mr. Chamu<sup>138</sup> of Sironoi of Nandi said Muslims also owned shops and hence was the first to introduce the art of shop keeping in Nandi land. There were also non-Muslims and Muslims Indians who owned shops (Plate 2). They therefore employed the Nandis as assistants from their Muslim Employers. Most of the workers from those shops later became Muslims, because they were attracted by the way Muslims operated and earned their living. The Nandi opted to be closer even to the point of being related in the faith in order to succeed in their business life.

These economic benefits made many Nandi embrace the Islamic faith. To date, most slaughter houses, supermarkets, hotels, retail shops and butcheries in the study area are run by Muslims. This was because of the adoption of work ethics. Rural work ethics is directly linked to development of any people in the society. People with very strong work ethics, that is, a well organized society whose beliefs, values, norms and attitudes are work-oriented coupled with hard working are likely to experience more development in nearly all spheres of life than those whose work ethics are not strong like the Nandi. It is a fact that every person has his or her own culture and work ethics but this varies from one society or community to another.

It was after the establishment of the colonial administration in 1906 that permanent Muslim settlement in Nandi occurred. Colonial officers employed Muslims as askaris, cooks, porters, interpreters and gun-bearers. These Muslim servants were settled at Kapsabet. Muslim traders afterwards joined the first Muslim settlers. The traders found a ready market among the white settlers for Ivory and rhino horns and therefore an interdependent relationship was formed. The construction of the Kenya-Uganda Railway did not, however, play a direct role in the rise of the Muslim community in Nandi. By the time the railway reached Muhoroni in 1908, the Muslim community was over one decade old. Kibigori continued to attract many Muslim traders; a permanent Muslim settlement was never created there, though many Muslims took Nandi wives from Kaptumo. The traders would only collect goods at Kibigori and take them to Kaptumo, where the colonialists had erected an administrative centre and there were Swahili settlements.

Studies that have been done although few, show that work ethics and development have a direct and positive relationships. Islam possesses a magnificent tradition of inter-racial understanding and cooperation as it borrows heavily from the east as well as from the European culture. Islam still has the power to reconcile apparently irreconcilable elements of race and tradition.

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<sup>137</sup> OI, Sheikh Ayub, 3 Feb. 2008, Chepsonoi.

<sup>138</sup> OI, Chamu Joseph, 11 March 2008, Sironoi.

Plate 2: The first Muslim shop in Kaptumo.



## CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

### 5.1 Summary

According to the findings, the Arab Traders of various backgrounds became the first Muslims to visit Nandi and this group played a major role in converting indigenous Africans (not only Nandis) but a big part of the Sub-Saharan Africa into Islam. Also during the Kenya-Uganda Railway line construction, the constructors who were largely Arabs, Kamba and Kikuyus already converted to Islamic faith and working together with the new recruits, Nandi, while constructing the line from Nakuru towards Kisumu converted most of them to Islam.

The British enlisted Coastal people as *askaris* from the *Somali* and *Nubian* group, who together with the *Swahili* were recruited in the King's African Rifles (K.A.R.) when the World War I began, although they were similarly used in fighting thus enabling the colonization of the the interior under their control? On retirement or discharge, many of these soldiers and porters settled in the interior and started a new life. The British Administration further employed the Muslims as interpreters and scribes, as they were the only literate natives with some experience in administration and a working relation with the peoples of the interior. The respondents Muslims concurred that through that means their ancestors accepted the Islamic faith in search of job opportunities to out-way the dominance of the people from the coast.

As per the findings, Kaptumo was the first centre where the traced of Muslims was found and the Nandi men who first embraced Islam through the *askaris* from the Arabs, *Somali* and *Nubian* people were Mzee Omar Kipserem Arap Sugut and Mzee Ahmed Malakwen Arap Sisiwa, both belonged to the *Maina*

age-set of the Nandi. Kapsabet Town became the second center Muslims settled after *Kaptumo-Kapsabet* road was completed. The new town gradually grew into an administrative and commercial centre whereby the dominants were Arab traders and support staff of the colonial administration who were mainly Muslims. Hence the most dominated Muslim areas were towns like Chepsonoi, Kabiyet, Kipsamoite, Selia, Ndaptabwa and Nandi Hills.

There are challenges also that Muslims in Nandi still face which are globally instigated by the current global challenges over the Muslims world which also affect the Muslims in Nandi. Such challenges include Education Life, Social life, Economic Life, Youth and Women Funds, Human Rights violations, Issue of Identity Cards and Passports, Foreign Donations and Philanthropic Organizations, Office of the Chief Kadhi and the attacks over Terrorism. The New Constitution has endeavoured to address some and this will greatly enhance peaceful settlement of Muslims in the Nandi Districts, now the Nandi County.

## **5.2 Conclusion**

The study of the spread of Islam in the Nandi region has brought to highlight a number of issues about the nature of the spread of the Muslim faith in Kenya. Muslims first found their way to Nandi through the avenue of colonialism and trade in the middle of the 19<sup>th</sup> century. The relations between the Muslim traders and the Nandi, initially amicable, deteriorated over time because the former ignored some Nandi rituals. At times conflict between the groups resulted in bloodshed. The Muslim traders did not establish permanent settlement for they were only seasonal visitors, and trading contacts did not lead to conversions in the Nandi community.

Conversion to Islam took various forms, mostly based on individual contacts between Nandi and Muslims in Kapsabet town. Social relations, trade, employment of Nandi by Muslims and intermarriage were among the important activities, which fostered contacts between Muslims and Nandi. Some Nandi were also exposed to the Muslim faith when they traveled to the coast and Nairobi. Some of them later came back as professed Muslims and thus came to form part of the Nandi Muslim community.

Immigrant Muslims in Nandi failed to attract many Nandi followers, for they lacked institutions like those set up by the Christian missions. Again, the Christians were located in the rural areas where the majority of the Nandi people were. The fact that Muslims were confined to one urban centre limited their contacts and made them less well known in the rural areas. Traders visited rural areas, but such visits declined as years elapsed. Thus, the impact of Islam in the rural areas was minimal.

The penetration of Islam among the Nandi was further examined in the study because when the religion reached Nandiland, some of its cultural aspects received resistance from the Nandi. At the same time, Christianity coupled with western education came immediately after Islam and offered strong competition to Islam. The Nandi were therefore torn between Islam and Christianity. This made the apparent success of Islam fail, while Christianity flourished due to its benefits to the converts. Despite this, few Nandi embraced Islam and continue to practice up to today. The continued persistence of the Islamic faith upheld by a minimal population among the Nandi community, located at the centre of vigorous competing faith such as Christianity and indigenous religion, prompted the researcher to investigate the penetration and persistence of the faith among the Nandi to date. As already stated in Chapter one, Nandi District that was the study area has a total population of about one million people. Out of this, there are about 100,000 Muslims and the remaining figure is shared amongst Christians and Indigenous religionists.

It has been demonstrated in the study that the major agent of Islamic expansion among the Nandi were Arab Muslim administrators of the British and Railway workers from Kibigori and Mumias and

Muhoroni. Though the general claim by earlier scholars states that Muslim traders are the major agents of Islamic expansion in the interior of Africa, the research work revealed that the major agent of Islam expansion among the Nandi were Arab traders Muslim administrators from Mumias.

The simple style of presentation of Islam to the Nandi is by similarities between some Nandi indigenous beliefs and practices and those of Islam explain the mode with which the Nandi embraced Islam. The research findings revealed that Islam looked attractive to the Nandi initially and was therefore embraced by some families because of some parallels between its culture and the indigenous culture. The two cultures observed customs like circumcision and polygamous marriage. In addition to these similarities, some aspects of Islam like Muslim feasts and life in the umma made Islam not only appealing but also calling for further propagation by the local people.

The research work has thus demonstrated that the socio-cultural impact of Islam on the Nandi is reflected in the Islamic manner of dressing, greetings and Kiswahili language. The Islamic influence is also felt in other aspects of life like the Islamic monotheistic doctrine, rites of passage and the communal living in Majengo estates. At the same time, it has been shown in this study that conflict and harmony were experienced in the merging of Islam and Nandi indigenous religion. This is expressed in the socio-cultural influence of Islam on the Nandi, where Change and continuity in the beliefs and practices involved were realized. Due to the absorptive nature of the religions, there was the process of indigenizing Islam and Islamizing indigenous cultural practices with the dawn of Islam among the Nandi by mixing indigenous beliefs and practices and those of Islam.

Though other factors hindering the spread and persistence of Islam among the Nandi have been stated, this religion has nevertheless taken sufficient root in the community to enrich the Nandi religious experience and has contributed towards making a new culture among the people. The researcher adduced evidence to the effect that Da'wah, interrelationship between faith and practice, the Muslim library, madrassa schools and the Islamic court are some of the main factors behind the persistence of Islam among the Nandi to date.

The legacy of Islam in the study area by 2000 is reflected in the existence of 25 Mosques and 30 madrassa schools. The legacy is further evidenced by the institutionalization of the Friday prayers, observing Ramadan, and generally striving to combine faith and practice in all aspects of life. The persistence of Islam among the Nandi therefore demonstrates that the contact- situation” between Islam and the Nandi indigenous religion was one of the “penetration” and not “conquest”.

Obviously, some aspects of Nandi indigenous religious have die out, through modern education, other world Religious interaction and partly because of the people’s movement to live in the cities. But we need to remember that Nandi Indigenous religion is complex, and even if certain aspects of it die out, other aspects will survive and many of them will be changed or transformed to meet the needs of the changing times. Indigenous religion embodies a whole world-view, inherited from many generations past. It cannot all collapse in a short time. It has produced Nandi peoples, as they were when they entered the twentieth century, together with their cultures, language, occupations, aspirations and problems. Some of the problems it tried to solve or understand still remain human problems, especially those concerned with birth, marriage, death, the hereafter, suffering, sickness, and so on. It will, therefore continue to have something to say on these issues of human life, even if other religions such as Christianity and Islam, and scientific ways of thought, has come upon Nandi people.

Therefore, the Nandi indigenous religion does not seek to compete with the other religions or with science; it only wants to cooperate in the search for a better understanding of the world in which humankind lives, and in working for the welfare of all people. It cannot be said that Nandi Religion

supersedes others. It is simply the religious systems, which Nandi is developed in response to their life's situations. Up to a point, it gave them satisfactory answers to their problems, quenched their religious thirst, and helped them to find an integrated and meaningful interpretation and understanding of the universe. However, these problems are not static, and the need for understanding the universe is not static. Man is forever expanding his horizon of knowledge and understanding.<sup>139</sup> Nandi Religion has contributed to that ever-expanding horizon. No doubt, it will continue to contribute something but without even pretending to supply all the answers for all people at all times. In a way thus, it has its own limitations; and it would be completely wrong to stretch Nandi Religion beyond those limitations.

### 5.3 Recommendations for Further Study

In the course of the study, new insights emerged which the study could not address all of them. Hence, further research could be directed on the following areas:

1. Factors underlying the predominance of Islamic faith among the Kipsigis peoples yet the two sub-ethnic groups live in the same region and share related historical and cultural structures.
2. The integration of formal education into the already existing Madrassa institutions in Nandi County.
3. Islam and Christianity as agents of change in areas of politics, health and other infrotruactive.
4. Although some works are available on the Nandi, there are other areas on which research could be carried out for example:
  - a) The influence of Nandi Religion upon contemporary missionary churches.
  - b) The religious power and mysteries that surround the Orgoiik people to this day

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<sup>139</sup> Ol, Rev. Basi, 23 April, 2009, Kaptel.

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## CO-DESIGN: CATALYST FOR INCLUSION IN THE DESIGN PROCESS

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### Abstract

Older persons are considered custodians of culture and the knowledge they possess need to be preserved for posterity. Is there a good approach to extract this knowledge and package it for posterity? This paper is an analysis of co-design approach and how it can be used to induce, capture and collect the knowledge, ideas, wishes and hopes of a group of older persons for the preservation of a cultural museum. Through the use of co-design tools, the older persons provided visual narratives that were used to redesign RAMA Cultural Centre in Homabay County. A field survey in Homabay County in August 2016 revealed that RAMA Cultural Centre had many cultural artifacts that were not well preserved and were at a great risk of destruction from environmental factors such as pests, molds and theft. Besides these, the older persons who were the curators of the cultural museum, had not been able to successfully integrate the youth in the management of the museum leading to a possible extinction of this indigenous knowledge. The methodology describes the co-design tools and how they were applied to include the older persons in the design of the RAMA Cultural Museum. The discussion is on co-design approach for novice researchers, possibilities and challenges of co-designing with older persons and concludes with learning on how to effectively co-design with non-designers, specifically older persons, tapping into their dreams and aspirations so as to inform as well as inspire the design development process.

**Key Words:** *Co-design, Co-create, Participatory design, Probes, Prototypes, Generative design tools, Older Persons*

### INTRODUCTION

Co-design refers to designers and people not trained in design working together in the design development process (Sanders & Stappers, 2014). The 1960s and 1970s witnessed a design community, concerned with the involvement of users in the design process for production of more acceptable products (Cross, 1971) and this has evolved to a present day where co-design has become rigorous and is a widely used approach across a range of contexts such as healthcare management, natural resource management, community mobilizations and so on. Co-design is considered collective creativity as applied in the whole design process. According to Steen, et al., (2011) co-design is an approach that enables a wide range of people with diverse abilities to make a creative contribution to the solving of a problem. It is on this basis that co-design is considered a panacea to solving a myriad of problems leading to a great interest in it from different sectors such as business, healthcare sector, government and private sector, the reason being, through co-design, users are empowered and the design process becomes democratic.

### THEORY

How do designers and non-designers engage in a design process? How is information shared between them to the point of a design solution? According to Sanders & Stappers, (2014) co-design considers the ‘user’ as the custodian of knowledge. The role of the designer is then to develop tools and methods through which this knowledge can be harnessed from the user. Brandt et al., (2013) in looking at ways to engage ‘users’ talks about their diversity and how the same can affect the nature of engagement. This diversity is a factor of age, gender, language barriers, literacy levels, all of which necessitate creativity in approaches to engagement.

### **Co-design with communities**

One of the key differences between co-design and traditional design processes is that the design team will face a community and not a 'client' and will involve several stakeholders including government officials and NGO representatives amongst others. The designers will work to co-create with people for whom design, design concepts or design processes have not yet been part of their experience. This is one of the reasons why in preparing for such a task, it is important for the designer to immerse into the community in order to understand its culture, needs and structure. It becomes very important to be observant of social dynamics. The co-design process should never be driven by individual interests, but should be communal and collaborative. To effectively collaborate with the community, the following considerations need to be taken:

#### **a. Build empathy**

Get to know the community before engaging in co-design. Each community is unique and cultures differ from one to the next. Start by knowing the basics; levels of education, language, social structures, expected code of conduct and so on. When a designer becomes one with the community the co-design process becomes easier.

#### **b. Make use of visual materials**

For the community, it may be difficult to understand conceptual ideas on an abstract level. Visualizations have proven to be very useful as a means of presenting ideas and as a basis for discussion and involving the community. Visual clues will reduce complexity and make contexts and correlations tangible and thus comprehensible and will allow people with diverse abilities to participate in the design process. Visual aids also form a basis for storytelling and narratives and will complement spoken explanations and written concepts.

#### **c. Assign roles to the community**

One of the greatest challenges of co-designing is that of treating the community and other stakeholders as equal partners in the design process and allowing each to create. Sometimes the assumption the community makes is that someone has come to solve our problems. It also sometimes becomes very difficult to avoid providing ready-made solutions to the community. Misunderstandings of roles and in consequence frustration can be avoided when processes and roles are continuously and critically reflected upon and explained. The role of the designer is often that of a facilitator and not a creator and for some designers, this becomes difficult. Co-design means that the community should be actively integrated into the design process and be allowed to provide their solutions to their challenges and all parties must be aware that they can or must take a creative role in the process.

#### **d. Feedback**

Providing timely feedback is very important in co-design. It creates a platform for further reflection on the outcomes of the process and can be a breeding ground for greater ideas. Timely feedback also builds trust amongst participants.

### **Co-design with older persons**

Our ageing populations make it critical that older persons continue to live and participate in their communities. The ageing of individuals is associated with a decline in abilities such as sight, hearing, working memory, fine motor control, speed of response and mobility (Siu, Ng, & Chan, 2011). Accompanying these are degenerative illnesses that come with age and a lack of effective social and family support systems for the older persons. These challenges, coupled with policy and governance issues, have led to a surge in the number of studies that seek to address the well-being of the older persons (Beverfelt, 1984; Lindsay et al., 2012; Margot et al., 2015; Siu, Ng, & Chan, 2011; Massimi & Baecker, 2006), mainly focusing on co-design for health management, housing needs, access to technology and use of assistive devices. Little has been done in terms of research on how to tap into the

tacit knowledge the older persons possess. Studies done by Beverfelt, (1984) on life histories of elderly Norwegians, show that the older persons can make significant contributions to culture in general as well as gerontology. Most older persons have a responsibility as culture bearers and their experiences may be used to teach younger generations about culture and for cultural posterity. The challenge is often how to engage the older persons in harnessing this knowledge and expanding its access to the world as a whole.

## RESEARCH METHODOLOGY

### Co-design approach for design research

In recent decades, co-design has become a widely used approach in design research. In it, users and designers work together to create, propose and develop their ideas and solutions together. Co-design is a versatile approach that offers all stakeholders a means of engagement in collective action, creativity, understanding and mutual learning (Sanders & Stappers, 2014). Through co-design, participants offer constructive solutions in relation to products, services and systems. This approach to design has several advantages as compared to classical design approaches shown in *Figure 1* below:

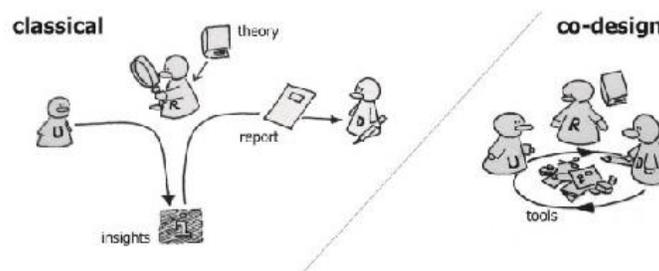


Figure 1: Classical roles of users, researchers, and designers in the design process (on the left) and how they are merging in the co-designing process (on the right).

Source: Sanders & Stappers (2008).

One key advantage is that in co-design, there is direct involvement of people in producing tangible ideas as a means to generate insight and creativity. In addition, the collaborative design experience often helps to uncover and address previously unmet or unrecognized needs. Lastly, the shared decision-making involved in co-design allows people to progress towards shared goals in ways that offer mutual benefit for all participants. It has been observed that involving local stakeholders is crucial in the design of products, services and public facilities (King, 2019). As a result, social researchers and design practitioners are involving local stakeholders in developing a knowledge pool for their specific needs through co-design. This participatory process is considered a means to stimulate creativity in developing effective design interventions.

This project aimed to collect and organize local communities observations and to use their insights to improve the existing designs and operations of RAMA Cultural Centre. Members of the local community in charge of the day to day running of the centre were assembled in a two-day workshop to share knowledge and insight through a participatory design process. This approach allowed a multi-perspective view of problems and design solutions.

### Co-designing with RAMA Cultural Centre members

The researcher in this project applied co-design approach in exploring possible solutions to problems that affect the sustainability of RAMA Cultural Centre. The main objective in establishing RAMA Cultural Centre was to conserve and preserve Luo heritage through collecting, curating and exhibiting Luo material culture. This is intended to lead to the establishment of a vibrant community-based tourism

enterprise. To grow into the greater vision, the center is currently involved in cultural festivals within and around the Nyanza region. They also organize tourism excursions within Karachuonyo to Lake Simbi Nyaima, Homa hot springs, Gor Mahia Shrine and Otok Pottery. However, the centre faces several challenges, key being that the already collected cultural materials are not well curated and are at risk of destruction from environmental factors. The center itself is also in a debilitated state, putting at risk the cultural materials stored in it. Existing exhibition and display does not effectively promote the cultural materials nor provide knowledge on the same. It was therefore evident that there was need for greater public participation in the refurbishment of RAMA Cultural Centre. Based on these challenges, the researcher conducted a co-design workshop with an aim of building on tacit knowledge of the local community and riding on their vision to build a sustainable centre in terms of activities, visitor numbers and economic benefits. The main objective of the co-design workshop was to improve on the exhibition and display at RAMA Cultural Centre, which the participants agreed on as the backbone of their enterprise. The participatory design research exercise involved a group consisting of six older persons, a designer (undertaking the role of the researcher) and a research assistant. These people were engaged in sharing their views about material culture, how to promote it in the community and best ways of exhibiting and displaying the material culture so as to engage visitors and enable them learn more.

### Co-design tools and techniques

Participation in co-design is not a one approach, but a myriad of design activities that together provide the basis for the envisioning of the new. Designers and non-designers engage in activities focusing on telling, making and enacting as ways of enhancing participation.

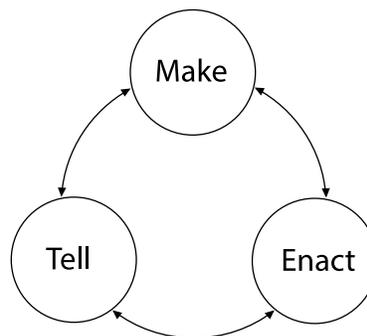


Figure 2: A participation in design by stakeholders involves tools and techniques that combine telling, making and enacting. The tell-make-enact diagram is circular with double-headed arrows to illustrate how the actions are connected and to indicate that participation goes both ways in the circle.

Source: Brandt, Binder, & Sanders, (2013)

Stappers and Sanders, (2008) suggest that in order to participate in the design process, the *users* must be given appropriate tools to express themselves. They suggest the development of co-designing tools and techniques such as three-dimensional toolkits that allow common people to communicate their own ideas.

The main objective of this project was to improve on the exhibition and display at RAMA Cultural Centre. One of the agreed on approaches by the participants on achieving this was to first align the exhibition and display along certain themes. The researcher used probes to enable participants come up with themes for the exhibition and display. Probes refer to design-led approaches that invite participants to express their experiences, feelings and attitudes in forms and formats that provide inspiration for designers (Gaver, Dunne, & Pacenti , 1999). Probing is a form of exploratory and design oriented self documentation method. Probing kits come in endless variations such as post cards, diary books, maps,

instant cameras and so on. In this project, the researcher provided the participants with cards (*Figure 3*) that had images of all the cultural materials in the museum<sup>140</sup>.

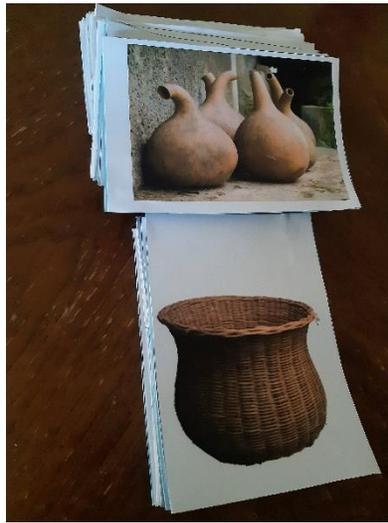


Figure 3: Pictures of cultural materials to be used in Card sorting  
Source: Author (2019)

Once the themes had been identified, the second step was to come up with a prototype of the physical exhibition and display which would align to the identified themes. The researcher came up with three-dimensional toolkits as shown in *Figure 4*, *Figure 5* and *Figure 6* below:



Figure 4



Figure 5

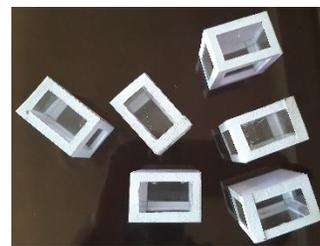


Figure 6

The use of 3D models was informed by the research of Sanoff (2000; 2010) who provided participants with small scale paper based representations of physical components (trees, buildings, people) to allow them to explore physical design options for interior and exterior environments. Similarly, also informed by the research of Sanders, (2003) who has been exploring with the use of 3D prototypes for hospital planning and architecture. Basing this project on the works of the mentioned researchers, participants at RAMA cultural centre were provided with small scale paper models of display units and a model of the interior of the centre and were asked to explore different options of displaying the cultural objects. As they were working on the exhibition and display of the interior space, they also explored the flow of movement within the centre.

## FINDINGS

### Current State of RAMA Cultural Centre

<sup>140</sup> During the planning for the workshop, the researcher took individual pictures of each item in the centre and printed them on card size papers. This were then used for card sorting

The physical structure at RAMA Cultural Centre is in a deplorable state. The exterior is made from iron sheets, which are not well reinforced (Figure 7). This has led to instances where the centre has lost some items to thieves who can get easy access to the museum. The interior (Figure 8) is dark with no lighting and poor ventilation. This results to a humid environment, which can cause molds on objects and is also a good breeding ground for such rodents such as rats, which are a danger to the artifacts.

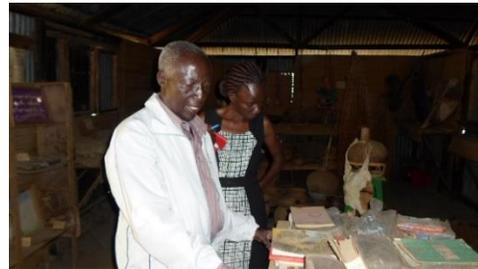


Figure 7 (Left) and Figure 8 (Right): RAMA cultural centre museum, exterior and Interior spaces.  
Source: Author (2019)

The cultural items on display needs to be protected from environmental effects such as dust, insects, rodents and accidental breakages through proper displays and preservation. *Figure 9* below shows objects displayed on the ground without a barrier around to prevent them from accidental breakages. *Figure 10* below shows items stacked on to each other probably due to lack of space. This display makes it difficult for visitors to get a full experience of the items. *Figure 11* below shows breakages on items due to improper display. *Figure 12* below shows books and other texts on display but they are not protected from dust and are susceptible to destruction by insects or rodents.



Figure 9: Items on the floor



Figure 10: Items stack together



Figure 11: Breakages



Figure 12: Dusty books

It is on this backdrop that this project was about redesigning the exhibition and display at RAMA Cultural Centre.

### Exhibition and Display Themes

The older persons came up with a display proposal meant to tell the story of the Luo people. The story revolved around food and according to the group, everything about the Luos can be discussed around food. The story tells how food is gathered, prepared, served, stored and how food by-products are used. *Table 1* below shows items under each category of the story:

**Table 13: RAMA cultural centre display narrative**

CATEGORY	ITEMS
Gathering	Bows and arrows, Fishing nets, Ropes, knives etc
Preparation	Pots, Grinding stone, Spoons etc
Service	Calabashes, bowls, stools, mats etc
Storage	Baskets, Pots, Food holders, calabashes etc
By-products	Musical instruments such as drums, nyatiti etc
Others	Books

Source: Author (2019)

The visual representation of the proposed exhibition and display of RAMA cultural centre can be summarized in *Figure 13* below:

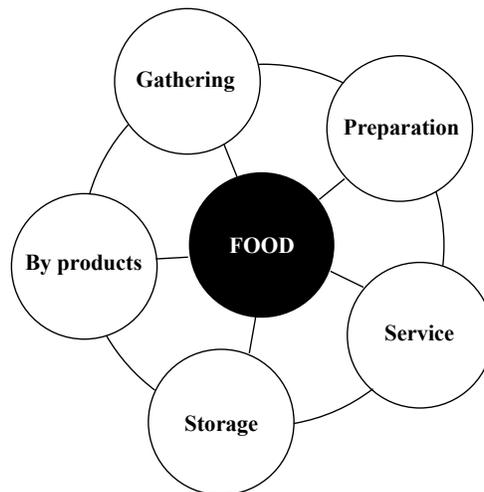


Figure 13: Display narrative at RAMA cultural centre  
Source: Author (2019)

Using the provided 3D models, the participants agreed on exhibition and display layout is shown in *Figure 14* below.

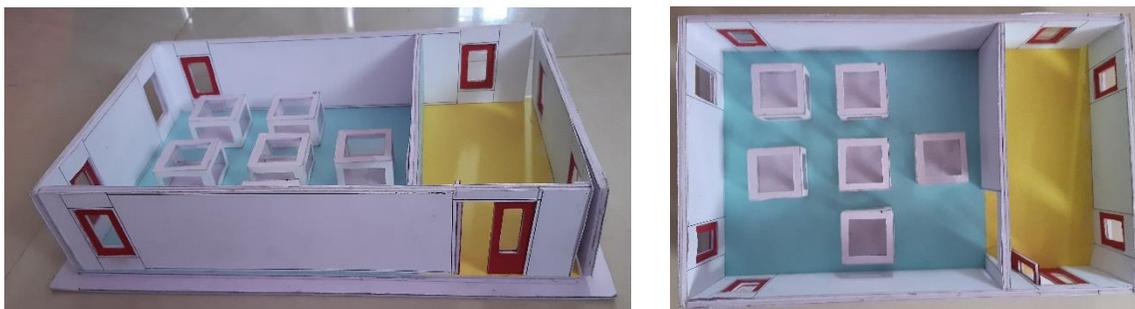


Figure 14: Display design for RAMA Cultural Centre

Source: Author (2019)

## DISCUSSION

### **Navigating Co-design as a Novice Researcher**

From literature, it is noted that there are a myriad of co-design tools and techniques but no guidelines on the choice of tool or technique for a particular project. This makes it very difficult for young researchers to engage in co-design as an approach for creating. To avoid a ‘hit and miss’ as related with the tools and techniques, some learnings from this project include but not limited to:

#### ***a. Having an indepth understanding of the participants Demographics***

Demographic is the statistical characteristic of a population such as age, gender, income, education, race and so on. Having a prior knowledge of this can help the researcher determine the appropriate tools and techniques. For instance in this project, the participants were male, elderly, had a form of basic education and would be considered to be of low-income bracket. As a result of this, the choice of tools and techniques to use needed to be visual, quite easy to navigate and devoid of technical jargon.

#### ***b. Mindset***

Mindset, especially when co-designing has been a challenge in design circles for long. Co-design is basically a collaborative process that engages with users in equal partnership with an aim of achieving meaningful, realistic and workable solutions to real social issues. The designer needs to acknowledge the community as the ‘expert’ while at the same time, the community have to be confident in their ability to create. A designer getting into this space need to be open and facilitate co-design sessions without undermining the community. This may need a level of education in co-design as a practice. The designer needs to raise awareness in the community and enable them to engage in a way that gives them the confidence in their ability to create.

A community that has a history of political injustices, retrogressive cultural practices and sometimes low literacy levels, may rarely view themselves as capable. In this project, the researcher came to the realization that members of RAMA Cultural Centre have a long history of reliance on aid from the government and aid agencies. Most of them perceived the planned workshops as sessions where the researcher will present her ideas, implement them and engage them in different ways. It took a while for them to adjust to the idea of co-design. The researcher on the other hand had to develop tools and techniques that put them on the creators pedestal.

#### ***c. Facilitation***

A facilitator is a person who monitors the design process and develops strategies to create new encounters between the community and the design problem. One important characteristic of a facilitator is to play a neutral role. Community participation may involve large numbers of people, each with diverse opinions. The dynamics of large group discussions may often lead to awkward disagreements and dead end discussions. The facilitator then becomes the person to guide the group through such challenges by offering a supportive voice to every participant during the co-design sessions. Facilitation therefore becomes management of team dynamics

Successful facilitation in this project begun by choosing the right tools and techniques, based on the type of participants and the problem to be solved. The next was in guiding the participants along the phases of co-designing. Each activity was clearly defined and expected end result agreed upon. The community was also provided with real-time representation of what was going on during the sessions.

### **Experiences of engaging with older persons in Participatory design**

Empirical research proves that older persons are capable of engaging effectively in participatory design activities (Lindsay et al., 2012; Massimi & Baecker, 2006). However, every designer needs to be

cognizant of the fact that age brings with it challenges that may limit the choice for the methods and tools for participatory activities and necessitates that the process is well thought out. Lindsay et al., (2012) observed that while engaging in participatory design with people living with dementia in the design of safe walking aids, there was a lot of struggle amongst the participants in envisioning the new technologies. A similar observation was made by Massimi & Baecker (2006) when engaging older persons in the development of mobile phones.

Several observations were made in this project as regards working with older persons in a participatory design process. One of this was that the older persons were delighted by the opportunity to discuss their experiences, with a hope that those experiences would be a springboard for great design ideas. The choice of co-design tools and methods should be those that encourage discussion, whether visually or verbally. The language used in design sessions and the structure of the sessions need to acknowledge the limitations brought about by aging. One of these limitations is the inability of older persons to stay focussed on a single issue for a considerable duration of time, making it necessary to have several short sessions with breaks in between. Other limitations included physical and sensory disabilities, difficulty in envisioning future scenarios which is important in participatory design.

### **The challenges of engaging with older persons in participatory design**

Any engagement with older persons is not without its challenges and findings from other studies in this area correlate with the findings of this study. Identified are four key factors to consider in participatory design with older persons.

#### **a) Make use of simple and intuitive co-design tools and methods**

Technology is considered good and can make work easier and faster. However, for older persons, adapting to technology is sometimes a challenge. In co-designing with older persons, there is a need to use simple and basic technology, which is intuitive to use. In this project, one co-design approach would be to ask participants to build a photo diary of what they thought a good exhibition and display of a cultural museum would look like. One challenge of this approach is that most of the older persons have mobility challenges and when there was need for travel, it was often not for leisure. This approach would also be limited in case the older persons do not have access to cameras and even if they could get access, they may be limited in the knowledge of how to use it. Alternative to this co-design approach was the use of sketches. The participants would be allowed to describe in detail examples of good exhibition and displays they have seen. The designer then would translate these into an illustration and all would provide feedback as the sketch is developed. In this project, the older persons were given 3D models to use to reconstruct the exhibition and display at RAMA Cultural Centre.

#### **b) Build a rapport and relationship with the older persons**

It is often so easy for the designer to focus on getting information from co-design sessions instead of seeking to build a relationship with the older persons. Doing this helps build trust that leads to better participation and a sense of ownership of the project by the older persons. The co-design tools should be those that engage in a way as to create a deeper connection with the older persons. Create an atmosphere where the older persons can freely express themselves either visually or verbally.

#### **c) Anticipate potential physical and cognitive limitations of older persons**

Based on research, all five senses (taste, touch, sight, hearing and smell) decline with age and as such, you find that most older persons may suffer from low vision, hearing loss and mobility impairments. To mitigate the effects of these limitations on the outcome of the participatory design, start by choosing an appropriate venue. Avoid staircases because there will be those on wheelchairs and walking aids. When communicating, use bigger print sizes and when talking, try to be audible. When addressing older

persons, stand or sit in a location where everyone can see your face clearly since some older persons with hearing loss rely on lip reading.

**d) Be flexible and have shorter sessions**

When engaging in participatory design with older persons, be flexible. Allow for time outs when is needed. Let the choice of co-design tools and methods be varied and choice of use optional. Older persons often do have a short concentration span and that must be put into consideration during the planning phase.

**CONCLUSION**

This project has identified co-design as a versatile approach that offers all stakeholders a means of engagement in collective action, creativity, understanding and mutual learning. As a participatory process that stimulates creativity in developing effective design interventions, it provides a multi-perspective view of problems and solutions. Due to the physical and cognitive limitations of older persons, a lot of consideration needs to be put in place when developing co-design tools for use by them. One key observation is that the co-design tools need to be more visual other than textual. It is also possible to make use of tell activities, make activities and enact activities while co-designing. Preferable would be use of story telling, probes, scenarios and various generative toolkits.

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## Proposed Workshop to Investigate the Psychosocial Effect of COVID-19 Pandemic, on Children playing with Painting and Clay modeling

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### ABSTRACT

Children's play welfare is already disrupted due to COVID 19 controlling measures put in place by the government of Kenya. Child's development experts asserted that if a child is inhibited to playing, there are bound to be psychosocial consequences for early childhood development. Various reports on Ngwacho (2020), Nandkar (2020), EdTech Hub Survey (2020), Schleicher (2020), United Nation COVID-19 Report (2020), and UNICEF Report (2020) has documented the dynamics and effects COVID-19 pandemic. Educationists and therapists posit that play with painting and clay goes beyond recreation to include the expression of desires, traumas, and elaboration of their conflicts and emotional healing. The aim of proposed workshop is to re-direct children to playing with painting and clay modeling as way of relieving effect of COVID-19 pandemic. It also intended to re-establish the role of play with painting and clay as a mitigating measure on children psychosocial effected by COVID-19 as school reopens. The researcher will employ a qualitative research approach complimented by quantitative method as seemed appropriate. A case study, population and a sample will be drawn from pre-schools as defined by Competency Based Curriculum CBC (2017) at Embakasi East sub-counties of Nairobi. The workshop will employ probability stratified random sampling on children aged 3-7 year. The evaluation and analysis of data will focus on the psychosocial effect of the COVID-19 pandemic on children playing with painting and clay modeling. The data will be collected using photography, video camera and checklist as guided by the relevant professional expertise. The researcher together with other assistants will participant in the play session. The workshop will consider COVID 19 health protocols and children's right principles during workshop participation. The result of the workshop will hopefully inform the stakeholder in understanding of unresolved psychosocial effects of the COVID 19 pandemic as well positively influence future professional interventions.

**Keywords:** *COVID-19 pandemic, children welfares, play, Paintings, Clay modeling, psychosocial effects*

### INTRODUCTION

Even with reopening and closing of school and business, the world is still grumbling with devastation of COVID 19 ravages as predicted in EdTech Hub Survey (2020), United Nations' COVID 19 Report (2020), Schleicher (2020), and UNICEF Report (2020). The reports had foretold a severe psychosocial negative consequence such as upsurge of aggressive behaviours, family conflicts; misunderstand among the member of public and lack of concentration in school among others. Nandkar (2020) associated psychosocial negative consequences of COVID-19 to stress disorder influence by the worries of the futures, economic un-stability, increase of COVID-19 infection, massive death of close member of society, and abrupt change of routine. In schools, UNICEF Report (2020) and Ngwacho (2020), noted that children welfares among them play, were affected by COVID 19. Botelho (2015) and Schirmacher (2002) highlighted that play welfares are among critical component of socialization and communication on growth and development children. The proposed workshop is A Fine Art that is responding to the call COVID-19 mitigation solutions as recommended by United Nations' COVID 19 Report (2020), and UNICEF Report (2020). It is also riding on the urge of Ministry of Education to collaborate with any social support group or discipline such religion and mental health expert to offer the psychosocial support and counseling to children effected by COVID-19 according to Ngwacho (2020). For instance, aftermath of ethno political violence in 2007 decade ago, Non-governmental Organisations in conjunction with the Kenya government utilized drawing as a mitigation tool to

children and youths affected by post-election violence according to Wambugu (2015). In that case, proposed workshop acknowledges that despite play with art been regarded as a fun activity; is also an effective vessel for therapeutic healing on depression and aggression behavior among children (Kendall, Williams & Finkelhor 1993).

### **Statement of The Problem**

Once schools and children gathering reopens; intolerance, and emotional responses will always carry the day due to effect of COVID 19 on healthy psychosocial as cited by Ngwacho (2020), Nandkar (2020), EdTech Hub Survey (2020), Schleicher (2020), United Nations' UN Covid 19 Report (2020), and UNICEF Report (2020). They have noted that if COVID 19 psychosocial effect are not mitigated, they bound to cause to a more life time negative consequences to the advancement of humanity.

van de Kolk (1994) and Mclead (2020) posits that human being are vulnerable to any psychosocial crisis resulting to personal contradiction relayed in various defense mechanism. van de Kolk (1994) and Talwar (2007) explained that a personal contradiction is imprinted in person mind as trauma, playing on emotions, images sensation and muscular reaction. Martin (2009) noted that pre-schoolers' traumas are displayed in symbolic play, aggressive behaviours and art expression due to the formative stage of growth and development. van de Kolk (1994) and Talwar (2007) cautioned that if traumatic experiences are not intervened by either diagnosis of transference, expression or even analytical amplification, they bound to cause greater damage in the development of child well. Therefore, the proposed workshop intends to actualize the theoretical validity of play with painting and clay modeling to children affected by the psychosocial effected of COVID-19 pandemic.

### **Objective of the Proposed Workshop**

The objective that will guide proposed workshop were as follows.

- i)** To identify Post-Traumatic Stress Disorder (PTSD) on children in the global crisis.
- ii)** To establish the mitigation employed on the global crisis.
- iii)** To establish the application of art mitigations in local crisis.
- iv)** To apply the play with painting and clay modeling in preschooler within Nairobi County.

### **Significance of the Proposed workshop**

The proposed workshop will be a source of mitigation tool for education stakeholders in helping the community to understand the inner conflict feeling of learners in the midst of COVID 19 pandemic. The result of the workshop will inform the general public to understand unresolved psychosocial effects of the COVID 19 pandemic as well positively influence future professional interventions of any global crisis in the community.

## **LITERATURE REVIEW**

### **Play with Painting and Clay modeling**

According to Ogutu (2021) play is activities that involve the freedom of mind that is; found outside ordinary life. He pointed that play is characterized on non-seriousness that absorbs the player's mind. He also explained that symbolic play is mostly associated with painting and clay modeling are represented in the form of abstraction and ambiguous pictures of child expression. A lot of symbolic play in children are expressed in scribbling (age 1-3) and schematic (age 4-7) in the artistic development stage, according to Lark-Horovitz (1967).

Ogutu (2021) pointed out that painting and clay modeling are among art materials/elements used to express feelings or perceptions of the children's' world. Muyanja (2011) defines painting as a method of executing artworks using colour pigments known as paints on distinctive enduring surfaces, while clay as a malleable soil material obtained from the swamp that is manipulated by hands. On the other

note, Muyanja (2011) demonstrated that clay has a smooth tactile feeling that makes it easy to manipulate any abstract representation of three-dimension basic forms. He concluded that the process of painting and clay modeling is an exciting and overwhelming process. Lark-Horovitz (1967) concluded that play that involves art painting and clay modeling among others are instruments for a child to gain a great understanding of their personality, emotions, and environment

### **The History of Global Crisis**

Milne (2012) and Erik (2003) explained that influenza pandemic killed more than 20,057 people, and made more than 800,000 people ill. He estimated global death from the influenza at death rate of 40 to 100 million people, and infected between one 1<sup>st</sup> - 5<sup>th</sup> of the world's population. They noted that the influenza swept around the world in three or four waves over the two-year period, making it the largest of all known influenza pandemics. Freh (2015) and Erin, (2015) posited that between 1945 and 1992, there were more than 149 major wars, killing more than 23 million people. They pointed out that warfare such as World War II, terrorism and other pandemics such as HIV/AIDS have significantly affected children. They concluded by approximating those 2 million children were killed; 4-5 million disabled, 1 million orphaned and 12 million dislocated from their home. The proposed workshop has established from World Health Organization (March 2020- July 2021): WHO COVID-19 Dashboard the similar predicament of COVID-19 to previous influenza pandemic. The WHO COVID-19 Dashboard has recorded 188 people infested illness, and 4 million on death mortally leaving several children orphans as screened on World Health Organization (March 2020- July 2021). However, various continuation statistic reports released by World Health Organization (March2020-July 2021), and Ministry of Health (March2020-June2021) is still recording high infection increase of COVID 19 and mortally death rate term as first, second and third waves.

### **The display of Post-Traumatic Stress Disorder (PTSD) as result of Global Crises**

Briere (2015), Freh (2015), Erin, (2015), Milne (2012) and Erik (2003) identified some major psychosocial disturbances pigged on global crisis such as World Wars II, terrorism, and Spanish flue among others to humanity. Briere (2015), and Freh (2015), mentioned posttraumatic stress, cognitive distortions, altered emotionality, dissociation, impaired self-reference, disturbed relatedness, and avoidance. Gil, (1991), narrowed psychosocial discerption to symptoms such as a posttraumatic stress disorder (fear and anxiety), aggression, depression, and aggressive behaviors once when subjected to any crisis. Freh (2015) and Erin, (2015) demonstrated negative consequences that children living in war zones are vulnerable to develop some form of Post-Traumatic Stress Disorder (PTSD) on their life time. Freh (2015) highlighted that children exposed to war-related, terrorism, crime and pandemic manifests in post-traumatic stress disorder and other psychiatric morbidities including depression, disruptive behaviors, and somatic symptoms.

For instance, the underplaying of psychosocial on a group of 94 Iraqi children; whom exposed in the bombing of the Al-Ameriyah shelter 1991, found to have developed Post-Traumatic Stress Disorder PTSD symptoms according to Freh (2015). They realized that majority of children experienced depression, anxious and afraid of losing other members of their family. Another the interview connected to the experience of the Spanish influenza pandemic in Ireland, found that the flu caused human tragedies such orphaned children, the widowed spouses, and changed economic circumstances according to Milne (2012). It is therefore clear that psychosocial effect of COVID-19 on children relates and depicted into PSTD among children subjected to bombing, warfare, influenza pandemic among others. Similarly, Schleicher (2020), United Nation UN Covid 19 Report (2020), UNICEF Report, (2020), Ngwacho (2020) and Nandkar (2020) has highlighted the similar Post-Traumatic Stress Disorder PSTD and negative consequences of COVID 19 on current situation among the children.

### **The Mitigation employed in Global Crisis**

Schleicher (2020), United Nation UN Covid 19 Report (2020), and UNICEF Report, (2020) analyzed the past global crisis as revealed by Freh (2015), Milne (2012), Erin, (2015) and Erik (2003) and then recommended mitigation approaches in order to intervene psychosocial consequence. The aim was to respond to reduce stigmatization and discrimination as result of global crisis among the children's mental health for well a longer-term. In Kenya, Ngwacho, (2020) has applauded the effort of Ministry of Education in supporting the COVID-19 psychosocial support, counseling and COVID-19 programmes in schools. CNN, BBC, CCTV News, Al Jazeera, among others (March 2020-June 2021) have reported various government agencies, religious leaders, politicians and psychologist have been offering mitigation and social support in the community effected by COVID-19. Therefore, the proposed workshop is among the mitigation tools of solution as recommended by United Nation UN Covid 19 Report (2020), and UNICEF Report, (2020) and Ngwacho (2020) among others. It has also responded to 3<sup>rd</sup> annual conference 2021 at Machakos University under the theme: *Responding to Emerging Global Challenges through Research, innovation, and technology for Sustainable development*, - with aim of employing fine art discipline to provide a solution the current global crisis in community especially schools.

### **Application of Art mitigation on the Local Crisis in Kenya**

Apparently, the proposed workshop connects with Wambugu (2015) art mitigation study, whose aim was to investigate the effect drawing on children affected by aftermath of ethnopolitical violence in 2007. The study was conducted on the children of age 7-12 within primary schools in Nairobi County. It also slightly connected to Omuyoma, (2011)'s art mitigation measure, whose aim was to use psychodramatic role-playing on communication to youth in Msambweni sub-county in Kwale-Kenya, affected by psychosocial effects of HIV/AIDS. Both studies from *The school of Creative, Performance Arts, Film and Media Studies, at Kenyatta university* have ascertain the mitigation role of play and art as vital clinical diagnosis and therapeutic healing to children or youth affected by psychosocial effects on any global crisis. Gil, (2002) and Malchiodi (1998) emphasized that children or youth affected by psychosocial effect of any crisis; are bound to express trauma, elaborate emotional conflict and healing through art creation or playing with art. Ogutu (2021) concluded that play with paintings and clay modeling are sources of therapeutic healing, development for self-attachment and behavioral dysregulation to children. The proposed workshop is satisfied that is relating to previous application mitigation art tools, and It will shift its objective and attention to target the current crisis situation of COVID-19 pandemic. Therefore, it will employ painting and clay modeling on investigating the effect of COVID-19, due to accomplishment nature of its element/ material (Painting and Clay) which has been theoretical applauded by experts to have overwhelming therapeutic healing in play process.

### **METHODOLOGY**

The proposed workshop will employ mixed research design (qualitative and quantitative), considering that the study will involve play within a school set up and number of children. The mixed research design will vary on its' objective, literature review and the validity of psychanalysis instrument. The quantitative research will consider the number of sample and numeric collection of data. The study will be carried out in middle class income within Nairobi County; -Embakasi East sub counties as indicated in Kenya National Bureau of Statistic (2019). However, the researcher is mindful of COVID-19 unpredictable dynamic and it elusive nature on psychosocial effects among low, middle, and upper social as reported on daily statistic by Ministry of Heath (March 2020-July 2021).

The target population and primary data will be the children of age 3 -7 years as noted by Competency Based Curriculum (CBC) due to the availability of preschool in schools and symbolic expressive nature of preschooler. The sampling technique of target populations will be probability stratified random sampling, whereby the number and population of school in Embakasi East will be identified, defined and then subdivided based on age into groups for sampling. The data will be collected using

photography, video camera and checklist as guided by the relevant professional expertise. The researcher will develop un-structure focus group of 6 participants on each play session. The assessment of psychoanalysis will be purely guided with a help of relevant professional expertise.

The researcher will seek an authorization consent from the relevant administration. It also intended to upheld high professionalism standard in conducting the workshop, analyzing the data, writing a report and recommendation. The researcher will continue to seek an assistance of relevant professional expertise to help in interpretation of the data and analyzing observation. It will strictly follow the COVID-19 protocol as laid by the Ministry of Health and concerned school administration. The proposed workshop will seek an assistance from Project management for accountability, transparency and successful workshop.

### **CONCLUSION**

The global crisis such as COVID-19 pandemic, warfare, HIV/AIDS and terrorism among others has been found to perpetrate acts of violence, which affects the welfare of children. Children are vulnerable recipient of psychosocial effected of any global crisis, due to their formative development stage of development on communication and socialization. Play with arts is an effective mitigation tool for traumatized children affected by any crisis. It permits children to express their constricted feelings of anxiety, emotion, fear, confusion, or loyalty conflicts.

As the government of Kenya reopens school with caution from COVID 19 protective measure as noted by (Kenyatta, May 2021), the proposed workshop should be actualized not only to ascertain theoretical validly of play with painting and clay modeling on the children effects by COVID-19, but to offer a therapeutic healing to the traumatized children in our community. The proposed workshop will be successful if it receives the partnership and support from various stakeholders. Lastly, adequate monetary funds should be availed to facilitate the cost expenses of the workshop, material and equipment and emergence response cover of COVID-19. This because COVID-19 is an elusive and un predictable pandemic as stated by Ministry of Health (March2020- July2021) reports.

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## Benefits of Psychosocial Interventions on Traumatized Children Living in Difficult Environments in Mbeere North: A Systematic and meta-analysis

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### ABSTRACT

This study examined the benefits of psychosocial interventions of traumatized children living in difficult environments. Psychosocial interventions refer to additional forms of assistance for child development other than educational or practical interventions. Children who have experienced any form of trauma or lack necessary basic needs require additional and specific psychosocial interventions. From reviewed studies, substantial evidence shows that exposure to traumatic experiences out of living in difficult environments can affect brain functions of children, have long-lasting consequences resulting to poor mental health and various psychological and social problems. All forms of abuse, abandonment, neglect, poverty, illness, disabilities, pandemics, loss, and conflict, among others can all have negative effects on a child's psychosocial wellbeing. Trauma directly causes stress fears as well as emotional reactions and memory processes. While several studies have shown the benefits of use of various forms of psychosocial interventions such evidence has been inconsistent, with results varying significantly based on various factors, such as gender, culture, age, economic status setting and conflict-phase, and various forms of disabilities. Very few studies have been conducted in Mbeere North Sub-County, as regards the significance of psychosocial interventions such as psychosocial counselling regardless of the numerous cases of children going through traumatic experiences and in particular during this time of Covid-19 pandemic. Additionally, the data supporting the importance of psychosocial interventions in Mbeere North on traumatized children has not been well synthesized. Based on the evidential inconsistencies, there was need to conduct a detailed analysis on significance of psychosocial interventions used on traumatized children exposed to traumatic experiences due to living under difficult environments for healing purposes. To establish the benefits of psychosocial interventions, a systematic review and a meta-analysis was conducted by searching published studies from online databases, including PubMed, Clinicaltrials, and various relevant journals dating from 2000 to 2020. The results from nine randomized control trails indicated that provision of psychosocial services on traumatized children enhances the implementation of children's rights, promotes personal and community peace and reconciliation, helps children improve on self-esteem and social awareness, improves children's emotional intelligence, and brings in healing to broken hearts as well as helping individuals live in a more satisfying lives. The results indicated a weighted mean of Cohen's  $d$  0.6 effect size in post treatment period. The results also indicated that the change between the intervention and control groups was statistically significant at  $p < .05$ . Findings further indicated that the assisted children had positive coping, enhanced hope, and reduced their fears, as well as being able to socialize and some accepted to return to school. The study recommends that teachers, parents and care givers be taught skills of dealing with in child trauma so that they can assist their children. The study also recommends that the stakeholders in Mbeere North sensitize the community and the parents on the benefits of provision of psychosocial interventions so that they can help children deal with post-traumatic stress disorder complications. Further, the local community needs to be economically empowered so that they can support their children towards accessing education and other services.

**Key words:** *Difficult Environments, Psychosocial interventions, Psychosocial Counselling, Trauma, Posttraumatic Stress Disorder.*

### Background

There is significant research in scientific literature showing the enormity of resources in children that help them in negotiating the common challenges of life. However, such resources can be damaged by

child traumas that a child goes through (UNICEF, 2009). In possession of their fast-growing intelligence, creativity, emotional range and social relationships as well as other assets, children have a way of meeting their own needs and overcoming difficulties. However, to overcome difficult times, children also depend on support of others, such as members of their families. In some challenging situations like continued hunger, separation of family, stricken poverty, all forms of abuse, abandonment, neglect, infections, disabilities, pandemics, loss, and conflicts, among others may cause trauma in children and this weakens competencies. Additional support during such aforementioned times may be necessary to help children cope with adversity, regain a sense of control and so that they can function as before (UNICEF, 2009). This study reviewed other studies and explored on the benefits of psychosocial interventions to the traumatised children living in difficult environments in Mbeere North.

Reviewed studies have shown that exposure to trauma in children living in difficult environments can result to poor mental health and other various psychosocial problems, prompting the need for psychosocial interventions including psychological support (Purgato, et al., 2014). In his work Hansen, (2014) in a book called “*A Handbook, Psychological Interventions*” describes psychosocial support’ as the procedures aimed at addressing both psychological and social needs of a person, his or her family or community. The International Federation of Red Cross (IFRC), (2020) states that psychosocial support represents the close and intense relationship between a person and the collective attributes in a given social entity.

According to Da Silva, Cardoso and Chronister (2009), teachers, counsellors, parents, teams of medics and different care givers as a multi-disciplinary team are in a position to provide psychosocial interventions to traumatized children so as to help them deal with the troubling issues. The multi-disciplinary team can conduct different types of assessment on the traumatized children through a each case theory and predict the form of intervention measures that need to be applied (Sherry & Nancy, 2013). Another benefit of psychosocial interventions noted in the reviewed studies is that the traumatized children acquire psychosocial adaptation towards achieving good fitness in a person-environment congruence described as adjustment (Da Cardoso & Chronister, 2009). By providing different types psychosocial interventions to the traumatized children, reviewed systematic and meta-analysis research has shown that children can attain psychological resilience.

Ian and Christine (2014) explain that psychological resilience is the ability of an individual to emotionally or mentally cope with a crisis, thus helping such an individual to promptly return to the status they were in prior to crises such as those experienced during childhood traumas. The National Institute of Mental Health (2020), describes childhood trauma as an emotional, painful or distressful event experienced by a child that more often than not leads to long-lasting physical and mental effects. Majority of children and youth living in difficult environments like some children in some sections in Mbeere are usually faced with greater risks for poor mental health due to exposure to unpleasant experiences, long time drought contributing to inadequate food, water, basic needs and others live in abject poverty. Other contributing factors include traumatizing include, emotional and physical abuse, insecurity, violation of human rights, poverty, or lack of basic needs domestic violence natural calamities, and wars, among others. Smith et al. (2020), emphasize that children and youth living in poor families are likely to experience trauma due to disasters and scourges, such as the novel coronavirus pandemic, HIV/Aids and other chronic disease, violent crimes, armed, family conflicts and other similar traumas. Trauma causes psychological trauma, (UNICEF, 2020).

The American Psychological Association (APA), (2019) describes trauma as an emotional response to dreadful events, such as natural disasters, accidents, experiencing tragic ordeals such as rape, or losing a loved one and family separation like divorce among other factors, which can cause psychological trauma. Another study report by SAMHSA (2015) identified an array of potential traumatic events that

children commonly go through. These stressful events include factors such as physical abuses, neglect, abandonment, psychological factors, experiencing or witnessing domestic violence; community or school violence; sexual exploitation or physical or sexual assault; violent or sudden loss of a family member or friend; experiences of war or living as refugees; and neglect among others. Reviewed studies have shown that when children are faced with potential harm, their bodies' *alarm systems* get activated in an attempt to fight or run away from harm, which subsequently leaves children feeling irritable, angry, scared or withdrawn (Copeland, Keeler, Angold & Costello, 2007) & the American Psychological Association (2011) and this calls for psychosocial support interventions.

Research reported by Pearce, Murray and Larkin (2019) shows that vulnerability to trauma in children is tied to the fact that their brains are still being developed. During tragic events, children go through a state of heightened stress, which sets off the body to release stress and fear hormones. Research findings state that such developmental trauma may be damaging to young children as it may cause disruption to normal brain development. Persistent trauma can substantially impact on long-term development in child's behaviour, mental and physical health. The feeling of fearfulness and helplessness in children may persist into adulthood, leaving such children with heightened risk of future traumatic effects and post-Traumatic Stress Disorder (PTSD), thus requiring psychosocial interventions (UNICEF, 2020).

A report by Substance Abuse and Mental Health Services Administration (SAMHSA) (2015), indicated that at least 70% percent of American children go through a traumatic event before celebrating their sixteenth birthday. Studies further as reported by Shriberg (2013) have shown that about 70% of children growing with a single mother live under low income status, while only about 30% of children live in other forms of family structures. This low income situation has its own negative effects, such as psychological and social emotional problems on children. Study results by Mohamed and Toran (2018) show that socio economic status of a family play an important role in influencing children's social emotional development.

More studies as reported by Eshleman (2020) indicate that long term and bad experiences can have devastating effects to the most vulnerable. During calamities, children are the most vulnerable members of the society and may in search of refuge even be forced to leave their homes, at times being separated from families and caregivers in the confusing escapades. This situation causes a lot of fear and trauma children and the whole family (UNICEF, 2009). Whether in ones childhood or adulthood, being exposed to trauma may end up increasing risks for various mental health problems that may last in one's lifespan such as PTSD (Breslau, Chilcoat, Kessler, & Davis, 2014).

Published studies by Harder, Mutiso, Khasakhala, Burke and Ndete (2012) on post political election violence, multiple traumas, and posttraumatic stress among children from poor families in Kenya indicated that experiencing violence related to elections caused multiple traumas, and had high levels of PTSD. Many children and young people continued to experience PTSD symptoms for over a period of 6 months subsequent to postelection violence. The study further indicated that those who said they experienced multiple traumatic events had a high likelihood of experiencing PTSD. Reported studies by UNICEF (2019) and UNESCO have shown that children face diverse challenges, including. These include altered family dynamics, older children assuming the role of caregivers to their siblings or taking care of physically or psychologically injured or ailing parents. Moreover, those who resettle across struggle with problems including foreign culture, learning new languages, and trying to adapt to different education systems under challenging circumstances (Reed et al., 2012). Study reports by WHO (2008) indicate that UNICEF and UNESCO provide support services to children in disaster areas by evacuating them to safer places and also participate in offering psychosocial support activities to children, adolescents, caregivers, families, and the wider community through a range of psychosocial interventions that meet their complex needs.

Munda, Munene & Nyagwencha (2020) from Day Star University conducted a study on the state of PTSD among children living and schooling in informal areas in Kajiado North. The authors found considerable number of young people living in such settlements to experience PTSD. Studies by Tumuti and Wang'eri (2014), from Kenyatta University reported traumatic stress among many students. The study established that trauma was higher in male students compared to their female counterparts. The traumatic events associated with significant levels of trauma included witnessing violence, having a terminally ill member of family being caught in situations where one has narrowly escaped death. Okumu (2018) study findings from Day Star University targeting bereaved adolescents in children's homes in Kajiado reported that such children had past and present experiences of traumatic events. The above cited study findings may have similar results or not if they were conducted in Mbeere Sub-County.

Ndetei, Francisca, Owuor, Khasakhala and Mutiso (2007) conducted studies from the Universities of Nairobi and Kenyatta, exploring on the traumatic experiences of high school students in Kenya, and to determine the extent of PTSD among Kenyan adolescents, in relation to socio-demographic variables. Findings revealed experiences of traumatic events among students in secondary school in Kenya, who also experienced significantly high levels of PTSD, thus requiring psychosocial interventions like counselling. Additionally individual counselling was found to be helpful to children who were seriously afflicted by political violence in Sudan (Jordans, et al., 2013). In Kenya, Mutavi et al. (2016) in a qualitative study targeting Nairobi suburbs found that children showed various negative psychosocial due to defilements. Some of the children turned to trafficking drugs while others suffered mental challenges.

Similarly, Waweru (2018) study findings in Mbeere South indicate that poverty in the area led to children being separated from their families. The abandonment resulted in fear and other traumatic experiences. Psychosocial interventions such as counselling for both children and parents was found essential for averting trauma in children and fostering integration. This is consistent with WHO advocacy that psychosocial interventions should not be a stand-alone activity but integration into wider systems including other family support mechanisms (WHO, 2007). Generally, there is evidence that psychosocial interventions can foster resilience in children and help them cope with traumatic experiences and psychological changes that could affect their cognitive, social and mental health.

Study findings by Mutumi, (2013) from Mbeere on management challenges of drug abuse found that drug and substance abuse was influenced by some traumatic experiences. The poor families in Mbeere South face perennial problems of in-adequate food, drought, water, and poor infrastructures to support proper learning conditions. Research by Mugai (2020) indicate that there are no trained counsellors and psychologists in Embu County in primary schools who can provide psychosocial interventions to children in Mbeere North of Embu County primary schools. This means that the traumatised children in schools in Mbeere North remain with traumatic events bothering them and thus resulting to problems of post-traumatic stress disorders.

Very few studies have been conducted in Mbeere North Sub-County, as regards the significance of psychosocial interventions such as psychosocial counselling regardless of the numerous cases of children going through traumatic experiences and in particular during this time of Covid-19 pandemic. Additionally, the data supporting the importance of psychosocial interventions in Mbeere North on traumatized children has not been well synthesized. Based on the evidential inconsistencies, there was need to conduct a detailed analysis on significance of psychosocial interventions used on traumatized children exposed to traumatic experiences due to living under difficult environments for healing purposes. To establish the benefits of psychosocial interventions, a systematic review and a meta-analysis was conducted by searching published studies from different databases.

## LITERATURE REVIEW

The concept of psychosocial intervention refers to any assistance that offers psychological or social support (or both) with a goal of helping to prevent mental health problems from developing, preventing post-traumatic stress disorders (PTSD), improve and promote good and long-term mental health (Feldman & Dreher, 2012). The Reference Centre for Psychosocial Support (2014) argues that applying the term psychosocial support interventions arises from combination of several factors responsible for psychosocial well-being of individuals. Supporting the same idea, Psychosocial Working Group (2005) and ARC (2009) contend that emotional, biological, spiritual, mental, cultural, material and social aspects and none can be detached from the others (INEE, 2010). As opposed to exclusively focusing on psychological or physical aspects of an individual's health and well-being, psychosocial support puts greater emphasis on people's ultimate experiences, more so highlighting the need for looking at these issues within the wider context of family and community set-ups where they occur.

Psychosocial intervention offered to traumatised children is usually offered through trained members of the community being targeted. These are people who are well respected and trusted in the community they live in, and from which they can be selected using interactive processes. These services can also be provided by other professionals such as those who hold training in mental health, psychotherapists, teachers, counsellors, local psychologists, and social workers, as well as psychiatrists, who offer services at the upper end of intervention pyramid. For emergencies, psychosocial support commonly takes place by way of child-friendly spaces as well as, through education, together with emotional and social learning. This may be affected by way child-friendly schools and temporary learning spaces, as well as mental health and psychosocial support service, (MHPSS) as described by United Nations agency for refugees (UNHCR Public Health Section, 2020).

Providers of psychosocial interventions to the traumatised children living in difficult circumstances need to understand a variety of issues such as the causes, nurturing methods, procedures, effects, types of interventions, treatment presentation, engagement and the outcomes of the support services to each individual child and how to include the parents and care givers in the provision of support services, (Technical Note on Mental Health and Psychosocial Support, (TNMHPS; 2021). Millions of children around the world suffer unthinkable distress due to different traumatizing factors. Mental Health and Psychosocial Support Network (2021) argues that psychosocial interventions ought to be accessed by anyone affected by crisis and more so childhood traumas.

The National Institute of Mental Health (2020), describes childhood trauma as an emotional, painful or distressful event experienced by a child that more often than not leads to long-lasting physical and mental effects. Given the importance of the family environment for child and youth wellbeing, family interventions are a powerful mode of treatment; however, their development and evaluation has received relatively little attention to children living in difficult circumstances (UNICEF, 2020). In another study reviewed, Michels, (2009) share similar views with (UNICEF), (2010) in a paper that presented some systematic reviews on methods of supporting traumatized children and had made analyses on psychosocial support interventions as an essential tool for protection of the rights of children participating in transitional justice mechanisms, and the rights of child victims and witnesses in transitional justice processes.

Another systematic study by Demaria (2015) outlines other importances of providing psychological interventions, psychological first aid, and professional self-care. The said interventions encourage children to return to everyday and routine activities. This is helpful as it gives a sense of normality,

creates a feeling of security and certainty to the traumatized children. Other reviewed systematic and meta-analysis studies explain that when traumatized children are provided with equivalent psychosocial interventions, they do not suffer from lack of psychological resilience. In simpler terms, psychological resilience exists in people who develop psychological and behavioral capabilities that allow them to remain calm during crises/ chaos and to move on from incidents without long-term negative consequences (Ian & Christine, 2014). There is need then for the multidisciplinary team of professionals to train traumatized children in difficult environments on how to develop and use positive emotions and positive affectivity to help in managing difficult traumatic situations.

Revised studies also explain that children and youth who have undergone through traumatic events lack positive affectivity. Positive affectivity, if acquired by traumatized children helps them promote sociability, open-minded attitude, and helpfulness (Schenk, 2017). The traumatised children having low levels of positive affectivity are characterized by sadness, lethargy, distress and un-pleasurable engagement. Gillies, Maiocchi, Bhandari, Taylor and O'Brien (2016) study contend that children and adolescents who have experienced trauma are at high risk of developing negative emotional, behavioural and mental health outcomes. The meta-analyses in this review provide some evidence for the effectiveness of psychological therapies in prevention of traumatic stress and reduction of symptoms of PTSD in children and adolescents exposed to trauma. Child Protection Initiative, Save the Children (2011), in Denmark, explains that psychosocial interventions entail the child's feelings, mind and behavior, or his or her inner world in connection to what is happening in their environment. Some children go through very traumatic experiences during their childhood.

Ayaya & Braitstein (2014) conducted a study in Uasin Gishu, Kenya to establish the importance of domestic care environment on potentially traumatic events (PTEs) among orphaned and separated children. From the findings, bullying was found to be the most common PTE amongst the domestic care environments of low economic status, leading physical and sexual abuse in that sequence. All PTEs were found to be most common among street children. The study however found sexual abuse to have been common in households. Further, PTSD was reported to be more prevalent among street children at 28.8%, followed by households at 15.0%. Findings further indicated that children who were separated from their families and orphans in different domestic care difficult environments suffered to some extent, while street youth suffered the most. Psychosocial support interventions are necessary for the purpose of addressing traumatic events such as bullying, neglect, sexual abuse, and abandonment particularly in children living in extended or large family households in the low economically disadvantaged homes (WHO, 2016).

Study findings reported by Shonkoff, Boyce and McEwen (2009), indicate that exposure to hardship as ways of living in difficult environments, especially in early childhood when children are still developing, may end up exposing such minds to permanent impairments, thus affecting their behavioral development, learning, and physical health as well as mental health. Adverse childhood traumatic experiences like those from low economic homes status are risk factors that refer to intensive and common sources of stress affecting children in their early stages of life. Advanced childhood traumatic experiences include wide ranging forms of abuse, acts of violence amongst parents of caregivers, and common dysfunctions in household like alcoholism, collective violence, substance abuse (WHO, 2016).

According to UNHCR, (2016) more than 50% of forcibly displaced people in the world are children. Displacement for such children is particularly a disruptive ordeal that henceforth separates children from their families, causes them to spend their lives away from home, thus causing them traumatic stress. Studies by Mutumi (2013), showed that some children in Mbeere North spend their time looking for clean water, food or looking after animals in cases where money to meet educational needs is not

enough. Such children may be at risk of all types of abuse, neglect, violence, exploitation, child labour and misuse.

### **What is a Traumatic Event?**

According to the National Child Traumatic Stress Network (2008), a traumatic event refers to an event that may be a cause of trauma and therefore causing psychological trauma. This form of trauma can be injurious to an individual's mind due to related resultant events that may yield an individual to overwhelming stress levels, which may end up overstressing an individual's coping abilities. This may also leave such persons with impaired abilities to integrate the involved emotions involved and this can eventually result in grave, long-term consequences (SAMHSA, 2014). The National traumatic Stress network (2020) affirms that if a child feels deeply threatened by an event that they have witnessed or been involved in, then such event or incident can be described as child trauma.

A traumatic event can also be illustrated as a dangerous, frightening, or violent experience posing a potential threat to the life or bodily integrity of a child. Witnessing traumatic, life threatening events with potential to harm an individual or a loved one's security or life can also be termed as traumatic (Cafasso (2017). Traumatic experiences particularly in children can initiate strong emotions and physical reactions that can persist long after the event. Children may feel terror, helplessness, or fear, as well as physiological reactions such as heart pounding, vomiting, or loss of bowel or bladder control. Traumatic experiences in difficult environments are described by researchers as some of the most influential factors on children and youth's mental, psychological social interactions, and growth as a whole (International Network for Education in Emergencies (INEE, 2010; UNESCO, 2006).

Being displaced from home, living in poverty, losing a parent or loved one, having a parent serving in a war zone or incarceration are other experiences that can be termed as traumatic for children (Sitler, 2009). After experiencing trauma, children often view themselves and the world differently, because they lose their ability to make sense of their experiences (Kuban & Steele, 2011). Symptoms of trauma include "posttraumatic stress disorder, anxiety problems, depressive symptoms, and dissociation" taking of alcohol, drugs and other substances (Jaycox et al., 2009). Other traumatic effects include dropping out from school, perpetration of violence, internalizing problems and showing of myriads of emotional and behaviour disorders (Zahradnik, O'Connor, Stewart, Stevens, Ungar & Wekerle, 2010, p. 409).

### **Impact of Traumatic Events on Children**

Reviewed studies state that while traumatic events may share certain characteristics, it is apparent that their exposure to emotional impact may not be the same (David, Edna, Riggs & Foa, 2004). Mental Health Foundation in London (2021) and National Center for Biotechnology Information, U.S share similar views that the impact of child traumatic stress can last well beyond childhood. Research has shown that child trauma survivors may experience impact such as, increased use of health and mental health services, increased involvement with the child welfare and juvenile justice systems, long-term health problems such as, diabetes child psychosis and heart disease among others. Trauma is a risk factor for nearly all behavioral health and substance use disorders.

Reviewed systematic studies indicate that trauma affects behaviour, social, learning, and emotional as well as psychological functioning of a student (Kuban & Steele, 2011, p. 41). Research indicate that children who survive trauma may experience learning problems, including lower grades and more suspensions, expulsions, rational thinking and emotional brain are affected. Such children may experience lower functioning, cognitive, develop attention and behavioural problems, drop off from schooling, or repeat grades and even experience educational achievement problems, such as poor performance in reading. Exposure to child trauma may also lead to impairment in school functioning, accelerate aggressiveness and delinquent behaviour (Jaycox, Langley, Stein & Schonlau, 2009, pp. 49-

50). Regarding achievement, exposure to child trauma may cause children to have poor performance in school, lead to absenteeism, and poor reading abilities (Kuban & Steele, 2011, p. 41). Researchers in examining classroom behaviours have established that when learners suffer traumatic effects, they may end up presenting with behaviours such as poor concentration, passivity, physical verbal blow-ups, spacing out and regular absences (Sitler, 2009, p.120). Thus it is important to provide psychosocial interventions for supporting traumatised students.

### **Supporting Traumatized Children through Psychosocial Support Interventions and Management Programmes**

Psychosocial interventions offered to traumatised children include all of the interventions in which counseling or behavior management techniques are used. The effective psychosocial interventions include contingency reinforcement, child therapies, music and movement therapies, supportive psychotherapy, group therapy, family therapy, telephone counselling, speech therapy, physiotherapy, nutritional counselling, fertility counselling genetic counselling, grief and loss counselling, and specialized pain services among others. Psychosocial interventions provides a framework which can guide the implementation of psychosocial care (Hutchison, Steginga and Dunn,( 2006) and (Lock, & Wolraich 2008). Psychosocial interventions, such as cognitive behavioral therapy and acceptance including commitment therapy, are often delivered by psychologists, social workers, mental health counselors, and community health workers. These evidenced-based interventions occur in both individual and group formats (Didwell and Crosby, 2020). These interventions are not tailored towards treating a condition but are designed to foster healthy emotions, attitudes and habits. Such interventions can improve quality of life even when mental illness is not present. Psychosocial interventions are part of psychosocial support services.

According to NAMI (2017) psychosocial managements (interventions) include structured counseling, motivational enhancement, case management, care-coordination, care, protection psychotherapy and relapse prevention. Other recommended intervention programs for trauma reduction include: non-traditional as well as traditional practices; Cognitive Behavioural Intervention for Trauma in School (CBITS) Support for Students Exposed to Trauma (SSET) program; Trauma Focused Cognitive Behaviour Therapy (TF-CBT; Structured Sensory Intervention for Children, Adults, and Parents (SITCAP) program; Project Fleur-de-lis, and CBI Classroom/school-based intervention. Others include TFT Thought Field Therapy; TF-CBT; Somatic therapies, Medications, self-care, mindfulness, having a balanced, regulated sleep, diets, exercises, and Trauma-focused cognitive behavioural therapy among others.

Flynn, Fothergill, Wilcox, Coleclough, Horwitz, Ruble, Burkey, and Wissow (2015) argue that the level of evidence on interventions to treat traumatic stress in children is based upon published, peer-reviewed data using the accompanying treatment classification criteria utilized by the ‘Office of Victims of crime Guidelines for the Psychosocial Treatment of Intra-familiar Child physical and Sexual Abuse. Their studies suggest inclusion of primary care providers, and their parents or other caregivers would be of help in addressing child traumatic stress. Similar studies for the interventions of trauma in children were also addressed by Psychological, Social and Welfare Interventions for Psychological Health and Well-Being of Torture Survivors (PSWIPHWTS); (2014) and Kellel, & William 2014).

Professionals assisting children experiencing trauma should understand how the effects of trauma in children (Akin, Little, & Somerville, (2011); Jaycox, et al., 2009); Dionne and Nixon (2014) suggested that integrating traditional and non-traditional practices may be helpful for traumatised children. Professionals like teachers and counsellors struggle to help children cope with traumatic effects common in a school setting. Study Findings from the narrative synthesis suggest that psychosocial

interventions may improve trauma feelings and include social support, financial support and other resources.

Other intercessions for early interventions and prevention of PTSD to help traumatised have been suggested by various writers such as the American Psychiatric Association (2013); and Groves, (2007). Their findings suggest that irrespective of a child's age, reassurance and support should always be offered for the purpose of supporting and **encourage children to openly share their feelings**, help them know that whatever the feelings they are experiencing are normal. Children should be assured that even unpleasant feelings will pass if they open up about them. They should be allowed to grieve any losses and those experiencing trauma should be given time to mourn and heal from the form of loss they are experiencing. This may arise from events such as disasters or a pandemic like the Covid-19 or any other disease. Activities known keep their mind occupied should be encouraged in order to remove their focus from the traumatic event. Children can be made to feel safe again by reassuring with acts such as hugging, which can be helpful in comforting and making any child feel secure irrespective of their age. Other approaches include establishing practicable structures, maintaining routines, and schedule their lives so as to make their world feel stable again. Professionals can also try to maintain regular mealtime, time for homework, and other home based or family activities (American Psychological Association, 2013); Chen, Shen, et al. 2014). Helpers and parents should keep their promises to the child as they help them rebuild trust by being trustworthy. They should reassure and help them place the situation in context (Chen, Shen, et al. 2014).

Other ways of helping traumatised children deal with trauma include: minimizing media exposure, or stop exposing the traumatized children to graphic images and videos and especially those which have similarities of the past traumatic event. Helpers should create an environment where the child feels safe to communicate what they are feeling and to ask questions, provide the child with ongoing opportunities to talk about what they went through, encourage traumatised children to ask questions and express their concerns but never force them to talk. Other helpful ways include communicating with the child based on their age since some children can have difficulties talking about a traumatic experience. Encouraging a child to seek friendship with others and engaging in sports, games and hobbies that were enjoyable prior to experiencing the traumatic incident can help in coping. Encouraging physical activities, doing sports, games, doing happy music and play among others. Helpers should encourage children to eat good and well-balanced diet with plenty of water that is, being focused on overall diet rather than specific foods (National Center for Child Traumatic Stress (2010); National Child Traumatic Stress Network (2008). Counsellors to offer structured psychosocial counselling and child therapy. Psychological counselling encourages and assists the child to find a solution for his/her problem/situation, (The National Child Traumatic Stress Network, 2020).

Further studies by Pattison from the University of Nottingham jointly with Harris (2006) from Arden University support that psychological and psychosocial counselling are effective in helping children going through trauma. Proper psychosocial counselling will help incorporate valuable lessons in a child's new life after the events. Psychosocial support helps to shape a student's behaviour and also instil enough discipline in them if they had changed their behaviours after the event. Proper psychosocial counselling helps traumatized children learn skills of helping them achieve their goals (MOeST 2004). For those who had found silence in alcohol and substance abuse due to trauma, they will learn skills of stopping the drug abuse tendencies. Psychosocial support and counselling help those with suicidal tendencies come to self-realization and change their thoughts Ajowi, & Simatwa, (2010); American School Counselor Association (2012); American Psychiatric Association (2013).

### **When should Professionals be Contacted to assist the Traumatized Children?**

According to National Child Traumatic Stress Network (2008) symptoms like confusion, numbness, despair and guilt that one experiences following a disaster, crisis, or other traumatic events may begin to weaken after relatively a short while. Nonetheless, traumatic stress reactions that are so intense may interfere with the ability of a child to function at home or school or home. If there is no indication that symptoms are fading, or in the event that they become worse over time, the affected child may require support from a specialist, such as mental health professional. Parents, care givers, or teachers should seek professional help for children if symptoms persist and interfere with day-to-day activities, school or work performance, or personal relationships. The commonest signs that a child is in need of professional help to cope with a traumatic event include: emotional outbursts, aggressive behavior, withdrawal, persistent difficulty in sleeping, continued obsession with the traumatic event, serious problems at school, disrupted sleep patterns, eating habits, correct use language among others.

American Psychiatric Association, (2013) asserts that psychologists and mental health providers can work with parents and care givers to find ways to help children cope with traumatic stress. Professionals can help both children and their parents understand how on to cope with the emotional impact of a traumatic event (Health line 2020); Children do recover from traumatic events, and helpers can play an important role in their recovery. A critical part of children's recovery is having a supportive caregiving system, access to effective treatments, and service systems that are trauma informed, (Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children and Adolescents, 2008)

### **Why is Psychosocial Support Important to Children?**

Through offering of psychosocial counselling, traumatised children are helped to deal with anxiety, reduce fear, cope with grief, depression, neglect, abuse, deal with self-care issues, loss of confidence, and improve on lack of social skills as caused by traumatic experiences (David, Riggs, Edna & Foa, (2004): Wikipedia Sep 30, 2017). Psychosocial interventions address all the child's essential elements of positive human development which are; emotional, intellectual, mental, social, and spiritual needs (Oxford English Dictionary, 2012). Other study findings by Kohrt, (2018) outline additional benefits of offering psychosocial interventions to traumatised children to include, building internal and external resources for children and their families cope with adversity, supporting families to provide for children's physical, economic, educational, health and social needs. Psychosocial interventions also help children to build resilience and positive emotions, (Ong, Bergeman, Bisconti, & Wallace, 2006); Wikidedia (2015). Even children in Mbeere Sub-county can benefit from psychosocial counselling offered by school counselors.

Guidance and counselling is offered in schools and traumatised children can be assisted by their school counsellors in collaboration with parents and care givers to develop positive emotions (Ajowi, & Simatwa, 2010). In order for the child to reach this goal, guidance and psychosocial counseling services should help children get to know themselves better and find effective solutions to their daily problems. Counsellors can also apply different types of child therapies. Child therapy helps young children as well as teenagers to cope with various psychological and emotional traumas that are affecting their wellbeing, (Wikipedia reviews, and 2019).

According to The American School Counselor Association (2012) and Oregon Department of Education (2003) primary roles of psychosocial counselor is to assist children in reaching their optimal level of psychosocial functioning through resolving negative patterns, prevention, rehabilitation, and improving quality of life. Another type of child therapy that assists traumatised children is Systems Therapy (TST) as reported by Saxe, Ellis, Fogler, Hansen, Sorkin, (2005) through their Clinical trial

studies. Child Trauma Systems Therapy (TST) is helpful for improving a traumatized children's mental health and well-being. This may include adolescents and young children with social problems at home or school, experiencing traumatic problems secondary to physical abuse, rape, neglect, death of a close member of family or other major life altering emotion trauma (Glenn, 2012).

According to study findings by and WHO, (2008); Wolf, Prabhu & Carello, (2019) every child reacts to traumatic events in his or her own way. It is important to listen and try to understand children's unique perspectives and concerns, as well as those of the family. Culture plays an important role in the meaning we give to trauma and our expectations for recovery. Thus, trying to understand the child's experience from the child's own point of view, as well as that of the child's family and community, can help guide intervention efforts, (USAID, 2020; UNICEF, 2020)

### THEORETICAL FRAMEWORK

The study was guided by Erik Erikson's Stages of Psychosocial Development theory. Erikson's psychosocial development theory emphasizes the social nature of our development rather than its sexual nature. Erikson observes that an individual goes through eight stages of development, with each stage building on the preceding one. Erikson suggested that how we interact with others is what affects our sense of self, or what he called the ego identity. Erikson perceived that social interactions and relationships hold a fundamental role in shaping people's growth and development.

### MATERIALS AND METHODS

The study used a systematic review and adopted a meta-analytic approach involving individual data from 2567 children in nine Randomized Controlled Trials (RCTs) evaluating the benefits of several psychosocial support interventions versus the waitlist control groups such as those receiving usual care or no treatment. The data was obtained by searching various online databases, including PubMed, MEDLINE, Clinicaltrials and a range of relevant journals dating back from 2000 to 2020. The data only included studies that focused on the benefits of psychosocial support services and interventions, such as individual and group counselling, involvement in support groups, peer support, and parental support as well as community services in traumatized children and youth in low- and middle-income households. Duplicate studies and studies that did not meet the criteria were excluded. Data was subsequently extracted on computer spreadsheets, focusing on details such as author, title, design, intervention and forms of comparison used, number of participants, pre-treatment and variation of scores for both intervention and waitlist control groups.

### RESULTS AND DISCUSSION

Data analysis involved finding and calculating the effect size of the population of each of the studies that met quality assessment for inclusion. Individual studies' Cohen's  $d$  value was obtained through random effects DerSimonian and Laird's method for meta-analysis. A Cohen's  $d$  score of  $d$  0.2 was considered as low,  $d$  0.5 as medium and  $d$  0.8 as high. Each of the studies effect size is shown on Table 1.

Table 1: Individual Studies Effect Size

Author, Date	N	Effect Size
Rith-Najarian, 2019	110	$d$ 0.82
James, 2015	1806	$d$ 0.74
Murray, 2015	131	$d$ 0.62
Bolton, 2018	125	$d$ 0.86
Dorsey, 2020	320	$d$ 0.14

Michael, 2014	138	<i>d</i> 0.63
Mannarino, 2012	158	<i>d</i> 0.77
Cohen, 2006	126	<i>d</i> 0.69
Chorpita, 2018	148	<i>d</i> 0.18

Data was obtained and recoded for each of the randomized control trials both at pre-intervention and post-intervention phases, after which scores were analyzed to establish the mean differences and standard deviations for each of the two groups. The study identified a beneficial effect of psychosocial interventions on PTSD after an intervention period of 6 weeks (Cohen *d* 1.02). The effect reduced slightly at follow up from at least 9 weeks after the interventions (Cohen 0.86). The analysis highlighted benefits of mental health psychosocial interventions such as focused care to children and families, specialized care, family and community support and social support services had benefits on post-traumatic distress in children. The analysis showed benefits of on PTSD (Cohen *d* 0.46), strengths such as positive coping (Cohen *d* 0.82), maintained peer social support (Cohen *d* 0.60 enhanced hope (Cohen *d* 1.04). The study hypothesis was tested by establishing confidence interval through a paired samples test for the means of the two groups. A statistical significance value of  $p < .005$  was obtained as shown on Table 2.

### Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower Upper			
Pair	Intervention_ Group - Control_ Group	.86556	.68832	.22944	.33647 1.39464	3.772	8	.005

Based on the above results, the study hypothesis that psychosocial interventions have no importance on traumatized children and youth in low- and middle-income families in Mbeere North is rejected, since the results provide an initial support for benefits of psychosocial support interventions ontraumatized children living in difficult environments. The findings were consistent with Purgato (2018) study which established that Mental Health and Psychosocial Support (MHPSS) is effective in reduction of PTSD and anxiety symptoms in children exposed to traumatic events in low-resource humanitarian settings.

## CONCLUSIONS AND RECOMMENDATIONS

### Summary

The study aimed at analyzing the benefits of psychosocial interventions on traumatized children living in difficult environments in Mbeere North. Based on the systematic and meta-analytic review of 9 randomized control trials involving 2567 children, it was established that psychosocial interventions are effective and beneficial in mitigating the symptoms of posttraumatic stress disorder in traumatized children living in difficult environments.

### Conclusions

The study concludes that psychosocial interventions are important in helping traumatized children living in difficult environments. Based on the results, the study further concludes that psychosocial interventions such as providing focused care, specialized care, family and community support services, psychosocial counselling as well as social services is beneficial and effective in dealing with symptoms of posttraumatic stress disorder resulting in positive coping, enhanced, maintained social support and

enhanced hope. The study makes inference that psychosocial interventions may be helpful on traumatized children living in difficult environments in Mbeere North.

### Recommendations

Based on the findings the following recommendations are made:

Given the scope of traumatic experiences facing children living in difficult environments, the Government of Kenya should channel more resources towards mental health to support rehabilitation of children and youth living in needy and broken families in including all those who are living in difficult circumstance, and those being currently affected by the Covid-19 pandemic in Mbeere North.

A similar study should be conducted in lower Embu as the areas share similar hardships and later compare the results. Further, teachers and parents should be taught skills of reducing stress in traumatized child so that they can assist their children. Further study is required on the benefits of specific psychosocial interventions on traumatised children in similar households.

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## Transgressing Maxims of Politeness: Effects of Combative Language Used during Covid-19 Televised Updates in Kenya

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### Abstract

Anchored on critical discourse analysis theory, this paper interrogates language used by Health Cabinet Secretary, Mutahi Kagwe and President Uhuru Kenyatta during the televised Covid-19 updates. It examines how the transgression of maxims of politeness in the daily updates resulted in linguistic impoliteness and further impacted the war against the pandemic across the country. Data for analysis and interpretation was obtained from purposively sampled televised daily updates from March 2020 to August 2020. To augment the data, social media postings and internet memes by Kenyans during this period were sampled and analysed. The paper demonstrates that the nature of language used during the televised updates prejudiced the fight against COVID-19 in the country, invariably impelled the public to shun COVID-19 recoveries, stimulated the victimization of families and relatives of the recoveries, and bred the public reluctance to voluntarily participate in mass testing and later, inoculation against COVID-19. The paper recommends that during pandemics, it is incumbent upon authorities, and necessarily so, to judiciously use gracious language for effective public health communication.

**Key words:** *Transgressing, combat, contestation, maxims, health communication and government communication.*

### 1.0 Introduction

Government communication during a national catastrophe, such as the Covid 19 pandemic is a challenging task that demands the balance of professional communication skills and self-restraint. This is because public use of language during such communication and the ways in which it is interpreted potentially dictates the effectiveness of the communication and adherence to government regulations by citizens, such that the strategic use of language in itself becomes a constitutive part of governance. Government communication has been described as the oral, written and visual language used by, and on behalf of, government officeholders, directed at the general public or particular groups in society (Hanson 2018, p.349). It encompasses government produced “texts, talk and images that are made available to the public: news releases, social media postings, policy documents, televised speeches, broadcast interviews, advertisements, and so forth” (p. 350). Hansson further iterates that government communication is made through authorized government communicators whose role, revolves around the production, packaging and transmission of administrative information aimed at, among other purposes, “giving advice and orders to people, for example, on how to submit annual tax returns, and how to behave in case of crises such as floods and pandemics” (p. 351). Based on this perspective, this paper reads the televised updates during the Covid 19 pandemic in Kenya as a form of government communication, whose purpose was to provide information on the pandemic and highlight containment measures to stem its spread. It also identifies Cabinet secretary Mutahi Kagwe and President Uhuru Kenyatta as key government communicators during the updates.

In line with communication guidelines<sup>141</sup> issued during the early stages of this pandemic by both the United Nations and the World Health Organization, the Kenyan government introduced the daily televised updates. As part of the global initiative to contain the pandemic, member states were required to ensure that they communicated intensively, constantly, and in an appropriate manner with their

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<sup>141</sup> World Health Organization. COVID-19 Strategic Preparedness and Response Plan Operational Planning Guidelines to Support Country Preparedness. Available online: <https://digitallibrary.un.org/record/3859863?ln=en>.

citizens. The updates were therefore directed at the general public and were broadcasted live on all major television channels and through the web. They generally followed the generic structure of government press conferences outlined by Bhatia (2006), that is; an opening and welcoming, presentation of a pre-planned speech, an interactional question-answer session and finally, closing.

As argued by Kumar (2003), government communication done through live updates and press conferences involves the delicate performances of politeness, meant to monitor the exercise and negotiation of power during all the phases of the communication, and, thereafter, influence the interpretation of this communique by the citizenry. Further, Wilcox et al underscore the importance of strategic communication during a public health crisis, arguing that during such outbreaks communicators must not only endeavour to provide accurate information, but also “identify and address the public’s concerns, recognize the public as a legitimate partner, anticipate hostility, respond to the needs of the news media, and always be honest” (p.300). This means that government communicators must ensure that they use linguistic strategies that are capable of conveying the communicative goals of their interaction with the public are met, especially during a public health crisis such as Covid 19. In view of this, our paper seeks to examine how instances of linguistic impoliteness by the communicators impacted on the communicative goals of the televised updates.

The analysis is based on the politeness frameworks suggested by Grice’s (1987) Cooperative Principle, Brown and Levinson’s (1987) Politeness Strategies and Culpeper Jonathan’s Impoliteness principle. It is also anchored on critical discourse analysis theory that sees language as a form of social practice that informs ways in which social relations are (re) produced, contested, and social realities interpreted. Through an analysis of language use by the two government communicators, the paper aims to establish how flouting maxims of politeness in communication resulted in language that was combative, impolite and weaponized. Further, it demonstrates that the combative language used during the sampled daily briefs possibly bred public revolt against government measures to control the pandemic and later, contributed to the stigmatisation of infected persons and Kenyan youths by portraying them as voluntary Covid 19 super spreaders. This in turn led to the victimization and shunning of Covid 19 patients and their families in Kenya.

### **1.1 Politeness and Impoliteness**

The Politeness Principle is based on a set of politeness maxims (Leech, 1983) and politeness strategies (Brown and Levinson, 1987) that dictate linguistic politeness in conversational exchanges. Brown and Levinson’s model of Politeness Strategies is based on the concept of face, fronted by Goffman (1967). They recognize that each individual “possesses a social face, a public self-image” (Brown & Levinson, 1987, p. 61) that is constantly negotiated and renegotiated in every conversation. They therefore posit that face is constantly threatened and can “be lost, maintained, or enhanced, and must be constantly attended to in interaction” (p. 61). Thus, when face is threatened, through face threatening acts (FTAs) participants in the conversation will engage certain strategies to minimize the face threats. These strategies are interpreted as politeness strategies that enhance the smoothness of a communicative event. Brown and Levinson argue that every individual in a society has two aspects of Goffmanian face, (pp. 17–18), one, positive face, (the desire to be socially appreciated and approved of), and, two, negative face, (the wish not to be imposed upon or impeded in their actions). Correlating to these two faces, there are two forms of politeness; positive politeness conveying the speaker’s desire to attend to the audience’s wants and desires and negative politeness which satisfies the negative face. Linguistic Politeness therefore attends to either the hearer’s (or receiver’s) positive face needs or negative face needs involves the use of words that mitigate the effects of FTAs.

Impoliteness on the other hand, as highlighted by Culpeper (2011) contrasts politeness and occurs when individuals continually engage in attacking face or aggravating the threats to the face(s) of others, rather

than using politeness strategies to mitigate the threats to face. Based on the notion of impoliteness as a transgression and breach from the schematically expected norms of politeness (Mills, 2003), this paper examines impoliteness super strategies used during the televised updates. It analyses how through these super strategies, language used during the updates transgressed certain maxims of politeness proposed by Leech (1983) and the effect of this transgression on the communicative function of the televised updates.

## **2.0 Methodology**

The findings of this paper are based on a qualitative approach and data for analysis was purposely selected from the Covid 19 updates that were aired live on Kenyan television and the web, between March and August 2020. For purposes of analysis, each televised update was divided into three segments. These segments were divided on the basis of Bhatia's (2006), postulations on the constituent sections of government press conferences, that is, the opening and welcoming, presentation of a pre-planned main speech and the question-answer session. We identified social media, specifically Facebook as one of the sites that provided data on the reception of the televised updates among Kenyans. We also examined news items from the national television networks that provided information on stigmatization of Covid 19 patients in both rural and urban Kenya. Finally, we compared the communicative behaviour of the Kenyan government communicators, displayed in the analysed updates with the internationally accepted principles of politeness in health and government communication, as prescribed in relevant professional literature, to come up with the conclusions in this study.

## **3.0 Findings and Discussions**

Within the months of January and February 2020, public information on the Covid 19 pandemic was scarce in Kenya, and was only available in short excerpts relating outbreaks in China and other parts of the world, during daily news briefs on mainstream media. However, in early March 2020, the Ministry of Health issued a circular, urging citizens to be vigilant and practice simple hygiene measures such as handwashing. Later, when the first patient was diagnosed on March 12<sup>th</sup> 2020, the Kenyan communication space was dominated by information about the pandemic, both from the public and the government. The findings on this paper are based on an analysis of the communicative aspect of The Ministry of Health updates as the Kenyan government's communiqué of the pandemic to its citizens, and how this impacted on government efforts to stem the spread of the virus. As earlier stated, the updates were examined in three segments, the opening and welcoming, presentation of main speech and the question answer session.

### **3.1 The Opening and Welcoming**

This session mainly consisted of greetings, welcoming remarks and introduction of Ministry of Health officials. The session was generally brief and well-coordinated. However, the televised updates often started hours later than they had been scheduled to. Hence, the main impoliteness strategy noted during this session was withholding politeness, where the communicators did not apologize even after keeping their listeners waiting for hours.

### **3.2 Impoliteness Strategies in the Presentation of Main Speeches**

In an analysis of main speeches from the updates, we identified the following super strategies of impoliteness that were used by the communicators; bald on record impoliteness, positive impoliteness, negative impoliteness and mock politeness.

#### *3.2.1 Bald on record impoliteness*

This involved the performance of Face Threatening Acts in a direct, clear, unambiguous and concise way, such that the audience's face appeared irrelevant or minimized. During the update on 5<sup>th</sup> May, Mr. Kagwe says;

When we start taking steps (clenching his fist)  
For surely, we must... take steps.  
When we start taking steps  
Let not the same individuals (pointing a finger at the audience)  
Start complaining, that eehh... You know....  
The ministry of health is taking two steps forward and one step backwards...  
If that is the case, (bangs on the table)  
(Raises his voice) so be it

As has been argued by Tracy and Tracy (1998), impoliteness involves any communicative act that is perceived by members of a social community to be offensive. This means that impoliteness is not only manifested in words, but also through kinesics and paralinguistic elements. Further, as mentioned by Culpeper (2009:13), impoliteness “involves (a) an attitude comprised of negative evaluative beliefs about particular behaviours in particular social contexts, and (b) the activation of that attitude by those in the particular context-behaviours”. This means that impoliteness is context and culture specific, such that the context, cultural background or shared knowledge of the interactants in a conversation can contribute to the interpretation utterances as impolite. For instance, Mr. Kagwe’s actions such as clenching the fist, banging the table and pointing at the audience are actions that are traditionally associated with aggressiveness and combative language within the Kenyan society. The use of such gestures during government communication therefore constituted what can be interpreted as a face threatening act by the intended listeners, that is, Kenyan citizenry.

As noted by Cupach (2007), no matter how well intended an utterance is, the speaker’s body language, manifested through “lowered eyebrows, unpleasant facial expression, expansive gestures, indirect bodied orientation, and a loud voice communicates greater rudeness or a lack of concern for face”. This means that just like gestures, the paralinguistic aspects of an utterance can be used to interpret it as impolite. For example, the notion of sarcasm, which is one of the strategies of negative impoliteness is inherent in sound, such that one way of conveying this form of impoliteness is through the use of prosodic features that undermine the politeness of the expressed utterance. Examining the paralanguage in the cabinet secretary’s final statement in this update, it is possible to argue that the rise in tone, employed after the three gestures, demonstrates linguistic impoliteness. As has been argued, the ways in which people interpret information involves attempts to blend new information with previous constructs and current beliefs (Hills, 2003). The possible outcome of such impoliteness therefore, is that that the citizens read the paralinguistic elements of the communication within contexts of previous knowledge (that raising one’s voice amounts to expression of anger, fighting etc) to interpret the utterances as a form of combative language, creating the impression that the Cabinet Secretary was attacking them personally.

### 3.2.2 Positive impoliteness

Positive impoliteness involves the use of strategies that are aimed at attacking the addressee’s positive face wants through strategies such as ignoring the addressee by failing to acknowledge their presence and through disassociation, that is denying association or common ground with them, being disinterested and unsympathetic to their needs, and name calling (Culpeper 2011). By name-calling, Culpeper refers to the use of derogatory nomination or insults. He presents four subtypes of this strategy: the use of personalized negative vocatives, assertions, references and third person negative references in the hearing of the target (Culpeper, 2009b).

In the first updates during the month of March, both the president and the cabinet secretary referred to the Covid 19 patients as ‘cases’ or ‘suspects’ and used terms such as ‘surveillance’ to refer to medical follow up on the patients. Patients whose Covid 19 status had not been ascertained were referred to as

‘suspected cases’. These nominations, *cases*, *suspected cases* and *surveillance* have a negative semantic prosody and can therefore be described as derogatory. By describing patients afflicted by a global pandemic and the process of their medical follow-up through semantic terms that have connotations of crime, the president effectively equated contracting Covid 19 to a criminal offence. Hence, one of the strategies used for positive impoliteness during the Covid 19 press releases was the use of inappropriate identity markers and derogatory nominations against the patients.

President Uhuru Kenyatta in his speeches used the war metaphor, continually referring to Covid 19 as an invisible enemy and comparing health professionals to frontline soldiers. This metaphorical presentation impacted on the way people conceptualized the pandemic and others afflicted by it. It is important to also remember that the president’s metaphorical representation of Covid 19 was not a new phenomenon in government communication. Globally, studies on government communication during previous epidemics such as SARS, Cancer and HIV have shown that the war metaphor has been utilized in health communication in other countries during the past few years. However, this communication of health issues using the war metaphor has been criticized for being a “power based and violent” form of communication (Reisfield and Wilson, 2004) that contributes to the stigmatization of the patient by painting those who contract the disease as enemy collaborators. In line with this, it is possible to argue that President Uhuru’s description of Covid 19 as “an invisible enemy” who “will find the most vulnerable of us and use them” painted the Covid 19 patients as voluntarily vulnerable enemy conduits of death and destruction.

In his utterances on 25<sup>th</sup> March, the cabinet Secretary speaks to Kenyans, through a certain media personality he calls Steve;

You know, so... Steve, you need to tell them  
You are the one in the media, tell them  
Because afterwards they will call and tell us  
*Serikali saidia* (Government, please help us)  
It doesn’t work, this is the one time  
You *saidia* (help)  
The government won’t *saidia*  
Because the government cannot help each and every home and every child.

The strategy of positive impoliteness utilized in the above utterance was the disassociation of the speaker with his interlocutors. Here, the cabinet secretary disassociates himself from his listeners by, one, speaking to them through a third party in their hearing, and, two, making it clear that the government is unsympathetic to their plight. This act of referring to the other using the third person in their presence is linguistically impolite and an ineffective mode of communication. Further, the utterances lacked empathy, which is one of the recommendations for government communication during a pandemic (Hyland- Wood et al, 2021). As has been argued by Pfattheicher et al (2020), when citizens feel that the government empathises with them, they are more likely to respond to health guidelines given by the government.

### 3.2.3 Negative impoliteness

This involves the use of strategies designed to damage the addressee's negative face wants. Tactics involved here include frightening, scorning or ridiculing the interlocutor or explicitly associating certain persons with a negative aspect. During the first week of the updates, on 21<sup>st</sup> March, Mr. Kagwe states;

As soon as the young people come into proximity with the older people the older people begin to die.

The above utterance is a blanket association of young persons with the deaths of older people. By associating young people, whether Covid 19 positive or not with the deaths of the older Kenyan citizens, the above utterance depicts them as the sole carriers of death. This is a strategy of negative impoliteness in which the speaker associates his interlocutor with a negative aspect. Again, on 18<sup>th</sup> April 2020, speaking about the first patient that tested positive in Homa Bay, he says

This person has now taken the disease to Homa Bay.

On 27<sup>th</sup> May, he states

If people are going to die, they will have been killed by other people.

One of the output strategies of negative impoliteness identified in the utterances of Mr. Kagwe at the time was the strategy of frightening and instilling a belief that an action detrimental to the other (in this case death) would occur if they associated with certain persons. Through this strategy therefore, the above utterances can be perceived as shifting the blame for the cause of the deaths from Covid 19 as a disease and placing it on the Covid 19 patients. Further his utterances present a discursive construction of the youth and Covid 19 patients as ‘death carriers’. Consequently, though his utterances aimed to discourage physical movement, they unconsciously performed the illocutionary act of creating fear of the patients as disease ‘importers’ within the community. This, coupled with the fact that the pandemic was fairly new and the citizens had very little information on how it is spread contributed to the shunning of suspected victims and their families as people sought to protect themselves from the ‘disease carriers’. Thus, during the month of May, the cabinet secretary consistently urged the people from Nairobi not to ‘take’ the disease to *Ushago* (upcountry). This too, was a discursive reconstruction of the stranger as a willing carrier of Covid 19 who needed to be avoided. On 5<sup>th</sup> June 2020, a few days after the May 27<sup>th</sup> utterance in which he stated that people who died would have been killed by other people, residents of Elgeyo Marakwet sub county, in Uasin Gishu, took to the street to demand the evacuation of five Covid 19 positive truck drivers, who had been admitted in a health facility within their sub-county. Waving placards and twigs, the residents complained that the patients had come to kill them and their children. An elderly woman speaking on KTN television states;

*Sisi tulikua tumejichunga kabisa*

(We had taken all precautions)

*vile tuliambiwa na waziri*

(Just as instructed by the cabinet secretary)

*tulijichunga kwa area yetu*

(We were careful in our area)

*Lakini tumeshangaa, wametuletea kifo*

(But we are surprised they have brought us death)

*Wametuletea kabisa mpaka nyumbani*

(They have brought death to our home)

According to the news anchor, the residents felt that the admission of Covid 19 patients in a facility within their vicinity put their lives at risk and threatened to forcefully evict the patients from the facility. The above utterances, by the cabinet secretary and their subsequent interpretation by the society, as seen in the elderly woman’s construal, show that any instance of instrumental-language use by a government communicator, must be sensitive to the fact that it could be interpreted by the citizens in various ways and therefore fail to achieve the purpose it may have been designed to serve.

### 3.3 The Question-and-Answer Session

The televised updates also involved a question-and-answer session where journalists were permitted to ask questions. On June 4<sup>th</sup>, asked about law enforcement officers using excessive force on citizens, Mr. Kagwe states;

Am I concerned that law enforcement officers are taking people’s lives?

(Violently shaking his head) I am not aware.

As seen above, the cabinet secretary denies knowledge of police brutality during enforcement of containment measures. This is despite the fact that there was documentary evidence that two men had died as from such brutality in Mombasa. During the question-and-answer sessions the cabinet secretary often evaded questions and provided answers that were not relevant to issues raised by the journalists. The cabinet secretary in the above utterance flouts Grice's maxim of quality that requires one to be as informative and as truthful as possible during a conversation, and, as argued by Mills (2003), any transgression of the maxims of politeness results in impoliteness. On the same issue, Mr. Mutahi continues;

Who...? Who are those who taking people's lives?  
And when you say taking people's lives,  
I don't know whether you mean by killing them?  
I don't know whether you mean by allowing eeh  
Infected people, to infuse themselves with them?  
Notwithstanding what the meaning of the question was  
The law will take its course  
But the law must at all times be followed

Here, Mr. Mutahi employs the impoliteness meta-strategy of sarcasm and mock politeness. In this strategy, the FTA is performed with the use of politeness strategies that are obviously insincere, and thus remain surface realizations. In his response, he also presents the police killings and the persons infected with Covid 19 as binary causes of death. He therefore appears to covertly evade the question of police killings and puts emphasis on strict adherence to the law, which was not the issue under question. In this context, Mr. Kagwe's remarks appear to suggest that those infected with Covid 19 are the life takers from whom the police are protecting the general citizenry. This is a veiled mockery of what he is expected to answer since it is clear that he is ignoring the fact that the police are being accused of excessive force leading to the death of citizens. The communication here appears to suggest that abidance to law is selective only insofar as it serves the interests of the government. That is, the reference to the killing of people by the police is cast as inconsequential thus amplifying the cause of death through Covid 19 infection as more terrifying.

In an update on 10<sup>th</sup> July, he feigns amnesia about a question he is asked.

Mambo hio ingine,  
(something else)  
Kuna mtu mwingine ameuliza  
(that someone else asked)  
Lakini sikumbuki  
(but I don't remember)  
Sikumbuki ulisema nani  
(I don't remember who you asked about)  
*The journalist attempts to clarify the question, but the cabinet secretary cuts him short.*  
Unaweza kuuliza swali  
(You can ask a question)  
Na mimi niseme sikumbuki  
(And I will say I don't remember)  
Lakini hata ukiuliza tena... pia sikumbuki  
(But even if you ask again, I still don't remember)

The above impoliteness strategy gave the impression that the communicator was insincere and was trying to cover up information on Covid 19. It also demonstrates a powerplay in which he attempts to

show that he is in command by selectively responding to certain issues while ignoring others. Again, the act of cutting the journalist short was impolite and demeaning, and therefore, made it difficult for the other journalists to ask critical questions. As has been argued, during a crisis, an open style of persuasive communication not only upholds the credibility of the communicating institution, but also eliminates public suspicion and builds public trust (Wray and Jupka 2004). Public trust has been hailed as a key resource in harnessing public collaboration and sustaining the behaviour change required to manage pandemics (Agle, 2020; Devine et al, 2020). Thus, the cabinet secretary's dismissal of journalist questions implied that he/the government was withholding vital information from the public. This seeming secrecy may have contributed to mistrust of the government by the public, further fuelling fears, myths, misconceptions and mysteries held by the public about Covid 19.

On August 9<sup>th</sup>, responding to a question that sought to know if indeed his son was not adhering to containment measures as evidenced in a video that was trending on social media, he states;

I do not have a son in my house who is less than 18 years,

Which means he is an adult, you can follow them and ask them

When this update was posted on Facebook, various Kenyans expressed their displeasure with this response, some argued that it was a rude answer, while others felt that the government was not enforcing the curfew equally among all citizens. From comments posted on Facebook under this update, most Kenyans state that Covid 19 was a hoax, in that privileged persons could flout containment measures and not get infected.

In all the above examples, the cabinet secretary used impoliteness strategies to overtly or covertly evade questions, shift the agenda of certain questions and perform actions not asked for. As argued by Ekström and Eriksson, (2018), mediatized communication from the government is organized with the overall purpose of “releasing public statements and making officials available for questions from the public (or, more specifically, from journalists who are assumed to act on behalf of the public)” (345). Because of the above strategies of impoliteness, the daily updates translated to an authoritative communication system that only allowed one-way communication, avoiding questions from the journalists, and effectively, the public about what they actually needed to know.

#### 4.0 Effects of Combative Language

It has been argued that in a pandemic such as Covid 19, effective government communication is vital for governance, for the efficacious response of the general public to government directives and for the public's adaptation into the new normal (Huang, 2020). Studies also show that successful reduction of Covid 19 infection rate is highly dependent on how communities perceive information provided by the government. (Hyland- Wood et al, 2021). This therefore, means that viable linguistic strategies of persuasion in government communication are critical for fighting the pandemic and stabilizing the society. Jane Mulderrig (2011) examines the subtle linguistic strategies employed by modern governments to convince, rather than coerce people into behaving in certain ways. She argues that government communicators do this through what she calls ‘Managing Actions’ realized through the use of managing verbs (such as *let, allow, help, enable, require* and *expect*). Governments therefore present certain actions by the interlocutors as voluntary and their outcomes as desirable, presuming their necessity, and assuming volition of the ‘managed actors’ (the citizens or manipulees) rather than giving them direct orders.

Examining the verbs used during the updates by both President Kenyatta and Mr. Kagwe, it is evident that they used words such as *must, will, shall, ensure* and *adhere* to give guidelines on how citizens were expected to conduct themselves during the pandemic. On 22<sup>nd</sup> March, Mr. Kagwe stated;

You will be observing enforcement measures

You must stay home

Go home (raising his voice)

In the above communication, Mr Kagwe addresses the interlocutors in second person pronouns, excluding himself and the government from observing the enforcement measures. An empathetic style of communication has been identified as crucial in persuading the public to take a positive action or refrain from potentially harmful acts (Reynolds and Quinns, 2008). Reynolds and Quinns argue that public compliance to government guidelines during a pandemic is dependent on persuasive strategies used during communication. In the above utterance by Mr. Kagwe, language use is explicitly backed up by coercion in that an order is given that the hearers are expected to obey without question. It is important to note that the main agenda of government communication during a pandemic is to harness public resilience and solidarity (Jetten et al, 2020). Thus, communiques that address citizens as partners (using pronoun *we*) and appeal to them to act, are superior to directives that imply that citizens are passive recipients of directives (such as *you must*) that they are not part of. Utterances such as the above by the cabinet secretary, therefore, produce the inverse of the intended communication. This is because people are more likely to rebel or disobey strongarmed messages, as opposed to when there are opposed to conciliatory or engaging communication. It is from this rebellion of directives issued by the communicators that Kenyans produced memes on social media demanding for “freedom”.

It has been argued that as part of responsible communication by the government, directives should be accompanied by appropriate measures to facilitate the desired behaviour change and action (Peters et al, 2018). People were therefore likely to observe the enforcement measures if they had been advised on how their daily needs would be met (Hyland- Wood et al, 2021). The utterances by Mr. Kagwe assumed that the govt had met its obligations to the citizens: ensuring medical supplies and food access. A week after these utterances, residents of Kangemi, in Nairobi County demonstrated against mass testing, arguing that they needed to be tested for hunger and not Covid 19.

## 5.0 Conclusion

The objective of this study was to identify and analyse impoliteness strategies in the utterances of President Uhuru Kenyatta and Health Cabinet Secretary Mutahi Kagwe, generated from daily televised updates on the COVID-19 pandemic and the possible implication of these utterances on government efforts to stem the pandemic. From the discussions, it is evident that the impolite use of language in Covid-19 communications threatened the face want of the interlocutors, that is, the Kenyan Citizenry. An examination of the paralinguistic aspects of communication used by the two communicators revealed that their language appeared combative and coercive to the intended recipients of the updates. In addition to this, the both the president and the cabinet secretary, in their utterances depicted Covid 19 patients as willing carriers of the virus, hence the perlocutionary act of their utterances was stigmatization and victimization of Covid 19 survivors. This paper therefore, recommends that, Given the role and indispensability of linguistic politeness in government and health communication, there is need by government communicators to self-censure in language use. In a pandemic like Covid 19, this would effectively them to share knowledge, ensure public compliance with directives and build public confidence in government, thereby fulfilling the communicative goal of government communication during a health crisis.

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## Socio-economic impact of disruptions from COVID-19 pandemic

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### ABSTRACT

This paper focuses on the underlying issues with regards to social disruptions brought about by global pandemics such as COVID-19. It discusses the disruptions, their impact on society and the possible mitigation measures from a gender perspective. It analyses the role played by capitalism in defining how women and men cope with the disrupted environment that they suddenly find themselves in. The paper looks at the socio-economic impact and zeroes in on the upsurge of domestic and sexual and gender based violence as reported in the social and mainstream media and their link to the disruptions brought about by the COVID-19 pandemic. It posits that the perpetrators are majorly men, while the victims are more often than not women. The social disruptions impact on women and men differently thereby requiring their mitigation efforts to be addressed with a gender lens. This paper bases its arguments on both the modernization and the liberal feminist theories and their nexus to the level of impact and the appropriate mitigation strategies for social disruptions brought about by pandemics. It postulates that part of the mitigation measures includes addressing effects capitalism and individualism which are both inspired by the modernization theory.

Key words: (Pandemics; Social Disruptions; Feminism, Modernization theory, Gender Violence)

### Introduction

The world has witnessed several pandemics in the past. Oxford Learner's Dictionary defines a pandemic as a large number of cases of a particular disease or medical condition happening at the same time in a particular community. Webster Dictionary on its part defines it as an outbreak of a disease that occurs over a wide geographic area such as multiple countries or continents, and typically affects a significant proportion of the population. Hays (2005), has chronicled fifty pandemics and epidemics spanning the fifth century to the contemporary pandemics. Among them were major pandemics of global nature that mainly resulted in high death tolls and serious social disruptions over wide areas. These include the three plague pandemics of the 14<sup>th</sup> 16<sup>th</sup> and 19<sup>th</sup> centuries and the Influenza of 1918 to 1819 commonly referred to as the Spanish Flu (Hays 2005).

Global pandemics of the magnitude of COVID-19 are rare and so far its impact has been compared to the Influenza. Gina Kolata in her 1999 investigative book *'The Story of The Great Influenza Pandemic of 1918 and the Search for the Virus that Caused It'* states that the influenza pandemic infected twenty five Percent of the American population, and left over half a million Americans dead as it spread to the rest of the world. She goes ahead to paint a grim picture of the extent of the devastation of the pandemic thus:

“Children were orphaned, families destroyed, some who lived through it said it was so horrible they wouldn't even want to talk about it..... It swept the globe in months, ending when the war did. It went away as mysteriously as it appeared. And when it was over, humanity had been struck by a disease that had killed more people in a few months' time than any other illness in the history of mankind.” (Kolata 1999:5)

This is a clear illustration of the fact that Impacts of pandemics should not just be analyzed on the basis of mortality rates, as they present with a myriad challenges way beyond the physical illness which

impact on large populations. Pandemics also present with social disruptions of huge magnitudes. Some of these may be pronounced while others may be less pronounced. Hays (2005), found that the cholera pandemic of the nineteenth century on its part caused disruptions in the society more severely than the deaths it caused thereby leaving behind untold devastations. The huge devastations and disruptions brought about by the pandemics and epidemics seemed to unite the world in mitigating the impact. This has been by and large the case with the current COVID-19 pandemic which has united the entire globe in an effort to mitigate its spread and the resultant socio-economic impact. It may appear that the more pronounced the social disruption, the more and the faster mitigation measures put in place. It therefore goes without saying that the reverse may also be true.

### **Social disruptions presentation**

Social disruptions can present in various forms with the most notable one being disruptions from a health perspective. This may include physical ailments, overstressing of the health systems and increased burden to the care givers who more often than not are women. Other forms of disruptions include socio-economic disruptions. The economic sector suffers due to reduced economic activities brought about by stringent guidelines imposed by states in an effort to avert the spread of the pandemic as has been the case with the COVID-19 pandemic. These include lock downs of sections of, or entire countries, closure of certain trades, night time curfews, closure of schools and institutions of higher learning thereby requiring people to work from home, teaching and learning online among other measures. All these measures although well intended inevitably result in social disruptions of a huge magnitude beyond the economy, hence the commonly used phrase in recent times of the ‘new normal’. This phrase goes a long way to illustrate the extent to which lives have been disrupted at every level, for both the young and the old irrespective of race, color, religion or creed.

The measures taken to mitigate the spread of the pandemic have led to retrenchment and redundancies of unprecedented proportions in recent history, increased hardships and enhanced dependency as a result of many people losing their means of livelihoods in various sectors of the economy. A report by Peter G. Peterson Foundation a US based non-partisan organization whose mission is to increase public awareness of the nature and urgency of the key fiscal challenges threatening America's future and to accelerate action on them captures the magnitude of this problem thus:

“The number of individuals experiencing long-term unemployment (lasting 27 weeks or longer) has quadrupled during the coronavirus (COVID-19) pandemic, growing from 1 million in February 2020 to 4 million in February 2021. The long-term unemployed now account for 42 percent of all unemployed workers, up from 19 percent before the pandemic. Such long-term unemployment causes significant harm to individual workers and the economy”. (Peter .G Peterson Foundation, 2021)

Many countries have gone ahead and implemented the COVID-19 mitigation measures without putting in place much needed safe guards to mitigate the socio-economic impact on the citizenry. Families have been locked in for months on end in some instances as part of the mitigation measures. Bread winners have been turned into dependants in some cases and many families have suddenly been uprooted from their homes to new unfamiliar environments. Many children have had to change schools out of necessity with many subjected to culture shock due to their new environments. This is more so for those whose families have been uprooted and forced to move from the urban to the rural areas. Similarly affected are those children who have had to suddenly move from private to public schools. A lot of men who were hitherto not used to staying at their homes for lengthy hours but have been forced to do so by the imposed new measures to curb the spread of the virus have had to devise ways of ‘killing’ their time at home. The adolescents who are young, energetic and mostly restless have likewise found themselves with plenty of time in their hands, and as the saying goes, “an idle mind is the devil’s workshop” hence the myriad reported cases of extreme mischief among adolescents reported on both main stream and

social media across the world. These are just but some of the disruptions that have come with the COVID-19 pandemic.

With normal family lives disrupted and family members who hitherto had their daily schedules planned out like a well-oiled-machine suddenly finding themselves huddled together in homes for hours on end, tensions are bound to build. These heightened tensions can lead to increased cases of domestic violence. This mainly presents in the form of sexual and gender based violence (SGBV). Mainstream and social media reports for the period of the COVID-19 pandemic bear testimony to this so far. The media however may only capture a minute fraction of the cases of SGBV as it falls among the less pronounced disruptions. Of the reported cases, majority of the victims tend to be women with the perpetrators not only being male, but also those close to them including intimate partners. This is not to say that men have not borne the brunt of violence in the hands of their partners, as many cases have been reported during the COVID-19 pandemic of men whose cases of domestic violence have turned tragic.

### **Socio-economic disruptions and sexual and gender based violence Nexus**

Given the rising number of cases of domestic and Sexual and Gender Based Violence reported during the COVID-19 pandemic some of which have turned tragic (Appendix I) the question that begs is whether there is a relationship between the socio-economic disruptions and the violence witnessed. The other question is the role of patriarchy and the enculturation process in the upsurge of violence during the pandemic. Most human societies are primarily male centered hence patriarchal. Rothman, (1994) argues that the patriarchal nature of society and socialization places certain expectations on individuals in society. These expectations in turn, puts a lot of pressure on them to conform. Dollard et al. (1967) posits that when a child meets his culture from a tender age, he meets a set of solid and long standing rules and an organized way of life which includes problem solving mechanisms all which he is expected to live by. Learning of these culturally appropriate habits begins early and in systematic and stereotyped situations. Failure to conform to these expectations often leads to deep frustrations and tensions.

Traditionally, men were viewed as bread winners while women were viewed as nurturers and house keepers. Despite the feminist agitation over the years, many societies still maintain these specific gender roles without giving consideration to other roles and responsibilities that the male or female may be involved in. This is as a result of the dynamic and intertwined gender roles in contemporary society. Often, the unique and specific circumstances under which each individual operates is ignored in the generalization. The result is a frustrated and overburdened individual bogged down with high expectations beyond their abilities, yet unable to deliver for reasons beyond their control. This has led to a situation where a lot of men have been left with no option but to depend on the women in their lives for survival. This situation heightened by the catalytic effect of feminist agitation over the years, and more specifically, Liberal feminists.

### **Liberal feminism and the gender power dynamics**

Feminism is a social movement with the primary goal being to bring equality between men and women. The journey towards women's emancipation was catalyzed by Betty Friedan after the publication of her book *The Feminine Mystique* in 1963 in which she highlighted the frustrations of American women at the time for being relegated to the roles in the private sphere as housewives and nurturers despite their material comfort. The *Feminine Mystique* animated the activities of liberal feminists. Liberal feminism advocates that women are rational beings and have the right to choose and shape their personal and sociopolitical autonomy. The focus of Liberal feminists has been mainly opening up traditionally male spaces to women. This focus is based on the patriarchal notion that occupations that are predominantly male are better rewarded. They maintain the position that despite these demands, their aim is not to dismantle the gender power relations, but rather, to create a level playing ground for women (Lober, 2010).

It is against this backdrop that women joined the work place and overtime entered hitherto male dominated fields. In the process traditional gender roles that relegated women to the private sphere as highlighted by Freidan (1963) have been disrupted over the years and with the disruptions, gender power relations have been redefined. The COVID-19 pandemic has further muddled the gender power dynamics in families especially in situations where men have lost their source of livelihoods and/or women have become the sole breadwinners. This has come at a cost to individuals and communities at large. The COVID-19 pandemic has exuberated this situation. It has not only created unforeseen social disruptions, but also led to loss of livelihoods for both men and women. According to Greenhouse, (2020) in the USA in particular, the pandemic has highlighted America's enduring racial disparities. He emphasizes this point thus:

“Blacks have been infected with covid-19 at three times the rate of whites, and their death rate is twice that of whites. (The same is true for Hispanics.) The coronavirus is also having a hugely disparate impact on Black people's finances and prospects. For myriad reasons, Black Americans will have a harder time rebounding economically from the pandemic” (Greenhouse, 2020).

In as much as both women and men are affected by these disruptions, the implications for either gender are different. Similarly, coping mechanism for men and women differ greatly. In most societies, men are socialized to be the breadwinners and protectors of their families, with the ability to take charge and provide leadership. Many who hitherto fulfilled these roles have suddenly found themselves unable to fend for themselves and their families on one hand, while on the other; they have been rendered idle with little to occupy their time. This is bound to reduce an individual's self-worth and dignity. The United Nations acknowledges the need for work and the right of every individual to remain in gainful and decent employment through the Sustainable Development Goals (SDGs) launched in 2015.

The SDG 8 pronounces itself on the right of everyone to a decent and productive employment. SDG 8 focuses on the Promotion of sustained, inclusive and sustainable economic growth which also includes full and productive employment and decent work for all. In particular, it targets to achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value by 2030. Further, it aims at protecting labour rights and the promotion of safe and secure working environments for all workers (UN Women n.d) a.

Due to the social disruptions brought about by the pandemic, there are many who may not have lost their source of livelihood, but may have found themselves confined for long periods in their homes with family and relations due to the lockdowns imposed by authorities, a situation which may appear alien to them. The situation is not helped much by instances where the physical spaces they occupy are limited and constrained. This scenario is bound to build tensions and is a clear recipe for domestic violence and sexual and gender based violence. Studies indicate that in most cases of domestic violence and in particular sexual and gender based violence, women and girls tend to be the victims as compared to men and boys.

The Sustainable Development Goals (SDGs) launched in 2015 by the United Nations, focuses on gender equality and gender based violence. SDG 5 in particular focuses on achieving gender equality and empowerment of all women and girls. It specifically focuses on ending all forms of discrimination against all women and girls everywhere, and the elimination all forms of violence against all women and girls in the public and private spheres (UN Women n.d) b.

Violence against women in particular is widely acknowledged to be as a result of power imbalance between men and women. Sen 1998 maintains that violence is an expression of power through which people seek control. According to Hooks (1984:124) a lot of male violence stems from their frustrations

in the outside world with the main culprit being capitalism. Her argument is that men resort to violence to vent their anger to the outside world by looking for a soft target. The soft target should ideally also not have adverse repercussions on them. More often than not, these targets end up being vulnerable members of the family who include intimate partners and minors. Sweetman (1998:5) on her part argues that women are generally safer in the streets than in their homes. It may appear that her statement still rings true today and the COVID-19 pandemic has only contributed in amplifying the situation.

#### **Media reporting of domestic and sexual and gender based violence during the COVID -19 pandemic.**

The media has reported several cases of domestic and sexual and gender based violence during the COVID -19 pandemic. This includes both the social and mainstream media locally and across the globe. With a focus on the media in Kenya, majority of the cases have involved relationship issues and domestic violence with many being both physical and sexual in nature. (Appendix II). Further, perpetrators of the violence are both male and female with several cases being fatal. Others have resorted suicide (Appendix III & IV). The majority of victims are however notably female. The manner and nature of the violence also appears unprecedented in terms of the degree and magnitude of the violence reported with perpetrators displaying heightened levels of tension and frustration which could be a reflection of the state of a majority of the population. In Kenya, the increased incidents of domestic, sexual and gender based violence have grabbed the attention of the authorities, top leadership and forcing the concerned Ministry of public Service and Gender through the Cabinet Secretary, to pronounce it self on the issue. Through a statement titled “*Statement on Increased Gender Based Violence in the Country*” in April 2021. The statement indicated that between January and December 2020, a total of 5009 cases recorded through the National GBV toll-free helpline 1195, showed an increase of 1,411 (36%) reported from previous year. It further stated that Nairobi, Kakamega, Kisumu, Nakuru and Kiambu Counties reported the highest cases of GBV.

#### **The catalytic role of capitalism and the Modernization Theory in Social Disruptions**

This paper is premised on the Modernization theory. Modernization theory was developed in the late 1940s. The Modernization theorists hold the view that less developed countries mainly in Africa, Asia and Latin America remain so due to their traditional values and practices which hold them back. They posit that the solution to the underdevelopment is to adopt Western cultural values and industrialize. This theory provides for individual freedoms and a variety of choices of associations that free individuals from group control and promotes individualism as opposed to collectivism. (Thompson, 2017, Kalogeraki, 2009). Individual freedoms coupled with the capitalistic nature of most developed and developing economies promotes individualism.

Kalogerak (2009) in explaining the ideology of individualism and collectivism argues that the central idea of a collective cultural orientation is based on interdependence, which binds individuals through a set of mutual obligations as opposed to an individualistic one which is based on individuals' independence and self-determination. In collectivist cultures the central feature is the suppression of individual goals in favour of those of the wider group which may include the wider family, work-group or religious group. In such setups, group values and norms are highly regarded, and may include sharing resources among members. This ends up establishing in-group stability and long-term relationships. There also exists a large degree of emotional attachment among members practicing such cultures. With regards to the social disruptions brought about by the pandemic, the concept of individualism, impacts negatively on the coping mechanism as it erodes the social safeguards previously available to cushion individuals and families from the social and economic ravages of a pandemic of the nature of COVID-19.

Capitalism is anchored on the Modernization theory which favours a capitalist-industrial model of development. Proponents of this theory believe that capitalism which refers to a free market economy

encourages efficient production through industrialization (the process of moving towards factory based production). Habermas (1984) maintains that in modern industrialized societies personalities become more independent and autonomous as they are differentiated from their social and cultural context. The pursuit of personal interests becomes common replacing collective ones (Parsons 1951), and individuals gain freedom in their choices and behaviors but lose the stability and security of earlier times. Modernization therefore, promotes an increasing shift in the direction of an individualistic ethos, which emphasizes self-actualization and personal happiness rather than collective goals (Kalogerak, 2009).

The Modernization theory has been criticized for assuming that western civilization is technically and morally superior to traditional societies and for implying that traditional values in the developing world have little value compared to those of the West. Post-Development thinkers on their part hold the view that the Modernization Theory model is flawed and that industrialization may do more harm than good for many societies as it may cause Social damage (Thompson 2017).

### **Mitigation measures for social disruptions**

Pandemics of the magnitude of COVID-19 have the capacity to overhaul social and economic systems of communities. The devaluation of traditional social safeguards mostly common in developing countries has exposed individuals and families to the vagrancies of the pandemic. The Modernization theorists consider the traditional value systems of developing countries to be a major contributor to underdevelopment yet the very same value systems are the ones that provide social safeguards. These include interdependence with individuals relying on others in their local communities for basic needs to be met when things get tough for them, strong community and family bonds and collectivism and affective relationships. Modernization theorists refer to the collectivism ideology as '**barriers**' to development'. However, these very same 'barriers' may as well provide mitigation measures for the impact of social disruptions brought about by pandemics such as COVID-19. Such safeguards not only provide a fall back option for those who have lose their source of livelihoods, but can also act as a source of refuge for those rendered homeless or those who need much needed care due to illness or loneliness. Further, the strong community and family bonds and collectivism may provide early detection and arbitration mechanisms to mitigate situations of domestic and sexual and gender based violence brought about by tensions as a result of the pandemic.

Due to the fact that most developing countries Kenya included, have over time embraced capitalism, the social ties and strong community and family bonds and collectivism culture have been wakened, thus leaving individuals and families vulnerable. There being poor investment in psychiatric disorder treatment in most of the developing world, much needed psycho social support is out of reach for many. This situation leaves individuals to their own devise with regard to coping with social disruptions.

Lack of social protection mechanisms during pandemics in many countries in the developing world unlike in the west has contributed greatly in heightening tensions especially within families. This has contributed in exuberating the impact of the social disruption. In Kenya, the measures put in place through the Ministry of Social Services and Gender seemed to be inadequate or poorly implemented in taming the impact of the disruptions. A statement by the said ministry regarding this read in part thus:

“The Government in recognition of the contribution of the COVID-19 pandemic to the GBV crisis made an investment through social safety nets cash transfers. Other interventions are through Affirmative Funds to provide support to self-help groups. As a result, loans to the tune of KES. WEF 300M, UWEZO 60M and Youth Fund 80M are disbursed every month”. (Kobia, 2021).

Developed countries such as the USA issued its citizens with Economic Impact Payments commonly referred to as stimulus checks due to unemployment brought about by the pandemic as stated by Peter .G Peterson Foundation, (2021). They state thus in part:

“As of early May 2021, the federal government has enacted legislation to provide about \$850 billion of Economic Impact Payments, also referred to as stimulus checks, to taxpayers. Those payments helped mitigate the loss of employment-based income for many households and temporarily eased the economic damage from the pandemic”. (Peter .G Peterson Foundation, 2021)

Such policies if well implemented can go a long way in cushioning citizens from the adverse impact of the pandemic. They can also alleviate the subsequent tensions that may occur due to measures taken to curb the spread of the virus such as lockdowns and social distancing.

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## Appendix I

### Woman held for stabbing boyfriend to death in Umoja.

Story by: Cyrus Ombati and Hillary Orinde. (2020, May 11)

*“Police have arrested a 29-year-old woman after her boyfriend was found stabbed to death at the weekend in Umoja, Nairobi. Police say Vigilance Shighi reportedly had a disagreement over food with her 33-year-old boyfriend Edward Okello before knifing him in the chest eight times. Police say Okello, who worked as an aeronautical engineer at Jomo Kenyatta International Airport, was rushed to Mama Lucy Kibaki hospital where he died. Police added that a planned postmortem will reveal more on the nature of the injuries.*

*Shighi is expected in court Monday as police seek more time to hold her as they investigate the incident. She is likely to face murder charges later on. Neighbours were quoted as saying the two had been fighting in their house in the past months.*

*The woman wept when she was informed her boyfriend had died. It was then responders to the scene and who had taken Okello to the hospital called the police. Officers, including those from the Directorate of Criminal Investigations (DCI) visited the house in Umoja and recovered a kitchen knife believed to have been used as a murder weapon. They also found a pool of blood in Okello's living room. Buruburu police boss Adamson Bungei said they needed more time to talk to the woman and collect more evidence.*

*"She needs to be taken to a psychiatrist and undergo other tests before she can stand trial," he said. Police said the woman told them she and the deceased had disagreed and that she acted in self-defence. She said Okello beat her up before she picked a knife and used it to defend herself which turned tragic. Cases of domestic violence are on the rise in parts of the country during the coronavirus pandemic. ”*

## Appendix II

### Mud thwarts married man's attempt to dump secret lover's body.

Story by: Fidelis Kabunyi. (2021, April 16)

*Detectives from the Directorate of Criminal Investigations (DCI) have arrested a 38-year-old man from Githurai Kimbo over his girlfriend's killing. Evans Karani is accused of murdering 25-year-old Catherine Nyokabi in Witeithie area, Juja in Kiambu County on Wednesday, April 14. Juja Sub-County Directorate*

*of Criminal Investigations Officer (DCIO), Richard Mwaura, told The Standard Karani attempted to discard Nyokabi's body, but his efforts were thwarted by Mother Nature.*

*While transporting Nyokabi's body in his car, Karani's vehicle got stuck in mud on Bob Harris road in Juja, forcing him to flee, leaving the body and car behind, the DCI said. Police, who arrived at the scene following a report by locals, verified the car ownership from the National Transport and Safety Authority's Registrar of Motor Vehicles. A hunt for Karani was, consequently, launched by a multi-agency team comprising police, DCI officers and the agency's Crime Research and Intelligence Bureau (CRIB) officers.*

*On Friday morning, April 16, detectives, via phone signal, tracked down Karani to his rented house in Githurai Kimbo area, where he was arrested. The authorities said Nyokabi's body had been burnt using a corrosive chemical. "She was badly disfigured. Besides the burn injuries, she had bruises on the face and head," a sleuth privy to the investigations told The Standard.*

*"It appears she was tortured before being killed," added the detective.*

*Karani is being held in custody at the Juja Police Station. Authorities said the suspect confessed to killing Nyokabi, a hotel worker in Kahawa Wendani, following a bitter conflict, which they had been embroiled in for the past two weeks. Karani, who is married, reportedly told police Nyokabi was his secret lover.*

*The deceased's father, Gitonga Njogu, told The Standard that initial reports suggested his daughter, the first born in a family of four children, died in a road accident.*

*"On Facebook, certain people were claiming my child was killed in a car crash in Juja. However, when we got to see her body at the City Mortuary, we were shocked. The visible injuries clearly indicated Nyokabi's cause of death was not a road accident as had been alleged," said Njogu.*

*"My girl (Nyokabi) was hard-working, cheerful and very loving. Her future was promising," said Njogu while attempting to balance a tear in his eyes.*

*The old man said Nyokabi had, in the past, introduced Karani to him as her suitor.*

*"I knew them to be lovers. Just like in any other relationship, they had differences, which I would help them iron out. Two weeks ago, my daughter said she and Karani had broken up. I told her, it was okay; she shouldn't cling onto a relationship in which she was unhappy. That was the last time I heard of the suspect."*

*Karani will be arraigned on Monday, April 19, when detectives would seek to detain him longer to allow for investigations to be completed.*

### **Appendix III**

#### **Man found dead at lodging in Thika.**

Story by: [Fidelis Kabunyi](#). (2021, April 28)

*A man was found dead in a lodging in Thika town in a suspected suicide.*

*Thika OCPD Mohammed Kofa said the man, identified as Joseph Nyutu, 45, had checked into the room alone on Monday.*

*“The man booked a room for a night but failed to get out the following morning, raising suspicion. The room attendant notified the manager who informed the police. The door was broken and we found his body lying on the bed. There were two bottles of insecticides by the bedside,” he said.*

*He said initial report suggests that he died of poisoning but post-mortem examination results would establish the real cause of his death. The body was taken to Thika General Kago Hospital mortuary.*

#### Appendix IV

Suspect in Catherine Nyokabi’s murder 'attempted suicide three times.

Story by: [Fidelis Kabunyi](#) (2021 April 21)

*Evans Karani, the 38-year-old man from Githurai Kimbo accused of killing his lover last Wednesday, had attempted suicide on three separate occasions after the chilling incident, The Standard has learnt.*

*The Directorate of Criminal Investigations (DCI) Officer investigating Catherine Nyokabi’s murder, Richard Mwaura, told The Standard that Karani confessed to unsuccessfully attempting to take his own life after he had allegedly killed the 25-year-old woman.*

*He first attempted suicide by wrapping a piece of cloth around his neck, which he tied to the roof so as to suspend from it. However, he abandoned that method for another, which he termed as a quicker way to die, authorities said.*

*On the second attempt, Karani jumped in front of an approaching vehicle on Thika Superhighway, but due to traffic build up, he did not sustain serious injuries as the vehicle was moving at a relatively low speed.*

*His third stab at death occurred recently, when he attempted to drown in a Kiambu dam. “He said his swimming skills prevented him from drowning,” said Juja-based DCIO, Mwaura. To prove his claims, Karani allegedly displayed marks on his neck inflicted during his first attempt at suicide.*

*The suspect, a sand broker in Ndarugo, Kiambu County, is said to have confessed to killing Nyokabi after she allegedly entered into a relationship with another man. “He said he had dated Nyokabi, a mother of one, for two years, but of late she had developed interest in another man,” said the investigator.*

*According to the informant, Karani had asked Nyokabi to delete pictures of her alleged new lover, but she refused, leading to the fatal attack on April 14. Two days later, April 16, Nyokabi’s body was found abandoned in Karani’s car in Juja, Kiambu County. Preliminary investigations indicated the vicenarian had been tortured and, thereafter, killed.*

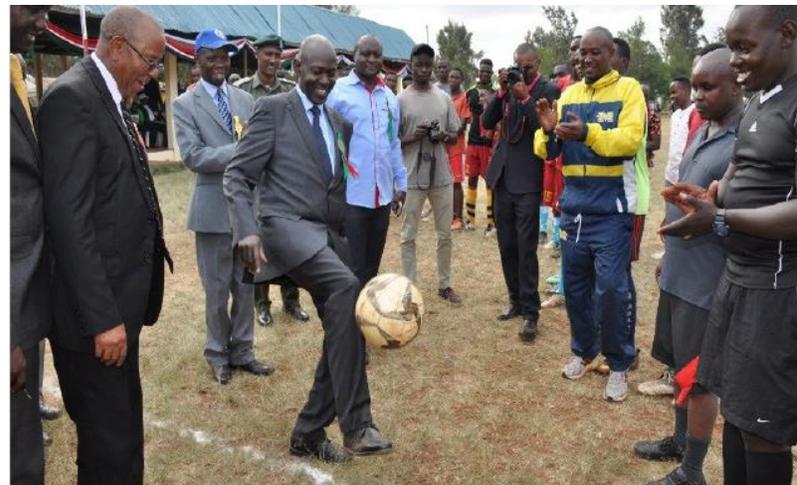
*Karani was allegedly transporting her body for discard when his vehicle, Nissan Wingroad, got stuck in mud in Witeithie, prompting him to flee. He would, later, be arrested at his rented house in Githurai Kimbo, police said. Police recovered empty beer bottles and knives in his car. The suspect has since been arraigned, and is in custody for two weeks after police requested for more time to complete investigations.*

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*This comes even as Karani reportedly said the court should not waste time, and move ahead to jail him for the offence. He is expected back at the Thika Law Courts on May 3, when he will take plea for murder.*

**SUB-THEME 6: ENHANCING POST COVID-19 RECOVERY  
MEASURES IN HEALTH, HOSPITALITY AND QUALITY OF LIFE  
FOR SUSTAINABLE LIVELIHOODS THROUGH SCIENCE &  
TECHNOLOGY**



## Strategies to Overcome the Damages Caused by Covid-19 in the Hotel Industry

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### Abstract

The year 2019 saw the emergence and spread of the coronavirus disease or covid-19 pandemic. The pandemic has moreover led to service interference, low customer demand, loss of traditional markets, reduced revenue, job losses, destroyed assets, reputation risks, higher operating costs and business closures in the hotel industry. Studies nonetheless indicate that the hospitality industry is not committed to crisis management and hotels tend to be reactive to crises. This means that the hotels do not plan ahead for the management of crises and resultant losses. However, the tourism industry has always recovered from crises like fires, terrorism attacks, political disturbances and natural disasters including tsunamis and floods. This review paper consequently facilitates proactive planning by exploring strategies that hotels can adopt to overcome the damages caused by covid-19. The recommended strategies include cost reduction, revenue management, insurance, internal marketing, product development, market re-strategizing, staff re-training, embracing the crises management approaches especially proactive planning, business continuity planning and crisis communication, seeking government assistance and applying for tourism relief funds. The paper concludes that the covid-19 crisis has created challenges and opportunities for the hotel industry. For example, by losing one market segment, the hotels get the opportunities to re-strategize and develop new products and markets. The pandemic has also stimulated technological innovations and advancements in the industry including robotic temperature scanners, disinfectants and sanitizers, keyless technologies and mobile applications. The paper therefore adds to existing strategies, policies and body of knowledge on the management of covid-19 in the hotel industry.

**Keywords:** *Covid-19, damages, strategies, hotels*

### 1 Introduction

A crisis is a “low probability, high impact event that threatens the viability of the hotel and is characterized by ambiguity of cause, effects and means of resolution, as well as by a belief that decisions must be made swiftly” (Karam, 2018). The hospitality and tourism industries have been exposed to crises that are “natural like earthquakes and floods, environmental like oil leakages, geopolitical like terrorism attacks, political disturbances or wars, social crimes or road accidents and epidemic diseases” (Jawabreh, 2019). Sawalha, Jraisat and Al-Qudah (2013) found that social unrest, terrorism, political instability and financial problems were the major crises that hotels in Jordan were exposed to. The Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation-COMCEC (2017) on the other hand highlighted fraud, floods, terrorism, political unrest, crime, fire and climate change as crises facing the tourism industry.

The year 2019 witnessed the beginning of a global crisis and health pandemic, the covid-19. The covid-19 or coronavirus disease first emerged in Wuhan China on 31<sup>st</sup> December 2019 but spread across the world (World Health Organization WHO 2020; 2021). The contagious disease has infected and/or killed many people (Worldometers, 2020; 2021). The covid-19 was declared a public health emergency of international concern on 30<sup>th</sup> January 2020 and global pandemic on 11<sup>th</sup> March 2020 (WHO 2020). The hotel, hospitality and tourism industries have suffered damages resulting from the covid-19 pandemic (Gursoy and Chi, 2020). However, studies on strategies to overcome the damages caused by

the covid-19 pandemic are wanting. This paper consequently purposed to answer the following questions;

- 1) What damages has covid-19 caused to the hotel industry?
- 2) Which strategies can be used to overcome the damages that covid-19 has caused to the hotel industry?

The paper therefore examines the damages that covid-19 has caused in the hotel industry and further explores the strategies to overcome the damages.

## **2 Literature review**

Crises can have negative and positive effects on industries and societies (Karunathilake, 2020). Decline in visitor arrivals with consequent staff layoffs, reduction in business turnover and profits, falling government tax revenues, reluctance to invest by overseas and domestic entrepreneurs and reduced customer numbers are some of the damages that result from crises in the hospitality and tourism industries (COMCEC, 2017). Alonso-Almeida and Bremser (2012) and Radwan and Radwan (2017) also noted that hotels cut salaries immediately to cope with crisis. Positive effects of crises on the other hand include innovations such as new technologies (Lau, 2020), emerging markets and shifts in demand for products and services. Albattat, Som, Marzuki and Farooq (2015) even so posit that hospitality firms need to be proactive rather than reactive to crises in order for the industry to develop business resilience. Zech (2016) further observed that the hotel industry is not committed to crisis management.

The negative effects of crises on the hospitality and tourism industries have moreover been evident during the covid-19 pandemic (Sigala, 2020). Travel was restricted as most countries banned national, regional and international flights, cruise and travel (Biwota, 2020). National curfews and lockdowns restricting movement were also imposed globally (Gursoy and Chi, 2020). These restrictions were aimed at curbing the spread of the disease. Consequently, the United Nations World Tourism Organization-UNWTO predicted that international tourist arrivals could decline by 20% to 30% in 2020 due to the border closures leading to major financial and job loss (UNWTO, 2020).

In Kenya, the Kenya Private Sector Alliance (KEPSA) revealed that the covid-19 crisis affected the country's international and domestic tourism source markets thus reducing tourist arrivals (KEPSA, 2020). Hospitality facilities in the country were also forced to stop operations in March 2020 and food service businesses such as restaurants were encouraged to offer deliveries and takeaways only (Standard Newspaper Kenya, 2020). There were moreover restrictions and cancellations of business-related travel such as conferences (KEPSA, 2020) and events like festivals, funerals and weddings. Bars and golf courses were eventually closed. These resulted to a drop in the number of hospitality customers. Some hotels therefore had to temporarily or permanently stop operating (Standard Newspaper Kenya, 2020). However, other hotels, both locally and globally, took advantage of emerging business opportunities by turning their establishments into covid-19 quarantine and isolation facilities (Standard Newspaper Kenya, 2020) and hosting covid-19 frontline health workers who needed accommodation (Kaushal and Srivastava, 2021). A few hotels like the Sarova in Nairobi Kenya further developed new products by turning their guest rooms into private offices for hire to customers looking for office space due to work from home and social distancing at the workplace orders (Standard Newspaper Kenya, 2020).

Countries across the world started opening up their economies around July 2020 when the number of Covid-19 infections started declining (Brizek, Frash, McLeod and Patience, 2021). For example, in July 2020, the Kenyan government authorized hospitality facilities like hotels and restaurants to resume operations (Ministry of Tourism and Wildlife Kenya, 2020; Ministry of Health Kenya, 2020) by lifting the bans on events and accommodation of guests. Hospitality facilities however had to strictly

adhere to Covid-19 Health and Safety protocols and guidelines that were jointly developed by the government and tourism stakeholders (Ministry of Tourism and Wildlife Kenya, 2020). Eventually, restrictions on the operation of bars and the sale of alcoholic beverages in Kenya were lifted in September 2020 (Standard Newspaper Kenya, 2020). The hotel industry started recovering after the rules were relaxed (Standard Newspaper Kenya, 2021).

By early December 2020, several countries had developed vaccines to manage covid-19 (WHO, 2020). These vaccines were eventually rolled out across the world. However, different variants of covid-19 emerged, indicating mutations of the virus (Centers for Disease Control and Prevention, 2021). Covid-19 also manifested in waves meaning that the number of confirmed cases would surge over different periods of time (Africa Centre for Disease Control and Prevention, 2020) and across different regions and countries. Governments across the world therefore imposed restrictions whenever they felt that the number of confirmed cases were too many or could overwhelm the medical systems. The restrictions included constraining movement and travel, closing business facilities like entertainment spots, bars, restaurants and hotels, announcing curfews and establishing lockdowns again. For instance, the government of Kenya on 26<sup>th</sup> March 2021 announced a partial lockdown of five counties in the country-Nairobi, Nakuru, Machakos, Kiambu and Kajiado- that prohibited movement, the operations of bars and sit in dining, after the number of confirmed cases in the zoned regions increased (The Presidency Republic of Kenya, 2021). These partial lockdowns were moreover lifted on the 1<sup>st</sup> of May 2021 and bars and restaurants in the affected regions allowed to resume full operations within curfew hours (The Presidency Republic of Kenya, 2021).

### **3 Methodology**

This paper had two objectives. The first objective was to discuss the damages caused by covid-19 in the hotel industry. Meanwhile, the second objective was to explore the strategies for overcoming the damages caused by covid-19 in the hotel industry. Thus, the paper compiled evidence from secondary data and literature in an attempt to achieve its objectives. Relevant information on covid-19, damages that covid-19 has caused to the tourism, hospitality and hotel industries and the strategies for overcoming the damages was therefore collected from the media and publications in journals, books, newspapers and the internet. The authors of this paper however further explored covid-19 damages and recovery strategies that were not discussed in the secondary data and literature that was reviewed. These damages and strategies were based on the authors' knowledge and observations during the pandemic.

### **4 Results and discussions**

Damages caused by covid-19 in the hotel industry

Covid-19 has caused several damages to the global hotel industry. First, the covid-19 has been linked to infections and deaths of people (Worldometers, 2021). The hotel industry has not been spared. The illness has moreover infected and/or killed some guests, customers, employees, suppliers, distributors and other hotel stakeholders. As a result of the risks, some hotel employees fear reporting to work (Stergiou and Fermaki, 2021).

The covid-19 pandemic has exposed hotels to reputation risks and damages. Reputation risk which is defined as “the threat of economic damage from angry, frightened and/or disappointed stakeholders” is common during crises (Kossovsky, 2018). Reputation damage during the covid-19 pandemic can occur when a hotel does not adhere to health and safety protocols and is linked with covid-19 infections of employees in the line of duty and guests during stay. Reputation damage can also occur when a hotel fails to meet its financial obligations. For instance, Dayour, Adongo, Amuquandoh and Adam (2020) found that hospitality and tourism businesses in Ghana had defaulted in the payment of pension contributions and taxes during the covid-19 pandemic. Reputation damage

can moreover lead to loss of revenue, customers, guests, employees, lenders, shareholders, suppliers and other hotel stakeholders.

Covid-19 has interfered with service delivery in hotels. For example, wearing of face masks hides the service provider's smile meant to accompany service. The smile is a hotelier's greatest asset (Andrews, 2010) and is known to win guests. Abolishment of buffets in the hotels has on the other hand caused dissatisfaction among most customers who appreciate variety and self-service. In addition, covid-19 curfews have affected the businesses of hotels, bars and restaurants by reducing the operating hours. Covid-19 lockdowns have also paralyzed service delivery.

The covid-19 pandemic has led to loss of business among hotels. Customer demand has dropped due to the poor economy and recession that has reduced disposable incomes among the travelling public, loss of consumer confidence, general fear of travel (Gursoy and Chi, 2020) and travel restrictions to countries greatly affected by the pandemic. Nan (2020) and Soehardi and Untari (2020) found that covid-19 reduced hotel occupancy as visitor numbers declined. Biwota (2020) further established that hotels in Ethiopia were receiving fewer hotel room bookings and more room booking cancellations due to covid-19. A similar scenario of low hotel room bookings and high cancellations of room reservations was also witnessed in Kenya especially in major tourist destinations like Mombasa and Maasai Mara during the Easter period of March to April 2021 when partial lockdowns were imposed on several counties in the country. Most guests who had booked hotel rooms in Mombasa and Maasai Mara and were traveling from Nairobi, Nakuru, Kiambu, Machakos and Kajiado had to cancel their reservations due to the partial lockdowns within these regions. The Kenya Television Network-KTN (2021) in a feature titled "Tourism dip in Kwale" later reported that the restrictions in the zoned areas led to lack of travelers, suspension of services by local airlines, empty hotels in most Coastal regions and thousands of job losses with no bailout for the hotels in place. Affected hotel investors however encouraged customers to postpone their stays instead of cancelling the reservations.

Covid-19 has led to loss of traditional hotel markets such as the older segments, group tours, events and sports tourists. Covid-19 has moreover affected the older population the most (Centers for disease control and prevention, 2021) meaning that travel from this market segment has gone down. Smart, Ma, Qu and Ding (2021) further observed that covid-19 had led to total loss of the tour group market indicating that group tours had reduced. Covid-19 as well affected events including sports that normally involve large numbers of people coming together.

Covid-19 has led to high unemployment rates in the hotel industry. Some hotel employees have lost their jobs, been made redundant, been retired early, been forced to take unpaid leave and/or been made to look for alternative sources of income. Soehardi and Untari (2020) also found that covid-19 reduced hotel revenue and tax income thus leading to job loss among employees. Ocheni, Agba, Agba and Eteng (2020) similarly observed that the hospitality industry had experienced major unemployment and job losses and that some facilities had to shut down operations. Thus, the negative financial effects on hospitality facilities are global. For example, in Kenya, the operation of bars and sale of alcohol in restaurants and eateries in Nairobi, Nakuru, Kajiado, Machakos and Kiambu counties were suspended on 26<sup>th</sup> March 2021 when the five counties were placed on partial lockdown (The Presidency Republic of Kenya, 2021). Hospitality facilities like restaurants and hotels in the lockdown areas were again directed to only make deliveries and offer takeaway services to their customers (The Presidency Republic of Kenya, 2021). This means that the employees in these facilities had to stop working thus resulting in unemployment.

Covid-19 has interfered with the operations of hotels by creating disconnect from the standard operating procedures. The disconnect arises because the slow re-opening calls for reduced number of staff who perform duties meant for other staff. This means that the hotels have to cross-train their employees and make them multi-skilled and flexible enough to work in different areas of the hotels (Kaushal and Srivastava, 2021).

The covid-19 pandemic has increased the operating costs of hotels. Hotels in Kenya have to acquire special business licenses, screen employees and guests, insure employees, train employees, test employees, renovate facilities to comply with covid-19 health and safety protocols, reduce capacity, increase demand, maintain social distance, manage reduced operating hours and buy new equipment such as partitions, screening machines, hand washing machines, sanitizers and thermo guns meant to curb the spread of disease (Ministry of Tourism and Wildlife Kenya, 2020). For example, the social distancing in the hotels reduces the capacities of restaurants, lounges and conference halls.

Covid-19 has distressed stakeholders (customers, employees, suppliers, local communities and owners) especially through the business closures. Hotels have experienced loss of customers' goodwill since customers have become uncertain of the sustainability and abilities of the hotels to satisfactorily meet their needs. Employees have been laid off, forced on unpaid leaves and had benefits and incentives withdrawn (Agarwal, 2021). Suppliers have lacked markets for their produce and had to cope with delayed payments. Local communities have missed the opportunities to visit hotels. Hotel owners have also experienced business and financial losses.

Business closures due to covid-19 have contributed to physical damages to hotel properties. Hotels have witnessed the deterioration of buildings, hotel vehicles and fixtures due to closure, attraction of mould on linen (bed sheets, bed covers, curtains) due to lack of airing of guests' rooms during the closure period, growth of algae in the swimming pool due to stagnant water and destruction of the hotels' ambience and comfort. These damages have increased maintenance costs and led to financial and property losses.

Because of the low business volumes in hotels, some establishments have defaulted on loans that they had taken to sustain operations. According to KEPSA (2020), as a result of the drop in the number of customers in hospitality facilities in 2020, there was "business uncertainty, several hospitality facilities were unable to repay loans due to reduced business and expenses had to be incurred due to precautionary response plans thus affecting business activities and resulting to financial loss".

Covid-19 has been linked to financial losses among hotels. For example, Soehardi and Untari (2020) found that hotel revenue had reduced due to covid-19. Hotels have also been forced to revise down the prices of their products and services in a bid to attract customers thus further reducing profit margins. For instance, most hotels have had to slash down guest room rates.

Lastly, Covid-19 has led to business closures among hotels. Nan (2020) observed that due to covid-19, hospitality facilities including hotels in China had to shut down operations. A similar scenario was observed in Kenya where some hotel chains suspended operations by temporarily closing some of their lodges and hotels (Standard Newspaper Kenya, 2020). Other hotels permanently closed their businesses. Thus, the business closures due to covid-19 could be temporary or permanent (Smart *et al.*, 2021).

Strategies to overcome the damages caused by covid-19 in the hotel industry

A few researchers have investigated the strategies for managing covid-19 in the hotel, hospitality and tourism industries. Rodríguez-Antón and Alonso-Almeida (2020) reported the initiatives taken against

covid-19 by leading hotel chains in Spain. The two authors moreover found that the hotel chains had initiated programmes that emphasized on “employee and guest health, safety and security, sanitation, reduced contacts, social distancing, innovative experiences, customer focused branding, employee training, communication, scanning and supervision”.

Other researchers like Biwota (2020) have gone further and proposed strategies for managing the negative impact of covid-19. Biwota (2020) specifically recommended that tourism and hospitality stakeholders ensure flexible booking and rates for guests during the pandemic. The hotels should therefore embrace revenue management by adopting pricing strategies such as value based, business expenditure and total expenditure that respond to the customers’ needs and allow the guests to reduce costs. Guests should also be allowed to change reservation dates and stay periods. This will help manage cancellations which would otherwise mean total loss of business. Consequently, the hotels should embrace yield management by adjusting the rates as the demand changes thus allowing for flexible rates that maximize profits and reduce losses.

The hotels should strive to reduce costs. The hotels should seek discounts from suppliers, distributors such as travel agents and tour operators and marketers such as promoters and sales people. The hotels should also reduce energy costs by regulating energy consumption in areas that are not operating during the pandemic. The hotels should further insure their businesses thus minimizing operational and financial losses resulting from the covid-19 pandemic. Insurances should range from personal to business, medical, employee and group. The hotels should also create additional meeting and eating places within the compound in order to reduce costs that are linked to reduced capacities.

Rodríguez-Antón and Alonso-Almeida (2020) recommend that the hospitality industry builds tourist trust, reinforces brands and adapts operations to the “new normal”. The hotels should therefore develop new markets and products that will attract customers to their facilities. For example, concern for healthy eating, health and fitness with an aim of boosting immunities during the covid-19 pandemic has grown. The hotels can therefore embrace wellness tourism and develop green restaurants, health restaurants and fitness centers for new and existing customers.

The hotels should try to win their customers’ trust in their products and services. For instance, emphasizing on room service and private dining spaces will facilitate physical and social distancing in restaurants and bars. In addition, using disposables in food and beverage service and housekeeping will convince customers that the hotels observe the highest standards of hygiene and cleanliness. Hence, the customers should be given the options of using disposables. Disposables that the hotels should invest in include plates, cups, spoons, beddings, towels and napkins. Customers should nonetheless be informed of the hotels’ efforts towards ensuring their safety. The resultant costs should then be factored in the prices of the services.

The hotels should work hard to ensure efficient service delivery to customers so that the guest experience is not totally lost due to covid-19. For example, the hotels should re-train employees on how to fully express good service without necessarily showing a smile in order to overcome the setback of a mask hiding the service provider’s smile. In addition, creation of barriers at the buffet to allow customers to pass through and view the gastronomical arrangement of foods before they are served by the chefs can help rebuild the meal experience that is desired by most customers.

The hotels should re-strategize existing markets. The traditional international leisure customers in hotels are older adults especially baby boomers who are retired and considered well off. However, covid-19 has affected the elderly the most (Centers for disease control and prevention, 2021) thus reducing international and domestic travel from this market segment. In Kenya and globally, a new generation

of young travelers who have embraced domestic, regional and international travel has emerged. The hotels should therefore target domestic, regional and international markets of young travelers especially the millennials who are believed to be more resilient to covid-19. This may mean adjusting the prices to suit the pockets of the younger markets and developing products that would attract this market. For example, Sofronov (2018) observed that millennials seek experiences when travelling. Hence, the hotels should embrace a total experiential approach by focusing on products, services, hospitality, ambience, destination, value and promotion rather than just concentrating on products and services alone. In addition, millennials are techno-savvy meaning that they appreciate technology hence the need for the hotels to invest in the latest technologies.

The hotels should target the business market. Business travel is a market segment that is not affected by seasonality. The hotels should therefore focus on international, regional, domestic and local business guests since most airspaces were opened up and cross-border and national travel resumed sometime into the covid-19 pandemic.

The hotels should focus on corporate events like conferences from public and private organizations to sustain operations. Governmental and non-governmental organizations are known to host conferences and meetings for their employees, customers, shareholders, suppliers and other stakeholders. The corporate events will moreover provide markets that will use conference facilities, guest rooms, food, beverages and other hotel products.

The hotels should embrace new promotion and distribution strategies like mail, email, video, social media, internet and digital marketing in order to create a presence in their markets. These strategies do not call for personal interactions, social and physical distancing. For example, the Kenyan government encouraged home deliveries and takeaways from restaurants and hotels during the lockdowns in 2020 and 2021 (Standard Newspaper Kenya, 2020; The Presidency Republic of Kenya, 2021) thus preventing total closure of these facilities. Likewise, virtual experiences can prove popular among hotel guests who cannot travel to view and enjoy the hotel products. Events, food, beverages and entertainment are some of the experiences that can be offered virtually for the guests thus reminding them of the hotels' existence.

The hotels should include crises management approaches like proactive planning, business continuity planning and crisis communication in their strategic plans. In proactive planning, the firm plans for crises by analyzing crises risks and developing emergency plans thus avoiding being reactive (Vašíčková, 2019). In business continuity planning and management, the firm ensures that it does not stop operating when crises arise by laying down plans and strategies for sustaining operations (Alharthi, Khalifa, Abuelhassan, Nusari and Isaac, 2019). Crisis communication on the other hand ensures that the firm's stakeholders are kept informed of unfolding events during crises (Zech, 2016). First, proactive planning will ensure that the hotels strategize on how to manage damages so that the negative impact and effects of the pandemic are minimal. Second, business continuity planning will ensure that the hotels plan for continuity of operations. Lastly, crisis communication will guarantee open communication with stakeholders on the status of operations during the pandemic hence building stakeholder trust.

The hotels should practice internal marketing by showing concern for their employees. They should plan for staff deployment and maintain morale during the pandemic. The hotels should also operate rotational shifts to ensure employee survival during layoffs. The hotels can further use the downtime during business closure to train their employees. Remote working from home, annual leaves and unpaid leaves should be options for employees during the pandemic. The employees should then be recalled when the hotels resume operations. Furthermore, the hotels should practice employee corporate social

responsibility by assisting laid off employees get additional skills and alternative sources of income. They should also re-train staff allocated new responsibilities in order to minimize the effects of disconnect with standard operating procedures that arise when operations are disrupted.

Ocheni *et al.* (2020) proposed policy options such as the “recapitalizing of tourism stakeholders, safety policies for group tours, adopting advanced telecommunication technology for employees and guests, meals and service delivery for the hospitality industry and financial aids by the government” during the covid-19 pandemic. In light of these, the hotels should establish niches as smart hotels. Technology has proven critical in delivering products and services to hotel guests during the covid-19 pandemic. Robotics, smart devices and artificial technology such as robotic waiters, remote and mobile check-ins and check-outs have helped manage challenges associated with social and physical distancing and enhance guest and employee health and safety during the pandemic. The hotels should therefore adopt these technologies for enhanced customer experiences and sustained operations. Other relevant technologies that they should embrace include “mobility tracing apps, robotized-AI touchless service delivery, digital health passports and identity controls, social distancing and crowding control technologies, big data for fast and real time decision-making, humanoid robots delivering materials, disinfecting and sterilizing public spaces, detecting or measuring body temperature, providing safety or security” (Sigala, 2020).

Biwota (2020) recommended that tourism and hospitality stakeholders ensure the safety and security of employees and guests. Thus, the hotels should encourage employee and guest vaccinations. Employees, guests and other stakeholders should also be provided with personal protective equipment (PPEs) like masks while in the hotels. These measures should be adopted while strictly adhering to the covid-19 health and safety protocols and guidelines outlined by the governments.

With regard to the destruction of properties due to business closure, the hotels should apply for funds like the Tourism Stimulus Funds in Kenya to caution the maintenance costs, frequently open the rooms for airing and dusting, frequently run the swimming pool machines for recycling of the water, conduct pool treatment and retain a few staff to maintain the images of the hotels through cleanliness and creating order during downtimes.

The hotels should establish other methods of generating revenue so as to manage the distress caused to stakeholders due to closures linked to covid-19. For instance, the hotels should offer affordable packages for local communities to use facilities like the gym membership forums.

Lastly, the hotels should work closely with stakeholders especially the governments during the pandemic. Governments across the world are expected to provide financial assistance in order to bail out hospitality facilities affected by covid-19. The hotels should use the funds to resume operations, improve existing products and markets, develop new products and markets, settle debts, run promotions, adapt technologies and ensure guest and employee safety and security.

Table 1 summarizes the strategies to overcome the damages caused by covid-19 in the hotel industry.

Table 1: Strategies to overcome the damages caused by covid-19 in the hotel industry

	<b>DAMAGES</b>	<b>NATURE OF DAMAGES</b>	<b>STRATEGIES TO OVERCOME THE DAMAGES</b>
1	Infections and deaths	<ul style="list-style-type: none"> <li>▪ Infections and/or deaths of some employees, guests, customers, owners and other hotel stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>▪ Encouraging covid-19 vaccinations</li> <li>▪ Strictly adhering to covid-19 health and safety protocols</li> </ul>

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		<ul style="list-style-type: none"> <li>▪ Fear of reporting to work among employees</li> </ul>	<ul style="list-style-type: none"> <li>▪ Getting personal protective equipment for employees, guests and other stakeholders</li> </ul>
2	Reputation risk and damage	<ul style="list-style-type: none"> <li>▪ Infection of employees in line of duty and guests during stay</li> <li>▪ Default on tax</li> <li>▪ Default on pension</li> <li>▪ Failure to meet other financial and non-financial obligations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Building stakeholder trust</li> <li>▪ Encouraging covid-19 vaccinations</li> <li>▪ Getting insurances - personal, business, employee, medical, group</li> <li>▪ Applying for relief funds</li> <li>▪ Seeking government assistance</li> </ul>
3	Wearing of masks	<ul style="list-style-type: none"> <li>▪ Wearing of masks hides the service provider's smile meant to accompany service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Re-training on how to fully express good service without necessarily showing a smile</li> </ul>
4	Abolishment of buffets	<ul style="list-style-type: none"> <li>▪ Abolishment of buffets has led to dissatisfaction among customers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Creation of a barrier at the buffet to allow customers to pass through and view the gastronomical arrangement of foods before they are served by the chefs</li> </ul>
5	Loss of business	<ul style="list-style-type: none"> <li>▪ Effects of economic recession</li> <li>▪ Impact of economic downtimes</li> <li>▪ Reduced business operating hours due to curfews</li> <li>▪ Total loss of business due to lockdowns</li> <li>▪ Effects of travel restrictions to greatly affected countries</li> <li>▪ Lack of consumer confidence</li> <li>▪ Loss of the customers' goodwill</li> <li>▪ Low demand for products and services</li> <li>▪ Low disposable income among customers</li> <li>▪ Cancellation of bookings and reservations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aggressive marketing</li> <li>▪ Offering flexible rates</li> <li>▪ Allowing flexible bookings</li> <li>▪ Allowing cancellations of reservations</li> <li>▪ Embracing revenue management</li> <li>▪ Embracing yield management</li> <li>▪ Appropriate pricing strategies - value based, business expenditure and total expenditure</li> <li>▪ Use of disposables in food and beverage service and housekeeping</li> <li>▪ Emphasizing on room service</li> <li>▪ Offering private dining</li> </ul>
6	Loss of traditional markets	<ul style="list-style-type: none"> <li>▪ Cancellation of events</li> <li>▪ Reduction in group tours</li> <li>▪ Loss of older market segment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Re-strategizing markets</li> <li>▪ Focusing on corporate events</li> <li>▪ Developing new products - wellness, fitness, health</li> <li>▪ Developing new markets - millennials, business market, corporates, domestic tourists, local travellers</li> <li>▪ Revising promotion strategies and distribution channels - mail, email, video, social media, internet, digital and virtual</li> </ul>
7	Higher operating costs	<ul style="list-style-type: none"> <li>▪ Need for special licenses</li> <li>▪ Need for special permits</li> <li>▪ Reduced capacity</li> <li>▪ Increasing competition</li> <li>▪ Need to increase demand</li> </ul>	<ul style="list-style-type: none"> <li>▪ Seeking discounts from suppliers, distributors and marketers</li> <li>▪ Getting insurances - personal, business, employee, medical, group</li> </ul>

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		<ul style="list-style-type: none"> <li>▪ Need for aggressive marketing</li> <li>▪ Need for new equipment</li> <li>▪ Reduced operating hours</li> <li>▪ Need to invest in technology</li> <li>▪ Conduction of employee testing</li> <li>▪ Screening of guests and employees</li> <li>▪ Need for physical and social distancing</li> <li>▪ High energy consumption during downtime</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reducing energy costs during downtime</li> </ul>
8	Social distancing	<ul style="list-style-type: none"> <li>▪ Reduced capacity of restaurants, lounges and conference halls</li> </ul>	<ul style="list-style-type: none"> <li>▪ Creation of additional meeting and eating places within the compound</li> </ul>
9	Loss of jobs and benefits to employees	<ul style="list-style-type: none"> <li>▪ Staff layoffs</li> <li>▪ Redundancies</li> <li>▪ Early retirements</li> <li>▪ Loss of benefits and incentives</li> </ul>	<ul style="list-style-type: none"> <li>▪ Operating rotational shifts to the employees to ensure their survival</li> <li>▪ Embracing internal marketing</li> <li>▪ Practicing employee corporate social responsibility</li> </ul>
10	Disconnect from standard operating procedures	<ul style="list-style-type: none"> <li>▪ Slow re-opening calling for reduced number of staff who perform duties meant for other staff</li> </ul>	<ul style="list-style-type: none"> <li>▪ Re-training of the staff who have been allocated new responsibilities</li> </ul>
11	Loss of customers' goodwill	<ul style="list-style-type: none"> <li>▪ Loss of customers' goodwill through closure of hotels</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reinforcing brands</li> <li>▪ Vibrant marketing upon re-opening</li> </ul>
12	Distress on the stakeholders	<ul style="list-style-type: none"> <li>▪ Distress on customers, employees, suppliers, local communities and owners</li> <li>▪ Loss of customers' goodwill</li> <li>▪ Job losses and withdrawn benefits and incentives among employees</li> <li>▪ Lack of markets for suppliers and delayed payment for deliveries</li> <li>▪ Missed opportunities for local communities to visit hotels</li> <li>▪ Business and financial losses for hotel owners</li> </ul>	<ul style="list-style-type: none"> <li>▪ Embracing crisis communication - open communication with stakeholders</li> </ul>
13	Deterioration of assets	<ul style="list-style-type: none"> <li>▪ Deterioration of buildings, hotel vehicles and fixtures due to closure</li> </ul>	<ul style="list-style-type: none"> <li>▪ Application for government relief funds and tourism stimulus fund to caution the maintenance costs</li> </ul>
14	Attraction of mould on linen	<ul style="list-style-type: none"> <li>▪ Attraction of mould on bed sheets, bed covers and curtains due to lack of airing in the guests' rooms during the closure period</li> </ul>	<ul style="list-style-type: none"> <li>▪ Frequently opening the rooms for airing and dusting</li> </ul>
15	Growth of algae in swimming pools	<ul style="list-style-type: none"> <li>▪ Growth of algae in the swimming pool due to stagnant water</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conducting pool treatment</li> <li>▪ Frequently running the swimming pool machines for recycling of the water</li> </ul>

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16	Destruction of the hotels	<ul style="list-style-type: none"> <li>▪ Destruction of hotels ambience and comfort</li> </ul>	<ul style="list-style-type: none"> <li>▪ Retaining a few staff to maintain the image of the hotels through cleanliness and creating order</li> </ul>
17	Default on loans	<ul style="list-style-type: none"> <li>▪ Failure to re-pay loans</li> <li>▪ Delays in re-paying loans</li> </ul>	<ul style="list-style-type: none"> <li>▪ Re-negotiating loan repayment terms</li> <li>▪ Seeking government financial assistance</li> </ul>
18	Financial loss	<ul style="list-style-type: none"> <li>▪ Reduced service charge</li> <li>▪ Reduced revenue</li> <li>▪ Lower profit margins</li> <li>▪ Business losses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Establishing other methods of generating revenue for the hotel such as creating affordable packages for local communities to use the hotel's facilities like the gym membership forums</li> <li>▪ Getting insurances - business, group</li> <li>▪ Applying for relief funds</li> <li>▪ Seeking government assistance</li> </ul>
19	Business closure	<ul style="list-style-type: none"> <li>▪ Temporary business closure</li> <li>▪ Permanent business closure</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adopting crises management approaches - proactive planning, business continuity planning and crisis communication</li> <li>▪ Applying for relief funds</li> <li>▪ Seeking government assistance</li> </ul>

## 5 Implementations

This paper provides comprehensive information on the damages caused by covid-19 in the hotel industry and further proposes strategies for managing the damages. The proposed strategies can be adopted by hospitality facilities and hotels that would like to minimize the negative impact of the covid-19 pandemic on their businesses.

## 6 Limitations

Despite the immense contribution that this paper has made to crises management in the hotel industry, the paper is limited in its lack of empirical evidence to support the findings. Future studies should nonetheless conduct empirical studies that will involve the collection of primary data from hotel stakeholders including managers, employees, customers and guests. This will moreover augment the findings and contribute to knowledge.

## 7 Conclusions

Covid-19 has created challenges and opportunities for the hotel industry. Losing one market segment provides the opportunity to develop and embrace a new one. Emerging markets also pave way for the establishment of new pricing strategies for new and existing markets. Similarly, losing a group of employees through layoffs and forced retirements provides the opportunity to employ a new group of more competent employees. Some of the damages caused by covid-19 such as permanent business closure may therefore be irreversible. However, other damages like reduced customer demand and employee layoffs are reversible. The hotel industry nonetheless stands a risk of losing its meaning in terms of inseparability where the service provider is packaged together with the service. Hence, with Covid-19 still in existence, more strategies need to be invented to stop further damage.

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## A Review of Dietary intake and Nutritional status of children with Cerebral Palsy.

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### ABSTRACT

Cerebral palsy (CP) is a group of neurologic disorders typically caused by a non-progressive lesion or abnormality of the developing brain that appears in infancy or early childhood and permanently affects body movement, muscle coordination, and balance. It is the most common cause of physical disability in childhood and is a significant health problem with major effects over the lifespan. The global prevalence of CP ranges between 2 – 10 per 1000 children in community-based samples with prevalence varying widely from country to country. Children are vulnerable to protein energy malnutrition (PEM) as well as micronutrient deficiencies because of their continuing growth that hikes their bodies' demand for nutrients. This risk of malnutrition is increased in neurologically impaired (NI) children e. g CP, due to a number of nutritional and non-nutritional factors. Among the nutritional factors is insufficient dietary intake due to feeding difficulties resulting from impaired chewing and swallowing. Cerebral palsy may be associated with a host of comorbidities such as undernutrition (46% to 90% of the patients), Studies have reported increased prevalence of morbidity and mortality secondary to compromised nutritional status among children with CP compared to their normal counterparts in the same age group. **Objective:** This review is aimed at assessing the effect of dietary intake on nutrition status of children with cerebral palsy. **Methodology:** A review of various publications was conducted using the key words, Cerebral Palsy, disability, and feeding difficulties. **Results and conclusion:** This review shows that feeding difficulties due to motor dysfunction is common in children with CP and may reduce their dietary intake resulting to poor health and nutritional status **Recommendation:** There is need to develop effective interventions aimed at improving the dietary intake of children with CP. Such interventions could help mitigate poor nutritional status as well as improve their quality of life.

**Key Words:** *Cerebral Palsy, Dietary intake, Nutrition status, feeding difficulties*

### Introduction

Cerebral palsy is a common childhood disability that affects sensory motor functions and leads to impaired motor behaviour and oral motor dysfunction. It is a physical disability that affects 0.4% of children globally (Pulgar et al., 2019). According to the World Disability Report (2011), 15% of the global population constitutes persons with disability. In Kenya, the overall disability rate is 4.6% translating to 1.7 million Persons with disabilities. Of this, the largest proportion is physical impairment, amounting to 24% (413,698), of which CP is inclusive (KNBS; NCAPD, 2008). CP is thought to be even more common and severe in low-income countries due to lack of access to early intervention and obstetric, neonatal, and rehabilitation services (Claudia et al., 2018). Studies conducted in Kenya by Auka and Afedo in 1986 and Kennedy in 1990, showed that CP affected about 0.25% of children. In the same study, CP was noted to be the second most common neurological condition causing physical impairments after poliomyelitis in Kenya (Auka and Afedo, 1985; Kennedy, 2001). Current data on prevalence of CP in Kenya is lacking.

Malnutrition, either under or over-nutrition, is a common condition among neurologically impaired children. Energy needs are difficult to define in this heterogeneous population, and there is a lack of information on what normal growth should be in these children. Non-nutritional factors may influence growth, but nutritional factors such as insufficient caloric intake, excessive nutrient losses and abnormal energy metabolism also contribute to growth failure. (Aggarwal et al., 2015; Penagini et al., 2015).

Depending on the severity of the impairments, children with cerebral palsy have feeding difficulties due to their inability to put food into their mouth and due to chewing and, or, swallowing problems. This situation makes them dependent on others, risking malnutrition, which negatively impacts on the quality of their life (Kakooza-Mwesige, 2015). Various studies have reported high prevalence of malnutrition among CP children in different settings (Almuneef et al., 2019; Penagini et al., 2015b; Rajikan et al., 2017). A study conducted by Koriata (2012), in Kenya among children with CP attending Kenyatta National Hospital outpatient clinic, showed that 70.3% were malnourished.

Food intake is one of the factors that determine malnutrition. Feeding dysfunction such as Oropharyngeal dysphagia due to motor dysfunction is common in children with CP and may reduce their food intake, resulting to poor health and nutritional status (Rempel, 2015) Adverse consequences of malnutrition among children with CP are widespread. Evidence from different countries reveals that malnutrition among children with CP results in poor health-related outcomes, poor quality of life and premature mortality (Power et al., 2018).

#### **Nutritional requirements of children with CP**

Studies reviewed indicate that many children with CP have decreased energy requirements in comparison with typically developing groups and that these differences increase with increasing severity of gross motor impairment. Differences are partly because of decreased basal metabolic rate and largely because of reductions in physical activity levels. (Bell and Samson, 2013). It is reported that the energy requirements of CP children who are able to walk and have athetosis are higher than those unable to walk (kakooza-mwesige et al., 2015). A healthy child requires 2000 kcal/day. However, energy requirements of children with severe CP who utilize a wheelchair for mobility have been reported to be between 60 and 70% lower than healthy typically developing children (Walker et al., 2012), so their energy requirements are between 1200-1400 kcal/day. Children with mild to moderate CP, who can ambulate often require more calories to perform daily activities than their normal counterparts (kakooza-mwesige et al., 2015).

Adequate protein intake is required to build and repair tissue, for adequate growth and development in childhood. There is currently no data available for protein requirements of children with CP therefore their requirements do not differ from the typically normal developing children and recommendations can be applied (1.0 g/kg of bwt/day) Severely malnourished children with CP, require additional protein for 'catch up' growth. Overall, an intake of 2.0 g/ kg of bwt/day of protein intake is considered to be sufficient in these instances (Pencharz, 2010).

Many studies have found that children with cerebral palsy have poor bone density. Factors leading to this are both nutritional and non-nutritional. Non-nutritional factors are lack of weight bearing activity due to long periods of immobilization; anticonvulsant medication interfering with vitamin D metabolism (sodium valproate); lack of exposure to sunlight; and metabolic bone disease associated with prematurity. Nutritional factors include oral motor dysfunction resulting in poor nutrition and low calcium intake. The development of healthy bones is dependent on adequate Vitamin D, Calcium intake and Weight bearing or resistance physical activity. Vitamin D deficiency can lead to osteopenia, which in turn can lead to chronic bone pain and fractures. The most common site of fracture in children with immobility is the distal femur (Herderson et al., 2002).

Children with cerebral palsy that are high risk for vitamin D deficiency include those, with low exposure to sunlight living in residential care, with dark skin those taking anticonvulsant medications as they can cause increased degradation of hydroxy vitamin D in the liver

A study by Henderson et al., (2002) found that bone mineral density (BMD) in the femur of children with spastic cerebral palsy was lower than recommended calcium intakes. Regarding fluid intake, studies reviewed show that some children with cerebral palsy experience fluid losses through excess salivation or sweating and unable to consume adequate quantities of fluid and/or to communicate thirst (Bell and Samson, 2013).

Children with cerebral palsy are at risk of inadequate micronutrient intakes because of their reduced energy requirements and subsequent intake. (Bell and Samson, 2013) Micronutrient deficiency can impair immune function, lower cognitive function, reduce bone density, and stunt growth. There has been little research on micronutrient adequacy in children with cerebral palsy. Estimated Average Requirement (EAR) or approximately 70% of the Recommended Dietary Intake (RDI) or Adequate Intake (AI), with specific note to: Iron, Zinc and vitamin C for pressure ulcers, Calcium (Schoendorfer et.al.,2010).

### **Causes of Malnutrition in CP**

According to Claudia et al., (2018), a large number of children with special needs are malnourished. Malnourishment in children can lead to serious problems and they may constantly feel cold and loose muscle mass and body tissue. Over time, their skin may become dry and pale. Malnourished children also tend to get sick at higher rates. They also take longer to heal from wounds and illnesses, and they may experience respiratory failure. These health complications are serious, and severe cases of malnourishment can lead to death. It is important therefore to ensure that children with cerebral palsy receive the necessary nutrition to remain healthy.

Some of the factors that lead to malnutrition are in children with CP are;1) **Inadequate nutrient intake** due to feeding dysfunction. Feeding difficulties (FD) interferes with the child's ability to adequately consume essential nutrients required for growth (Bell and Samson, 2013), impaired chewing and swallowing Coughing/choking during feeding, inability to take solid foods, inability to self- feed, vomiting/regurgitation and drooling. 2) There is also **increased nutrient losses** due to frequent regurgitation. Reflux esophagitis may cause discomfort leading to food refusal and further decreasing food intake. 3) **Altered metabolism** is another factor. The resting energy expenditure is lower in children with CP than in controls matched for age and weight. Hypotonic CP Children require few calories above the resting energy expenditure to thrive. Children with increased muscle tone (athetoid) forms of CP may require an increased amount of calories.4) **Longer Duration of feeding**; Children with CP often take longer duration to eat as compared to normal children. Parents have reported mealtimes to be stressful and time consuming. It can take up to 7 hours a day to feed these children. Mealtimes are often interrupted with repeated spillage of food, coughing, choking and regurgitation. Several studies have reported the mean duration of feeding session among these children to be 30 minutes (range 10-60 minutes). Children with a greater number of feeding problems took longer to eat. 5) **Chewing problem**; Chewing food with solid textures is difficult for children having eating impairments. They often have difficulty in transitioning to solid food and can better withstand liquid and/or semi-solid diets (Aggarwall, 2015). Children with CP can develop atypical and compensatory movements during oral functioning, evidenced by the difficulty in coordinating swallowing and breathing, as well as in dissociated oral movements, determining eating disorders, which affect different aspects of the child's life.

### **Methods**

From the studies reviewed, all caretakers were interviewed and informed consents were obtained. Information on demographic characteristics and feeding disorders were gathered by using a questionnaire. For feeding problems, the Parent Nutrition Screening Checklist questionnaire was used. The questionnaire comprised of questions which included subject's general health, feeding

problems, behavior problems and dietary habits based on the parent's perception. Information on nutrient intakes was collected from parents/caregivers by recording their child's food intake for three consecutive days (two weekdays and one weekend) in the food diary that was provided. Their mean daily energy and macronutrient intakes were calculated. Energy intakes of subjects were compared to their energy needs-based recommendation which were adjusted for their age, gender and level of physical activity. The macronutrient and micronutrient intakes were compared to the Recommended Nutrient Intake (RNI) distribution values based on sex and age (walker et.al.,2013)

In other studies, a 24-hr dietary recall questionnaire and a feeding observation schedule were also used. The 24-hr dietary recall recorded feeding frequency, types of food, and food modification methods. The feeding observation used a structured observation checklist during observation of one meal. (Claudia et.al,2018) The interview guide, food recall questionnaire, and observation checklist were all based on tools developed for a study by Adams et al. in Bangladesh (Adams, 2009). A recent study on children with cerebral palsy in Uganda confirmed that use of the WHO standard deviation scores (Z-scores) provides accurate parameters for assessing malnutrition in patients with cerebral palsy (Kakooza-mwesige ,2015).

### Results

In many studies, it was observed that children with CP had significantly lower caloric intake in comparison to controls (CG). The ratio of daily nutrient intake of being under 80% of RDA, were lower in the children with CP than the CG, although the differences were not significant. The mean daily calorie intake of the children with CP was lower than the CG ( $p < 0.05$ ). In a study carried out in Kenya by Koriata (2012), it indicated that Overall, 70.3 % of children with CP were malnourished, 35.0 % were severely wasted and 10.7% were severely stunted. Some of the factors that were significantly associated with moderate to severe wasting were; vomiting/regurgitation after feeding ( $p = 0.031$ ). A Study carried out in Uganda reveal that more than half (52%) of the children with cerebral palsy were malnourished, as they had a Z-score of below 2.0 in at least one of the indicators. Underweight was the most common form of malnutrition, recorded in 53 of 127 children (42%), followed by stunting in 48 of 128 (38%). Notably, 4% of the children were overweight (Kakooza-Mwesige et.al,2015). A study in Ghana, which assessed feeding difficulties and nutritional status among 76 children with CP and explored the impact of a 12-month, community-based, parent training program revealed that caregivers found mealtimes stressful due to time demands, messiness, and the pressure of providing enough quality food. They felt that the training program had helped reduced this stress and dietary recall data suggested some improved dietary quality. However, there was neither improvement nor deterioration in anthropometric status of the children (Claudia et.al.,2018).

In a study by Rajan and Zakaria (2017), it shows that fiber intakes amongst subjects were very poor (24%), lower than the recommended levels with significantly lower intakes amongst the severe subjects (20%) compared to subjects with mild severity ( $z = -2.361, p < 0.05$ ). This happens due to subjects' poor ability to chew vegetables and fruits, causing parents to feed these children with smaller vegetables and fruit portions.

Quality of life (QoL) scores were significantly lower among caregivers whose children had the greatest difficulties with feeding (median score 9.0) compared to those with least difficulties (24.6,  $p = 0.004$ ) even with adjustment for potential confounders (caregiver and child age, SES, north/south and cerebral palsy severity). QoL was similar for caregivers with a child with cerebral palsy who was underweight (10.8) compared to caregivers whose child was not underweight (11.8,  $p = 0.12$ ).

### Conclusion and Recommendation

#### Conclusion:

Children with CP experience difficulties during eating and drinking, which if not managed properly may result in stressful mealtimes, chronic malnutrition, respiratory disease, reduced quality of life of child and caregiver and reduced life expectancy. Further, lack of medical care

facilities, cultural barriers, minimal formal education and extreme poverty, worsen the condition of disabled children in developing countries (Aggarwal et.al,2015).

The findings of this review point out mealtime challenges encountered by children with CP and their caregivers which are largely reported in studies from many countries. The results suggest that caregiver training can alleviate some of the difficulties faced in relation to feeding their child with CP, and some of the stress associated with these. However, in some studies which the intervention involved caregiver training alone, there was no significant improvement in the children's anthropometric nutritional status (Claudia et.al.2013).

Researches have shown that an improvement in nutritional status results in improvements in general health. This review shows that feeding difficulties due to motor dysfunction is common in children with CP and may reduce their dietary intake resulting to poor health and nutritional status. Caregiver burden is also a significant concern, the feeding process may require considerable time and may be associated with stress and caregiver fatigue, therefore impacting on their quality of life (Sullivan,2005).

Emphasis should be therefore placed on an early identification, treatment and correction of FD. Management of feeding problems should co-exist with timely assessment of growth among these children. Increasing awareness among caregivers/ parents, government and health care providers, regarding the needs of children with disabilities and their feeding difficulties is urgently warranted. (Aggarwal et.al,2015).

#### Recommendations:

- There is need to develop effective interventions aimed at improving the dietary intake of children with CP. Such interventions could help mitigate poor nutritional status as well as improve quality of life of children with CP.
- Parents' should be taught on ways to incorporate higher portions of vegetables and fruits in their children's diet in order to increase their fiber intakes.

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## The Influence of Behaviour Centred Design Approaches on the Flame-Based Cookstove-Related Health and Wellbeing of Indigent South African Households

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### Abstract

The adoption of energy-efficient, clean and safe cookstoves can significantly enhance the health and quality of life of poverty-stricken sub-Saharan households, reducing mortality and poverty and positively impacting the protection of biodiversity and the climate identified in the United Nations Sustainable Development Goals (SDGs). The harmful emissions from inefficient flame-based cookstoves are the leading global cause of disease and death, after only inadequate water, poor sanitation and malnutrition. Multiple stakeholders are implementing programmes to promote access to improved stoves and clean fuels, with the Global Alliance for Clean Cookstoves (GACC) being prominent in dissemination efforts. However, few interventions have borne fruit on a significant scale over time, despite ample support in finding workable solutions. A sustainable transformation in household cookstove-related practices across diverse conditions requires innovative transdisciplinary approaches. The behavioural sciences suggest possible approaches for addressing the complex, interrelated, social, economic and environmental challenges facing communities in sub-Saharan Africa (SSA). Behaviour-focussed design interventions exhibit the possibility of transcending disciplinary boundaries. This paper explores the ability of a Behaviour Centred Design (BCD) approach to change cookstove-related behavioural motivations in a South African context. A series of motivational touchpoints are developed and tested in two representative South African sample areas on a pilot scale. The preliminary results suggest that a BCD approach targeting a set of mapped touchpoints can significantly change the pertinent behavioural motivations related to flame-based cookstoves, responding to a vital evidence gap in efforts to shift inefficient cookstove-related behaviour in a South African low-income context.

**Keywords:** *Behavioural Sciences, Behaviour Centred Design, Improved Cookstoves, UN Sustainable Development Goals*

### Introduction

Household air pollution (HAP), in large part due to the use of inefficient cookstoves, is the third most significant global cause of morbidity and mortality, primarily affecting women and children (Who, 2014). In addition, each year, over 300 000 people succumb to severe burn injuries in large part attributed to inefficient flame-based household appliances (Mock et al., 2008). The majority of interventions focus on disseminating improved cookstoves and fuels, improved ventilation in the household environment and changes in cookstove-related behaviour (Puzzolo et al., 2013; Golden et al., 2015). Despite broad support, only a limited number of interventions have shown success, at scale, over the long term (Hanna et al., 2012). South Africa has followed the same trajectory (Kimemia & Van Niekerk, 2017). Cooking with traditional solid biomass and liquid paraffin persists among impoverished South African households (Kimemia & Van Niekerk, 2017). In addition to an estimated 2 500 deaths in South Africa in 2008 attributed to HAP (Barnes et al., 2009); burns, scalds and poisonings have since become a public health priority (Kimemia & Van Niekerk, 2017). South Africa records 1.6 million burn victims per year, of which 3200 require medical attention (Allorto et al., 2018). A significant proportion are directly linked to the explosions of poorly designed and manufactured paraffin devices (Kimemia et al., 2014). In South Africa, the large-scale electrification rollout, introduction of regulatory standards and provision of fuel subsidies has had a limited influence on the use of unimproved cookstoves (Makonese & Bradnum, 2018; Kimemia & Annegarn, 2012).

Over the past five years, the UNDP, UNICEF, UN Women and UNITAR, in partnership with related agencies, have embarked on probing the efficacy of designing behavioural approaches to achieve increased adoption of new cooking appliances (Lambe & Senyagwa, 2015; Dieye, 2018; Goodwin et al., 2014; Rhodes et al., 2014; Niedderer et al., 2016; Lambe et al., 2018). The hybrid Behaviour Centred Design (BCD) approach (Aunger & Curtis, 2016) under consideration, is attributed to notable successes in campaigns ranging from handwashing to oral rehydration, food hygiene, child and maternal nutrition achieved in low-income contexts spanning India, Zambia, Nepal and Indonesia (Greenland et al., 2016; Rajaraman et al., 2014; Biran et al., 2014). Key to the iterative phase-based BCD approach is the careful development, implementation and assessment of surprising touchpoints to spark reevaluation of the pertinent behavioural motivations leading to the repeated performance of a behavioural goal by the targeted segment of the population (White et al., 2016; Gautam et al., 2017; Greenland et al., 2016; Rajaraman et al., 2014; Burns et al., 2018; Tidwell et al., 2019; Wood & Neal, 2007; Aunger & Curtis, 2015a).

### **Main Research Objectives**

This paper investigates the role motivational touchpoints could play in facilitating a shift in the South African flame-based cookstove-related behaviour as part of a behaviour centred design (BCD) intervention campaign. The main objectives in this paper are to describe the targeted population base affected by unimproved flame-based cookstoves in South Africa; provide a brief overview of the South African cookstove-related behavioural context, propose possible behavioural motivations related to flame-based cookstove use, and conduct a case-study-based mapping and assessment of a set of selected touchpoints in revaluating motivations linked to selected flame-based cooking appliances among a representative sample of South African households.

### **Limitations of Research**

The scope of the research is limited to the field of BCD, specifically the aspects related to motivational touchpoints required for a successful improved cookstove dissemination campaign, applicable to South African households living in poverty. The development of a full BCD intervention strategy and its implementation is outside the scope of the paper. Detailed technical aspects of the relevant cooking appliances and the investigation of the larger socio-cultural, socio-technical and socio-economic environment are excluded. While present in South Africa, coal-fired combustion stoves are excluded because of their localised use – the study is targeted at results that can be generalised to other low- and middle-income regions in sub-Saharan Africa. While this study was limited to a relatively small sample size in two geographic regions, the regions were chosen to gain a generalisable result for other contexts.

### **Background and Literature**

The integration of behavioural motivations in a BCD intervention campaign relies heavily on the concept of touchpoints drawn from the field of service design (Lockwood, 2009; Zomerdijk & Voss, 2009; Aunger & Curtis, 2016). The mapping of touchpoints to the relevant behavioural motivations serves to guide the exposure the identification of the representative segment of the target population in an intervention campaign (Lockwood, 2009; Aunger & Curtis, 2015a), and generate a marked surprising response at the point of interaction during an intervention campaign (Clatworthy, 2011). The exposure to the touchpoints facilitates the reevaluation of the pertinent underlying behavioural motivations, leading to the performance of a specific behavioural goal (Stein & Ramaseshan, 2015; Ziliani & Ieva, 2018; Moggridge & Atkinson, 2007). The behavioural motivations for the cooks to shift from using unimproved flame-based stoves to clean and efficient advanced stoves are influenced by the demographic factors of the targeted population base; and the availability and affordability of appropriate improved cooking stove and fuel combinations (Holdren et al., 2000; Maré & Annegarn, 2017) and the behavioural motivations for cooking with flame-based cookstoves (Maré & Annegarn, 2014).

### South African Targeted Population Base

The use of inefficient flame-based cookstoves is prevalent among black South African households living in the bottom four SEM bands representative of South Africans living in poverty (World Bank, 2014; Kimemia & Annegarn, 2016). The lower SEM groups are still racially skewed in representation, with ninety-eight percent of people in *SEM1* black African (Stats SA, 2012).

The targeted population base can be further categorised in the lower threshold living in poverty (*SEM1* - *SEM2*) and households beginning to emerge from poverty (*SEM3* and *SEM4*) (BRC, 2017). Households living in *SEM1* and *SEM2* are predominantly dependent on fuelwood as a fuel source (Stats SA, 2012); living in informal shacks, small state-provided cement-brick houses and traditional dwellings (SAARF, 2014; BRC, 2017). A significant number of households own electric hob stoves. Paraffin as a fuel source is reported in both segments (Stats, 2015; BRC, 2017). *SEM3* and *SEM4* households have some high school background and are prevalent in both urban and rural areas (BRC, 2017). Urban households reside in small state-provided cement-brick dwellings and small houses; rural residents live in traditional dwellings (BRC, 2017). *SEM4* households tend to own a title deed to the house they live in and can take out credit for purchases such as larger stoves and furniture. Ownership of electric hob stoves is high, with the emergence of four hob electric stoves (BRC, 2017).

### Cookstove-Related Context in South Africa

The cookstove-related behaviour of low-income electrified and unelectrified households do not differ significantly, with hoarding of cookstoves and fuels prevalent (van der Kroon et al., 2013). Impoverished South Africans still cook and heat with flame-based appliances. The failure of a shift to electric cooking is attributed to the low power output, unreliability of the supply, growing number of illegal makeshift electrical connections, fear of electrocution, dramatic increases in the relative cost of electricity, and precarious levels of household income. Increases in flame-based cookstove use have been reported in several areas (Tait, 2015; Tait, 2017; Lusunga & de Groot, 2019). The flame-based appliances include stoves using paraffin, LPG and biomass. Although coal-fired stoves are typical on a localised basis near South African coalfields, they were excluded from this study.

#### *Paraffin Cookstoves*

Flame-based cooking is still characterised by the prominent use of paraffin-based cooking stoves (Lloyd, 2014). The escalating cost of electricity in recent years has also led to an increase in the use of paraffin for cooking (Tait et al., 2012; Buthelezi et al., 2019). The introduction of unpressurised methanol stoves have recently been introduced as an improved alternative.

#### *Biomass Cookstoves*

The use of biomass cookstove appliances in South Africa is still common in rural and urban settings (Matsika et al., 2013; Makonese & Bradnum, 2018). The most common urban low-cost cooking appliance is the inefficient 'imbaula' stove, a basic self-constructed stove linked to severe respiratory problems. A wide variety of improved biomass stoves have been introduced over the years without success (De Chastonay et al., 2012).

#### *Liquefied petroleum gas (LPG) Cookstoves*

The use of LPG among South Africa's low-income households remains low, standing out globally among similar emerging countries (Kojima et al., 2011). Price controls and subsidies have been introduced in response (Buthelezi et al., 2019). A variety of LPG stoves are available in many stores with negligible focus on low-income households in either urban or rural low-income areas. An exception is KayaGAS which distributes LPG gas, stoves and cylinders in low-income settlements on a localised basis (Tatham, 2013).

### Cookstove-Related Motivations

The mapping of touchpoints requires an understanding of the local cookstove-related motivations in South Africa. Cooking over a wood-fuelled fire remains prevalent in both urban and rural

environments, and substantial meals prepared for the extended family with large pots on weekends and special events (i.e., funerals and weddings). Households regard the role of wood in their culinary routines very differently – and it does not appear to carry the same connotations of poverty – with open fires being used alongside electric stoves (Balmer, 2007; Madubansi & Shackleton, 2007; Matsika et al., 2013). Cooking over an open fire in rural areas is usually done outside or in a separate traditional kitchen area (Madubansi & Shackleton, 2007; Maré, 2013; Matsika et al., 2013).

Unique to the mapping of touchpoints in a BCD approach is the incorporation of the distinct biophysical and psychological mechanisms motivating nearly all facets of human behaviour (Aunger & Curtis, 2008; Aunger & Curtis, 2013; Aunger & Curtis, 2015b; Kenrick et al., 2010). Aunger and Curtis (2008) categorises motivations in the following manner. The biophysical motivations are satisfied by absorbing physical resources in our immediate environment into our bodies (e.g., food for hunger and heat for comfort) or avoiding resources that may be harmful to our bodies (e.g., the disgust associated with rotting food or fear of fire) (Aunger & Curtis, 2008). The emotional motivations are influenced by the local physical and social context we live in (i.e., affiliation, nurture, attraction, status and justice). The touchpoints linked to motivations for learning refer to the motivations linked to the brain satisfied by curiosity and play. Drawing on reviewed literature the behavioural motivation under consideration for linking with prospective touchpoints in a cookstove-related dissemination campaign are tabulated

Table 14 below:

Table 14: Possible behavioural motivations linked to flame-based cookstove-related behaviour

<b>Motive</b>	<b>Description of Behavioural Motivation</b>
Lust	An image of a woman or man, with the women stating: “I will find a better husband/partner.”
Hunger	Food is primarily cooked as a source of biophysical sustenance and consumed for energy and strength rather than as a luxury (Maré & Annegarn, 2017). The precarious income levels are directly linked to the levels of hunger (Maré & Annegarn, 2017). Intentional exposure to aromas is frequently targeted in triggering hunger for food items sold among impoverished segments of the population (Ramaekers et al., 2014).
Comfort	The comfort derived from a warm and dry space provided by an improved flame-based appliance appears a critical motivation linked to the use of paraffin-fuelled appliances or self-constructed imbaula stoves (Makonese et al., 2016).
Fear	The fear motivations could be linked to the fear of injury to the body from gas and paraffin stove explosions or fires; the threats of death associated with carbon monoxide poisoning or the threats of death of children from paraffin ingestion (Barnes et al., 2009).
Disgust	Disgust motivations could be linked to the taste of food cooked over paraffin. Disgust is reported attributed to the pungent smell of paraffin or smoke associated with dirty home and clothes permeated with the odours of smoke and paraffin is South African households (Lloyd, 2014).
Nurture	The maternal nurture motive is linked to the hazards of unimproved flame-based stoves (Harold et al., 2013). The motives of caring and protecting children could be targeted as the women cook nurture and care for their children predominantly in close proximity to where the meals were being prepared, due to the cramped living conditions (Lusinga & de Groot, 2019).
Hoard	The precarious levels of poverty lead to a hoarding of options between the many competing household decisions (Masera et al., 2015); as observed is the activity of stacking of multiple cookstove types and fuels as a hedging measure (Maré &

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Motive	Description of Behavioural Motivation
	Annegarn, 2017; van der Kroon et al., 2014). The effects of resource scarcity are strongly linked to hoarding motivations.
Create	Motivations to create are observed in the wide variety of pathways and recipes observed in preparing meals under severe constraints. Motivations to create are often sparked by the material, social and economic constraints. The creativity of cooks through a multitude of iterations in the preparation of meals is confirmed in the literature (Modi, 2009; Bikombo, 2014). An example are the adaptations in preparing steam bread in an urban environment diverging from its traditional origins in South Africa (Paxie W. Chirwa et al., 2010).
Affiliation	Motivations for affiliation to build trust and strengthen social cohesion are frequently observed through the cooperation with others by sharing food or cooking together in social settings (Viljoen & Others, 2010; Maré & Annegarn, 2014; Rhodes et al., 2014). The positive motivations gained from cooking together with family and friends can provide motivations to maintain social relationships, form new alliances or conform to the established norm (Kar & Zerriffi, 2018; Minkow, 2016; Rebitski et al., 2019).
Status	Th motivations of status with an improved stove could be linked to the perception of a higher standard of living (Lloyd, 2014; Ravindra et al., 2021; Khadilkar et al., 2015). A durable, well-constructed appliance with a brand reputation for quality will take pride in the home, with the user taking great care to maintain it (Jayawickramarathna et al., 2018; Oodith & Parumasur, 2017). The importance of the status motive is furthermore observed and confirmed by the perceptions of low status associated with the odours emanating from poorly constructed wood and paraffin stoves (Maré & Annegarn, 2017; Lloyd, 2014).
Justice	The justice motivation is frequently ill-advisedly targeted by regulatory means. The preponderance of illegal electric connections and unsafe paraffin stoves continue despite regulations and standards in place (Kimemia & Van Niekerk, 2017).
Curiosity	Motivations for learning through curiosity could be linked to cooking luxurious foods with a novel improved stove accentuating dramatic savings in time and money compared to an unimproved stove as cookstove marketing practice in India indicates (Beltramo et al., 2015; Perry et al., 2000).
Play	The role of motivations of play in cooking are well established (Altarriba Bertran et al., 2019; Larsen & Österlund-Pöttsch, 2012). The play motive can be linked to the learning of embodied skills and knowledge in using an improved flame-based appliance in simulated activities demonstrating the dangers of stoves without the risks of injury (Nuwarinda, 2010).

### Research Methodology

The case study-based mapping of motivational touchpoints for an intervention campaign is facilitated by a co-creative workshop method facilitating a series of collaborative activities as suggested by Mor, Warburton and Winters (2012); and Kwon (2010), conducted by a representative group of participants in partnership with BREADrev a local behaviour change agency. To assess the fidelity of exposure to the selected motivational touchpoints in achieving a revaluation of motivations, a stated preference study incorporating a card-based Choice Experiment (CE) is administered before and after a pilot implementation of selected aspects of the campaign concept in two sample areas representative of households in the four lower *SEM* bands of South Africa.

### *Intervention Mapping Method*

An intervention mapping method is employed by the researcher to synthesise the collected qualitative data emerging from workshop-based observations confirmed by semi-structured interviews elicited from workshop participants. The workshop sessions encouraged an informal,

comfortable atmosphere between the community residents, baking staff and the workshop facilitators.

For the first workshop session the facilitator guided the participants through the process of baking a high-hydration dough bread with an improved flame-based oven following the amended BREADrev activities (Figure 14). The procedures of lighting and using an LPG stove and heater are added. The data collected from each workshop session were collated and mapped around a sequential series of touchpoints and corresponding behavioural motivations. The qualitative data analysis consisted of a combination of phenomenological and narrative methods applied to the data collected during the workshop activities.

The selected touchpoints are adjusted after each workshop session in consultation with the workshop participants between each workshop session (Figure 15). The causal linkages between the campaign design elements, campaign activities and touchpoints linked to the behavioural motivations guide the mapping process. The touchpoints are formulated by the expected proportional intensity and frequency of interactions during an intervention campaign, balanced against the cost and effectiveness of each interaction. The intervention mapping culminates in a proposed campaign concept and touchpoints linked to corresponding behavioural motivations that could lead to the sustained adoption of improved flame-based cookstoves by the targeted population base.



Figure 14: Workshop participants baking scones with an improved rocket stove



Figure 15: Low fidelity intervention mapping by workshop participants of key aspects during the baking sequences.

#### *Stated Preference Method*

A card-based stated preference (SP) survey is conducted to assess the changes in behavioural motivations linked to available flame-based stove types targeted by the selected touchpoints included in the intervention campaign strategy piloted in Dunoon and Mamelodi. The first pilot implementation is conducted by the researcher from the 24th of August to the 12th of September 2017 in the representative sample area of Mamelodi, Gauteng Figure 16. The second intervention campaign implementation is conducted by the behaviour change agency BREADrev from the 12 of August to the 27 of September 2017 in the representative sample area of Dunoon, Western Cape as depicted in Figure 17 and Figure 18.



Figure 16: Demonstration of LPG stove with auto-switch mechanism during the Mamelodi pilot implementation



Figure 17: Demonstration of the improved biomass oven during the Dunoon pilot implementation

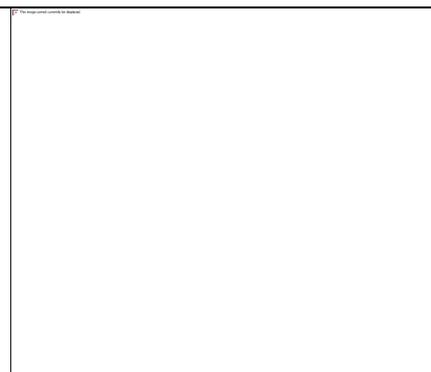


Figure 18: Sharing of freshly baked scones with the improved rocket oven during the Dunoon pilot implementation

A visual card-based CE is used to assess the proposed set of motivational touchpoints. The CE consists of choice sets depicting photos of the stove-related attributes under investigation linked to visualisations of each behavioural motivation drawn from the pre-coded list in

Table 15.

Table 15: Pre-coded list of questions for each behavioural motivation

Motive	Description	Motive	Description	Motive	Description
Lust	An image of a woman or man, with the women stating: "I will find a better husband/partner."	Attract	A picture of a well-dressed woman saying: "I like looking beautiful after cooking in the home."	Affiliation	An illustration of a woman caregiver typical of the neighbourhood saying: "You showed you are one of us, well done!"
Hunger	An illustration of a woman saying: "I never want to go hungry again."	Love	An illustration of a young child saying: "I love you for doing that!"	Status	A respected elder says: "Everyone in the community will admire you for doing that!"
Comfort	A woman appearing comfortable at home, stating: "I like being warm and comfortable when cooking at home."	Nurture	A confident mother says to him/herself: "Now my child will be safe!"	Justice	An illustration of a male or female elder saying: "That was the right thing to do, well done!"
Fear	An image of a woman stating: "I am safe from accidents and dangers."	Hoard	A depiction of a woman in a well-stocked home saying: "I will never need anything for cooking a meal."	Curiosity	An illustration of a woman saying: "I like being well informed about what is going on in my community."
Disgust	An illustration of a woman elder pulling her face and thinking to herself: "The smell is disgusting; you did well!"	Create	An illustration of a woman saying herself: "I've made the household better now; I did well!"	Play	A woman saying to herself: "I really learned a new way of doing things, I did well!"

The main flame-based cookstove features available in a South African setting were used in the design of the CE sets, presented to respondents as card-based question sets. The use of multiple questions, with different combinations of attributes, is used, due to the variety and number of

questions can be asked, thereby generating more than one sample from each respondent. The image-based cards are selected to allow the visualisation of the various choices and avoid potential confusion and fatigue from an overload of similar questions. The stove types referenced in each of the card-based choice sets include the biomass, LPG and paraffin powered cooking devices as depicted in Figure 19.



Figure 19: Sample card representing a pre-coded list of behavioural motivations targeted by the selected motivational touchpoints

#### *Data Collection*

The data collection commenced with the administration of the baseline survey in each study area, followed by the pilot intervention campaign, first in Mamelodi followed by Dunoon. The endline survey is administered six months after the pilot the intervention campaigns again in each study area. Both baseline and endline surveys are administered on a door-to-door basis among the four sample groups of respondents administered first in Mamelodi, followed by Dunoon. Given the low literacy rates, the field workers administered the survey verbally to respondents following the same format in all sample groups at baseline and endline. Each motivation is presented as a short narrated informed by the statements listed in

Table 15; and asked which stove option best matches the narrated motivation Respondents chose between options each with stated attributes, using question card sets to determine the preference between various combinations of cookstove features linked to behavioural motivations targeted by the selected touchpoints integrated in the intervention campaign. After presenting each card to the respondents, each individual illustrated motivation depicted in the card sets is verbally described to the respondents. The responses were recorded, with the chosen cards marked and filed with each consent form. The survey in each sample area concludes with questions to assess the respondents' survey experience.

#### *Data Analysis*

The stated preference results of the two groups of endline respondents (i.e. those respondents in the study areas exposed to the intervention campaign and those who were not) are separated and compared. The resulting data are visually displayed with spider chart method as suggested by (Atanassova & Angelova, 2021). The data is separated by stove type, with the stove type being the dependent variable and the behavioural motivation levels plotted against it. The range of motivations provides a measure of sensitivity for each given stove attribute. The data were entered and analysed in a statistical model running in Excel software.

#### **Results**

The results of the development and assessment of selected aspects of a BCD approach is presented below.

*Touchpoint Mapping Results*

The mapping facilitated by the workshop-based activities suggests the following set of touchpoints, matching relevant behavioural motivations incorporated in an amended campaign concept tabulated in Figure 20.

	CAMPAIGN ELEMENTS			TOUCHPOINTS	MOTIVATIONS	GOAL
PRIMARY SEQUENCE	EMO	1-2	BIO	LIGHTING THE ROCKET OVEN	CURIOSITY	BIO
	EMO	1-2	BIO	WARMTH OF THE ROCKET OVEN	COMFORT	BIO
	EMO	1-2	BIO	AROMA OF SCONES IN THE OVEN	HUNGER	BIO
	EMO	1-2	BIO	BAKING SCONES TOGETHER	PLAY	BIO
	EMO	1-2	BIO	SHOW FUEL SAVINGS	HOARD	BIO
	EMO	1-2	BIO	CLEAN COOKING AREA TOGETHER	STATUS	BIO
	EMO	1-2	BIO	SHARE SCONES LOCALLY	AFFILIATION	BIO
SECONDARY SEQUENCE	EMO	3-4	LPG	REPEATED LIGHTING OF LPG STOVE	FEAR	LPG
	EMO	3-4	LPG	SHINY LPG STOVE WITH AUTO-SWITCH	STATUS	LPG
	EMO	3-4	PFN	PUNGENT SMELL OF PARAFFIN	DISGUST	LPG
	EMO	3-4	LPG	WARMTH OF LPG HEATER	COMFORT	LPG
	EMO	3-4	LPG	MAKING TEA WITH LPG	AFFILIATION	LPG
	VIDEO	3-4	PFN	RAGING PFN FIRE	FEAR	LPG
	EMO	3-4	LPG	SERVING TEA & SCONES	AFFILIATION	LPG

Figure 20: Mapping of Proposed Touchpoints linked to corresponding behavioural motivations for the primary and secondary campaign sequence

The campaign concept consists of two sequences demonstrating selected improved flame-based appliances with the two bands representative of the target population in a local physical setting, facilitated by trained local change agents drawn from the local community. The primary campaign sequence aimed at triggering increased adoption of improved biomass stove (similar to the Stovetec Ecozoom) among South Africans living in the SEM1 and SEM2 category consists of demonstrations of baking scones with an improved biomass oven. The secondary campaign sequence of aimed at triggering increased adoption of LPG double hob stoves (similar to the KayaGAS offering) among South Africans living in the SEM3 and SEM4 category is facilitated by the serving snacks and tea boiled with an LPG stove.

*Primary Sequence: Baking Scones with an Improved Biomass Oven*

The first touchpoint focussed on demonstrating the ignition of a novel improved flame-based oven with a chimney linked to motivations of curiosity. A touchpoint of the warmth emanating from the flame-based oven linked to the motivations of comfort is included. The aroma of freshly baked goods emerging from the oven is selected as the third touchpoint, targeting the motivation of hunger. The touchpoint to facilitate motivations for playfulness. A key touchpoint is proposed to be the baking luxurious items with the participants in a controlled sequence with the improved biomass oven without the risks of injury targeting motivations for play. A touchpoint showing physically how much wood is saved to address motivations to hoard. A touchpoint linking the use of a clean stove and cooking area to status motivations of being seen as a good housekeeper among their peers is suggested. A touchpoint of sharing the baked or cooked items emanating from the demonstration in the local setting is suggested targeting motivations for social affiliation.

*Secondary Sequence: Luxuries & Tea with an LPG Stove*

For the second campaign sequence, a touchpoint of a physical repeated lighting of a LPG appliance by participants to dispel motivations of fear associated with LPG stoves is included. The mapping furthermore proposes a touchpoint of using a high-quality LPG device with an auto-switch mechanism linked to the motivations of status. The pungent odour emanating from the brief lighting of a paraffin stove is suggested as touchpoint linked to motivations of disgust. A touchpoint targeting warmth of the LPG powered heater is suggested as motivation for comfort if the weather is cold enough at the time of demonstration. The key touchpoint of boiling water for tea with an LPG stove by participants together to facilitate motivations of affiliation by demonstrating the speed and ease in using an LPG stove. The touchpoint of experiencing the uncontrolled destructive force of a fire caused by a paraffin stove linked to motivations of fear and disgust is suggested, facilitated by a video of a shack burning down viewed on a mobile phone during the sequence. Finally, a touchpoint serving snacks with tea is suggested to conclude the sequence with to facilitate the exchange personal pleasantries, establish an open atmosphere conducive for building trust and linked to motivations for social affiliation and dissemination of changes in behavioural routines related to LPG stoves in the community.

*Stated Preference Results*

The stated preference results of the exposed and unexposed samples for the Mamelodi and Dunoon intervention indicated clear changes in touchpoint-linked behavioural motivations after exposure in the intervention campaign as indicated in the tabulated results (Figure 21).

Figure 21: Changes in Cookstove-Related Motivations for the Two Sample Areas

Stove Type	Area	Sample	Hunger	Comfort	Fear	Disgust	Nurture	Hoarding	Create	Affiliation	Status	Justice	Curiosity	Play
LPG	Mamelodi	Baseline	34% (15)	31% (16)	45% (14)	5% (23)	34% (19)	48% (17)	32% (17)	38% (15)	35% (12)	42% (15)	34% (16)	30% (17)
		Endline	35% (19)	36% (10)	24% (11)	3% (15)	30% (19)	47% (16)	34% (19)	38% (19)	45% (15)	40% (19)	35% (18)	32% (14)
	Dunoon	Baseline	23% (15)	12% (11)	45% (14)	22% (18)	33% (20)	23% (19)	34% (13)	16% (17)	36% (15)	41% (18)	36% (17)	23% (17)
		Endline	22% (13)	11% (15)	34% (13)	12% (18)	32% (17)	38% (15)	30% (16)	18% (21)	39% (13)	40% (18)	38% (23)	28% (12)
Paraffin	Mamelodi	Baseline	32% (22)	38% (15)	32% (22)	78% (8)	23% (10)	30% (17)	12% (14)	36% (20)	13% (18)	23% (21)	36% (13)	32% (18)
		Endline	31% (22)	34% (15)	45% (16)	83% (16)	16% (19)	31% (19)	16% (13)	38% (17)	11% (16)	22% (19)	32% (15)	33% (11)
	Dunoon	Baseline	31% (24)	21% (15)	34% (16)	34% (13)	23% (12)	31% (19)	21% (18)	11% (19)	12% (15)	34% (19)	26% (21)	26% (16)
		Endline	8% (23)	12% (19)	51% (18)	76% (14)	31% (16)	12% (17)	12% (23)	3% (16)	8% (22)	31% (17)	12% (14)	16% (20)
Biomass	Mamelodi	Baseline	34.0% (13)	31.0% (19)	23.0% (14)	17.0% (19)	43.0% (21)	22.0% (16)	56.0% (19)	26.0% (15)	52.0% (20)	35.0% (14)	30.0% (21)	38.0% (15)
		Endline	34% (9)	30% (25)	31% (23)	14.0% (19)	54.0% (12)	23% (15)	50.0% (18)	24% (14)	44.0% (19)	38% (12)	33% (17)	35.0% (25)
	Dunoon	Baseline	46% (11)	67% (24)	21.0% (20)	44% (19)	44.0% (18)	46% (12)	45.0% (19)	73% (14)	52% (20)	25.0% (13)	38% (12)	51% (17)
		Endline	70% (14)	77% (16)	15.0% (19)	12% (18)	37.0% (17)	50% (18)	58.0% (11)	79% (13)	53% (15)	29.0% (15)	50% (13)	56.0% (18)

The results of the stated preference survey administered after both interventions indicate an increase in motivations of fear associated with paraffin stoves in both study areas as targeted by the selected touchpoints (

Figure 22).

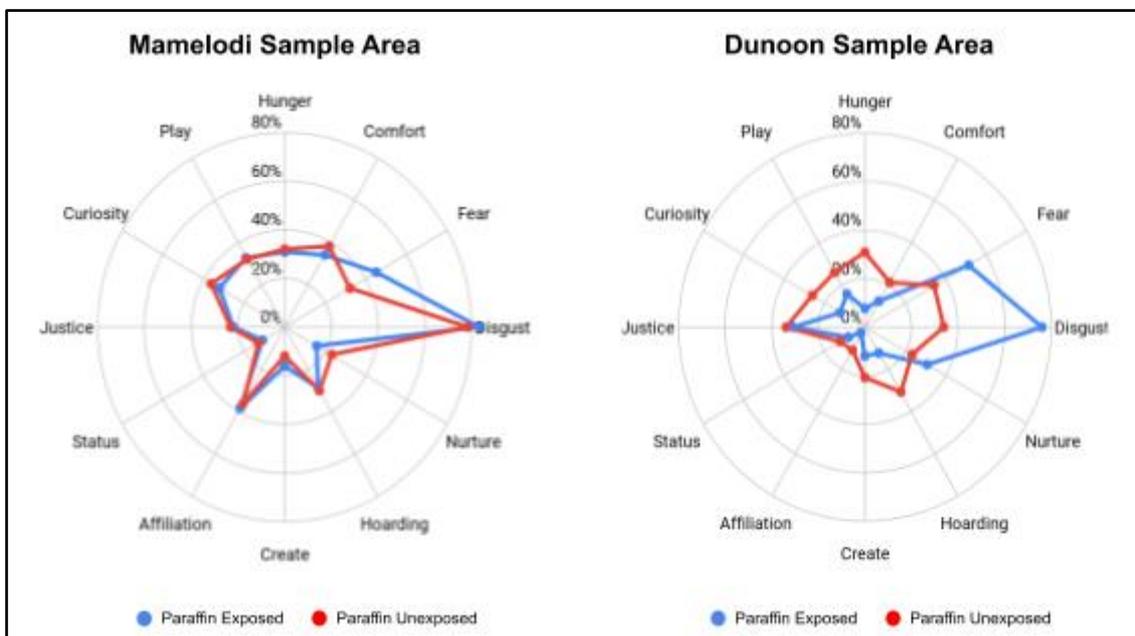


Figure 22: Behavioural Motivations related to Paraffin Stoves

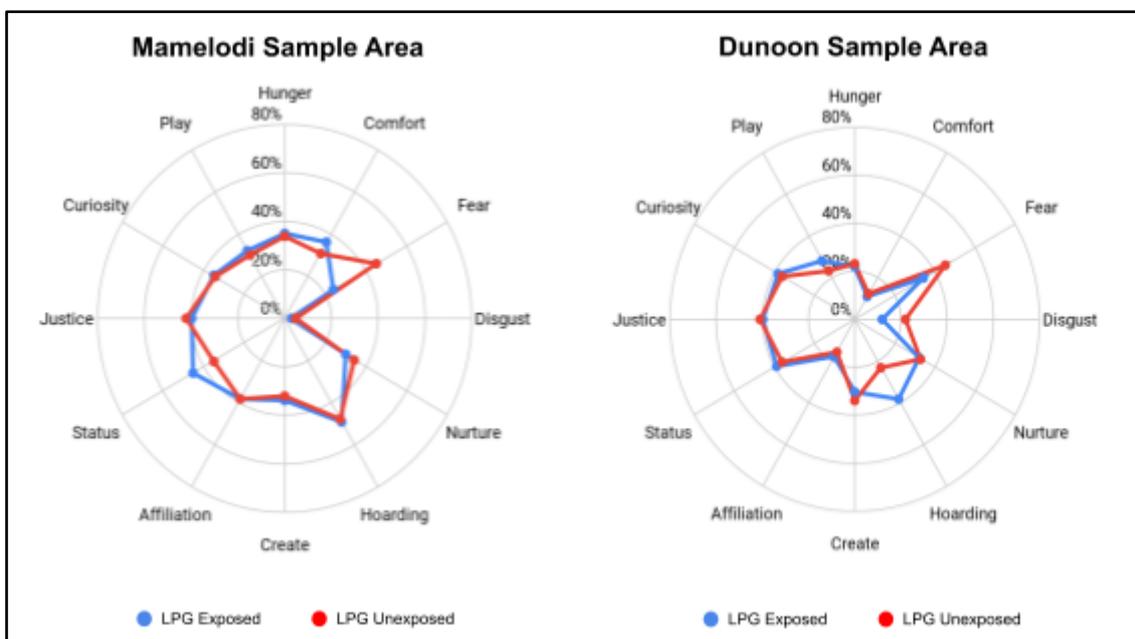


Figure 23: Behavioural Motivations related to LPG Stoves

A significant decrease in motivations of fear was associated with LPG stoves in the Mamelodi sample area, while a modest decrease was reported after the Dunoon intervention. Motivations associated with status showed a small increase associated with biomass stoves (Figure 23).

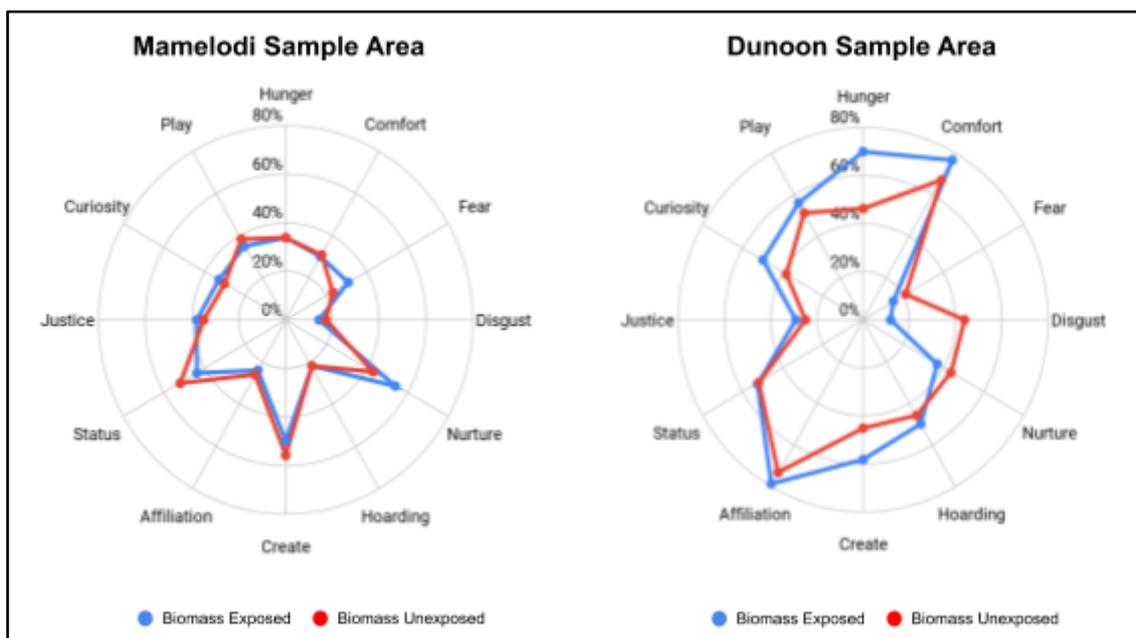


Figure 24: Behavioural Motivations related to Biomass Stoves

No significant change in motivations associated with biomass stoves is reported in the Mamelodi sample area, while the motivations linked to comfort, curiosity and play increased after the Dunoon intervention. A significant decrease in motivations linked to disgust and a moderate decrease in motivations of fear is furthermore observed for Dunoon (Figure 24).

### Discussion and Conclusions

The results indicate that aspects of a BCD approach, specifically including motivational touchpoints in cookstove-related dissemination campaigns could significantly decrease the use of inefficient and dangerous flame-based paraffin powered appliances. An additional finding indicates that the application of a stated preference methodology could assist in assessing the level of change in the key cookstove-related motivations of South African households in response to behaviour-focused intervention campaigns. Respondents in both sample areas changed their motivations linked to more efficient options after exposure to the selected motivational touchpoints. The pilot campaign increased the motivations of fear associated with paraffin stoves in both sample areas and decreased motivations of fear associated with LPG stoves.

The findings in this study indicate that the mapping of motivational touchpoints could significantly accelerate the adoption of more efficient cookstove alternatives as verified by the results of stated preference methodology of the changes in cookstove-related motivations of South African households in response to the dissemination campaigns.

Despite the study being limited to two South African sample areas, the sampled households shared the main criteria for using inefficient cookstoves, implying a wider relevance beyond South Africa. This study may have important implications beyond change in motivations for using clean and efficient cookstoves. BCD based approaches could significantly assist the implementation of cookstove dissemination campaigns, addressing barriers to a change in of cookstove-related behaviour that have impeded the success of previous dissemination efforts in developing countries. The inclusion of touchpoints linked to cookstove-relation motivations in the development of tailored campaigns attuned to local cultural settings faced by low and middle-income households globally. The application of BCD methods and instruments can assist in understanding the motivations of households across sub-Saharan Africa, and can demonstrably ease the success of initiatives aimed at achieving the SDGs.

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## Effectiveness of NHIF in addressing Students' Healthcare in Public Secondary Schools in Meru County, Kenya

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### Abstract

Health insurance helps to cushion people from healthcare costs and facilitate equity in access to health facilities and services. The Government of Kenya has invested in a unique NHIF program, namely EduAfya, for public secondary schools. Although EduAfya is relatively new, it has been facing implementation challenges attributed to the weak structures and mechanism for supporting its operationalization. This study aimed to assess the NHIF as a health service provision model in public secondary schools in Meru County, Kenya. The specific objective was to examine the efficacy of NHIF as an approach for addressing healthcare in public secondary schools in Meru County. The study was guided by Andersen's model of health service utilization and adopted a descriptive survey design. Public secondary schools were stratified into four categories; hence, a proportionate systematic sampling technique was applied to sample 191 principals and the Students' Council's chairperson, while the County Director of Education was sampled purposively. Data was collected using a self-administered questionnaire and interview guide. Quantitative data were analyzed using SPSS, where factor analysis, means and standard deviations were computed, while linear regression analysis was used to test the hypothesis. Qualitative data were analyzed using the thematic technique. The study noted that students were underutilizing the NHIF program (EduAfya) despite its significance in addressing their healthcare. This was attributed to the low awareness, challenges in obtaining NEMIS number, and lack of awareness. Therefore, NHIF staff should conduct training and sensitization in public secondary schools targeting students, principals, and parents. In addition, the Ministry of Education and NHIF should collaboratively liaise with stakeholders in accrediting more local health facilities, including private health centres, to enhance the proximity of access to healthcare. The government should also develop a clear policy on handling emergencies and transportation costs; streamline the issuance of NEMIS number & biometric cards, and clarify the role of principals in enhancing the effectiveness of the EduAfya.

**Keywords:** *NHIF, EduAfya, school health service provision model, students' healthcare*

### 1.0 Introduction

Many nations worldwide have recently been implementing and investing in long-term healthcare strategies such as universal healthcare, social insurances, and the introduction of comprehensive healthcare programmes for learners in schools. Notably, learners' health has been gained attention globally (Wasonga, Ojeny, Oluoch, & Okech, 2014) due to increased cases of sickness. In Japan, for example, mental illness among learners is becoming an increasing concern and is linked to many suicidal cases. Also noted was the spread of lifestyle-related diseases, allergic diseases, infections, drug abuse, and motor organ disorders, among others in Japan (Michinaga, 2013). In Wales, Moore, Cox, Evans, Hallingberg, Hawkins, Littlecott, Long & Murphy (2018) described rampant substance and drug abuse cases among adolescents, many of whom were high school students. However, many learners in secondary schools, especially from developing countries, lack access to consistent quality healthcare.

Many developed countries such as Netherlands, France, New Zealand, Germany, Canada, Japan, Spain, and Italy use diverse approaches to address learners' health. For example, New Zealand has well-established healthcare services and systems for secondary schools (Clark, Canvin, Green, Layard, 2018). Other countries such as California are still struggling with providing access to basic primary healthcare (Reback, 2018). Some countries in Africa, such as Nigeria, Ghana, and South Africa, have instituted free health care services to students of public secondary schools (Lancet, 2020). The common mechanisms and approaches used by the countries mentioned above to

address healthcare of learners include establishing school-based clinics, including students in social insurance programs, allowing partnership and collaborations from public and private players or by having a health insurance plan for high school learners (Baltag & Levi, 2013).

The health of learners in school is paramount and has far-reaching implications on education achievement, and contributes significantly to social-economic development (Kolbe, 2019). When students are sick, they are likely to have little concentration in class, while others may miss attending at all (Sarkin-Kebbi & Bakwai, 2016; Sprigg, Wolgin, Chubinski & Keller, 2017; Wahlstrom et al., 2014). For example, the report by Wood Johnson Foundation (2016) indicated that students in the US miss attending classes approximately 14 million days every year cumulatively, which was attributed to physical and mental illness. Kuponiyi, Amoran & Kuponiyi, (2016) also noted that approximately 60% of students who missed classes in Nigeria were due to ill-health, which affected their examinations performance. This amplifies the indispensable need for mechanisms, systems and model for providing healthcare to learners. Countries that have instituted appropriate measures for addressing healthcare of learners aim at achieving learners' equity of access to health services, improve their retention in schools, and completion rates (Department of Health Western Australia, 2014; Sarkin-Kebbi & Bakwai, 2016; Rasberry et al. (2017; Wood Johnson Foundation, 2016).

The main deterrent to the provision of healthcare worldwide has been the cost associated with it. The annual health budget in many countries is usually huge and usually increases exponentially every year. For example, global expenditures on healthcare are expected to continue increasing at an annual rate of 5.4 per cent between 2017-2022, from USD 7.724 trillion to USD 10.059 trillion (Deloitte Touche Tohmatsu Limited, 2019). Consequently, many countries are coming up with new healthcare delivery approaches and financing models to solve healthcare problems (Deloitte Touche Tohmatsu Limited, 2019). Although many African countries have not integrated UHC in their national strategies, the progress towards achievement is minimal due to limited domestic resources and lack of elaborate mechanisms for providing it.

Kenya has prioritized its citizens' health, safety, and well-being as exhibited in the national four agendas and reflected in the national budget. The government has social insurance open to all citizens, namely National Hospital Insurance Fund (NHIF). The NHIF is a concept derived from the National Insurance Fund, which refers to a system of health insurance that insures a national population against the costs of healthcare (World Health Organization, 2019a). In Kenya, NHIF constitutes a pool of funds managed by the government where citizens make monthly contributions. To facilitate accessible healthcare to learners, the Government of Kenya introduced a special NHIF program, namely EDUafya, in 2018 which covers students (not dependent) during the entire study duration in public secondary schools.

The NHIF cover requires a student to be registered with Hospital Insurance Fund (NHIF) and be in National Education Management Information System (NEMIS) database (Capital Digital Media, 2018); NHIF, 2019). This initiative has led to increased budgetary allocations on health (4 billion Kenya shillings annually). However, it is still below guidelines by the Abuja declaration of 2001, which required governments to set aside 15% of the national budget to health (Murunga, Mogeni & Kimolo., 2019, p. 127). Despite the directive to provide healthcare services in public secondary school, the initiative faces unprecedented challenges emanating from a lack of well elaborate structures and implementation mechanism of the program. This poses a real challenge to the effectiveness of this program in providing quality healthcare to students. The operationalization ineffectiveness of this program is putting principals of public secondary schools in an awkward situation. The situation is no different in public secondary schools in Meru County.

According to Meru County Government (2018), there are 175 public secondary schools with 54,682 students. Undoubtedly, providing healthcare services to such a high population of students is challenging, especially with the government directive of 100% students' transition from primary

to secondary school. Meru County has one level 5 hospital, eight level 4 hospitals, 31 levels three facilities (health centres, nursing homes, and maternity homes) and 260 level 2 facilities (dispensaries and clinics) (Meru County Government, 2013). Students are expected to receive healthcare services from the NHIF-accredited facilities. Very few level 3 facilities are accredited. Apart from the Corona virus (COVID 19), which threatened the entire world, other prevalent diseases in this county are skin diseases, intestinal worms, HIV/AIDS and respiratory diseases among others. Cancer has also recently emerged as a severe chronic disease in this County. The aforementioned health conditions also have ripple effects on students of secondary schools, hence the need to examine the effectiveness of NHIF in addressing healthcare of students in this county. The study took cognizance that an effective healthcare provision model ought to include preventive, curative services and control of diseases and provide emergency care solutions to students (Munyasya, 2014).

This study aimed to assess the effectiveness of NHIF as a health service provision model in public secondary schools in Meru County, Kenya. The specific objective was to examine the efficacy of NHIF as an approach for addressing healthcare in public secondary schools in Meru County. The objective was realized by analyzing quantitative data which further enabled testing of a hypothesis that, NHIF approach was not statistically significant in addressing students' healthcare in public secondary schools in Meru County. Mechanisms used and intricacies encountered by the ministry of health in the use of this NHIF approach were out of scope and were therefore not investigated in this study. The study mainly focused on perspectives of effectiveness from the user point of view. It was guided by Andersen's model of health service utilization in exploring probable solutions to the NHIF healthcare provision model in Kenya.

#### ***Overview of National Healthcare Insurance Fund***

Reviewed literature indicates that every country has a unique national health system that mostly reflects its history, economic development, and dominant political ideologies. In many countries, the concept of health insurance is increasingly being overshadowed by Universal Health Care (UHC), which ensures that all people have access to preventive, curative, rehabilitative and palliative healthcare services without exposing the user to financial hardship (World Health Organization, 2019b). The UHC services are usually provided by accredited health centres (public and private) and national hospitals.

Germany has national social health insurance systems dating back to Otto Von Bismarck's social legislation time. In this country, health insurance is compulsory for the whole population. The citizens enjoy health benefits co-financed by employers and employees and heavily subsidized by the German government to ensure those out of work or on low wage remain covered (Obermann, 2010). The program also includes learners in school. The Canada's universal publicly funded healthcare system—known as Medicare, is a source of national pride and a model of universal health coverage. Its elaborate structure enables secondary school learners in Canada to access medical care (Health Insurance Association of America, 2008).

In India, both public and private healthcare providers are heavily involved in providing health services. Most secondary school students in India access medical care through public providers, which are usually funded by the federal states. Studies done in Australia shows that her healthcare system is one of the most comprehensive in the world. It offers healthcare services ranging from general and preventative healthcare to treating more complex conditions that may need a specialist or hospital care (Davies, Perkins, McDonald & Williams, 2009). These benefits are extended to high school students.

In Nigeria, healthcare provision is a direct responsibility of the government through the National Health Insurance Scheme (NHIS). However, NHIS does not fully qualify to be named a national insurance healthcare body because it cannot be accessed by all citizens (including secondary school students) (Kuponiyi et al., 2016b; Sarkin-Kebbi & Bakwai, 2016). In addition, the health system in

Tanzania reflects a political-administrative hierarchy. In some cases in Tanzania, patients are referred to doctors in foreign countries to receive medical care. Therefore, the program also includes secondary school students in the health system (World Health Organization, 2009).

In Kenya, NHIF operates a pool of funds managed by the government where citizens make monthly contributions. Moreover, the government of Kenya recently made a deliberate initiative of improving access to healthcare for students in public secondary school in April 2018 (EduAfya, 2019). This was realized through the signing of a contract to offer unique, comprehensive medical insurance (Muli, 2018). This bold move led to increased budgetary allocations on health with a view to providing affordable healthcare to learners (Murunga, Mogeni & Kimolo, 2019).

Literature shows that several parameters can be used to measure the effectiveness of NHIF in providing healthcare services. The parameters include healthcare accessibility, affordability and quality healthcare services (Sundays, 2015). However, there is a dearth of research on national health insurance in Kenya. The few ones such as by Kiroji, Mwaura-Tenambergen and Mwangi (2019), determined the perception of NHIF outpatient facilities vis-à-vis utilization of primary care services by private university employees in Nairobi County. Another study by Mwangi et al. (2019) assessed the implementation of social insurance national scheme in selected Counties in Kenya. Chiduo (2017) studied the benefits of NHIF and classified them into two broad categories; outpatient and inpatient health services.

## 2.0 Methodology

The study employed a descriptive survey research design. It targeted a population of 375 principals, 375 students' council chairpersons, and one County Education Officer. Data was collected through a questionnaire and an interview from a sample size of 195 principles, 195 students' council chairpersons and one Director of Education. First, public secondary schools were stratified into four categories: girls' boarding schools, boys' boarding schools, mixed boarding schools and mixed day secondary schools. Then, a proportionate systematic sampling technique was applied to sample 191 principals and the Students' Council's chairperson, while the County Director of Education was sampled purposively. A total of 392 questionnaires were distributed to both principals and the students' leaders chairpersons, where 138 (70.4%) and 142 (72.4%) were returned, respectively. Content and construct validity were ensured while Cronbach's Coefficient Alpha was computed to determine the reliability of research instruments (Kumar, 2014). Quantitative data were analyzed using SPSS version 24, where descriptive statistics such as factor loading, mean and standard deviations were computed, while regression analysis was used to test the hypothesis. Data from the interviews were analyzed using thematic analysis. Finally, the findings were presented using tables, figures and narratives.

## 3.0 Results and Discussion

Considering the government of Kenya had initiated a unique NHIF program for students in public secondary schools, it was essential to assess the effectiveness of this approach. In the first instance, the study sought to ascertain the level of awareness of NHIF and the health services offered to students under this package. Results were summarized in a descending order of the mean values as shown in Table 1.

Table 1: Students' awareness of NHIF benefit package/services for students in public secondary school

Services (in-patient and out-patient) provided to public secondary school students through NHIF (N = 142)	Factor loading	Mean	Std. Deviation	Skewness	Kurtosis		
		Statistic	Statistic	Statistic	Std. Error	Std. Error	
Medicines and medical consumables	.836	2.84	1.328	-.099	.245	-1.308	.485

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Drug administration and dispensing	.821	2.82	1.299	-.191	.245	-1.276	.485
Consultation	.817	2.62	1.318	.127	.245	-1.412	.485
Laboratory investigations	.896	2.60	1.336	.241	.245	-1.310	.485
Dental and Oral Health services, Dressings or medications prescribed by the physician for in-hospital use	.685	2.41	1.265	.343	.245	-1.175	.485
Optical services	.755	2.33	1.272	.437	.245	-1.118	.485
Emergency services	.765	2.10	1.295	.775	.245	-.814	.485
Surgical services	.812	2.07	1.139	1.023	.245	.201	.485
Referral for specialized services	.776	2.07	1.244	.989	.245	-.108	.485
Operating theatre charges	.853	2.02	1.136	.959	.245	-.191	.485
Ophthalmological services	.768	1.95	1.074	.671	.245	-.952	.485
Radiological examination	.781	1.92	1.067	1.007	.245	.182	.485
Maternity and reproductive health	.788	1.90	1.177	1.143	.245	.266	.485
Physiotherapy and rehabilitative services	.722	1.87	1.077	1.193	.245	.537	.485
Medical / Orthopedic appliances	.670	1.87	1.007	1.151	.245	.833	.485
Occupational therapy services	.590	1.84	1.007	1.339	.245	1.312	.485
Kaiser-Meyer-Olkin Measure of Sampling Adequacy							.848
Bartlett's Test of Sphericity							.000

The factor analysis indicated that all health services loaded very well with Eigen values above 0.5 in each case. Tabachnick and Fidell (2007) recommended a minimum factor loading of 0.45 for real-life data. The data further exhibited a high Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) of 0.841 and a significant Bartlett's Test of Sphericity ( $P = .000$ ). This confirmed that all NHIF services posed to principals were sufficient and valid for the analysis, although their level of awareness varied to a great extent. The low awareness could be attributed to the rate at which the services were utilized by students.

The famous NHIF services included medicines and medical consumables, drug administration and dispensing, consultation, laboratory investigations, dental and oral health services, dressings, and medical prescriptions. Students indicated less awareness of ophthalmological services, radiological examination, maternity and reproductive health, physiotherapy and rehabilitative services, medical/orthopaedic appliances, and occupational therapy services. The instances where teachers accompany students to NHIF-accredited hospitals was sought from students. According to the results, slightly more than half of the students indicated 'sometimes' 53 (54.6%) while 33 (34%) said 'never'. This points out weaknesses in awareness program resulting to information asymmetry, which ultimately affects the extent to which such health services were utilized. It was clear from the results that, although the government of Kenya had invested money in the NHIF program for students, its utilization in public secondary schools was low.

The study further sought students' opinion on the performance of NHIF. This helped to obtain information on the effectiveness of NHIF as an approach for managing students' healthcare in public secondary schools. Results are presented in Figure 1.

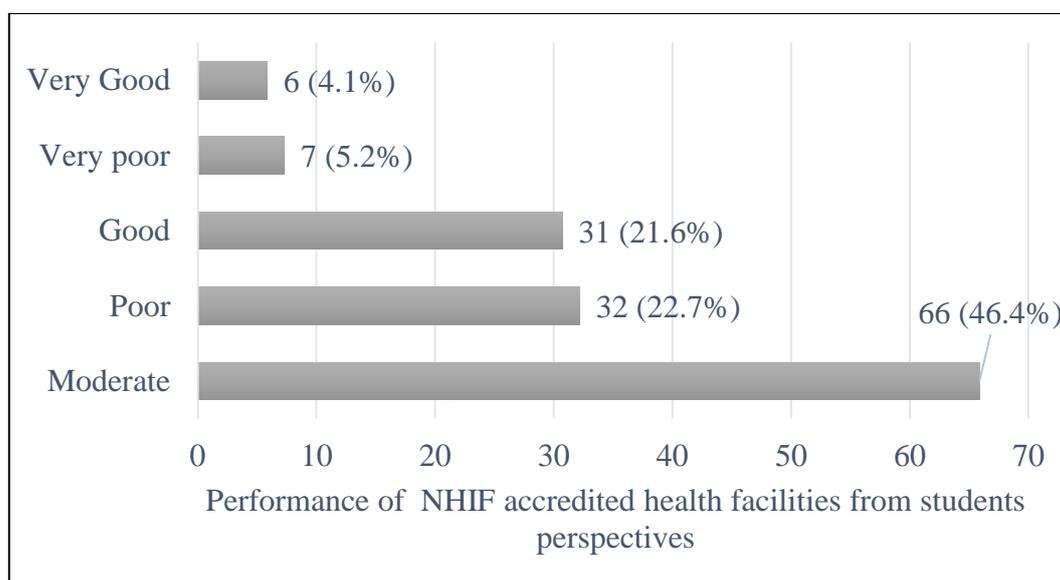


Figure 1: Students' perspective on the performance of NHIF accredited health facilities

According to Figure 1, the majority of users of the NHIF services 66 students, (46.4%), rated the healthcare received from accredited facilities as services as moderate, while 32% described them as inferior. This further posed a question on awareness of NHIF among students. It also raised questions on the effectiveness of this approach in addressing students' healthcare in public secondary schools. In addition, one wondered whether the sensitization on NHIF services for the EDUafya program was a role of principals or was a preserve of the NHIF or the Ministry of Education. When students were asked to indicate how often they required to use NHIF and told that the service was not in the package, most students indicated 'sometimes' 48 (49.5%) while 45 (46.4%) said 'never'.

### Challenges facing the use of NHIF by students in public secondary schools

Considering that principals were figurehead and Chief Executive Officer in secondary school and central in the use of NHIF by students, the study sought to find out their opinions on challenges associated with the NHIF approach by students in their schools. The findings are presented in Table 2.

Table 2: Challenges facing NHIF use by students in public secondary schools

Challenges facing NHIF use by students in public secondary schools (N = 138)	N Factor loading	Mean	Std. Deviation
Inadequate county health facility infrastructure	.433	4.57	5.821
Poor communication from NHIF	.870	4.13	1.029
Insufficient guidelines from NHIF	.894	4.09	1.054
Inadequate capitation	.406	3.85	1.261
Lack of clear policy on the use of NHIF by secondary school students	.746	3.72	1.168
Poor services of NHIF accredited health facilities	.565	3.51	1.310
Poor NHIF accountability	.665	3.36	1.428
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.719
Bartlett's Test of Sphericity			.000

Factor analysis in Table 2 indicates that most challenges that were facing the use of NHIF by students in public secondary schools loaded very well in the model, where most occurrences had a factor Eigen value above 0.45; with an overall KMO value of .719, and a Bartlett's test of sphericity being significant (P= .000). Two challenges, however, did not load adequately; these were inadequate county health facility infrastructure; factor loading = 4.33, and inadequate capitation, factor loading = 4.06; both of which were below 0.5. The failure to load by these two aspects can explicitly explain that the government does not expect the county government to put up extra infrastructure for the NHIF program. Students are expected to utilize the NHIF accredited facilities; hence, no capitation was available to public secondary schools for this program.

Principals pointed three key challenges, these were, inadequate county health facility infrastructure, (mean = 4.57; standard deviation = 5.821), poor communication from NHIF (mean = 4.13; standard deviation = 1.029), and insufficient guidelines from NHIF (mean = 4.09; standard deviation = 1.054). The study by Muriithi (2020) had also noted challenges such as lack of information technology solutions for informing decisions, inadequate guidelines, communication breakdown, and confidentiality challenge in the NHIF health program.

The County Director of Education further indicated that the amount allocated for Eduafya was inadequate in catering for all health needs of learners. The Director also lamented that the registration process of learners into the Eduafya program was experiencing delays due to the requirement for birth certificates and Unique Personal Identifier (UPI). This was because some students lacked birth certificates while obtaining UPI was marked with some delays. The County Director of Education also singled emergency and evacuation services as one of the listed services offered by the NHIF but was facing a big challenge, especially in the rural areas. The Director said, *"This has forced many schools to incur extra expenses by providing mobility service on behalf of the health providers"*.

It appears that the effectiveness of NHIF as an approach for managing students' healthcare in public secondary schools is largely not within the control of principals. However, according to the County Director of Education, principals of public secondary schools were expected to establish close working collaborations with the nearest NHIF Office, acquaint themselves with information on the provision of NHIF cover to students, ensure students are allocated NHIF –accredited health facilities, and follow-up to ensure students are issued with the NHIF card.

Principals were further asked to indicate the extent of agreement with suggested success factors for the effectiveness of students' NHIF-funded healthcare services. This was aimed at suggesting ways to improve this model. The findings are presented in Table 3.

**Table 3: Success factors for students' NHIF-funded healthcare services**

<b>Success factors for students' NHIF-funded healthcare services (N = 138)</b>	<b>Factor loading</b>	<b>Mean Statistic</b>	<b>Std. Deviation Statistic</b>
The proximity of NHIF-accredited health centres	.788	3.77	1.315
Clear access policy	.798	3.28	1.371
Adequate government funding	.674	3.23	1.410
Technology	.741	3.11	1.348
Integration of stakeholders views	.688	3.06	1.382
NHIF guidelines on operating modality	.805	3.04	1.421
Kaiser-Meyer-Olkin Measure of Sampling Adequacy			.895
Bartlett's Test of Sphericity			.000

Table 3 shows that proximity of NHIF-accredited health centres is a critical success factor for the effectiveness of NHIF-funded healthcare services. Another key determinant for the success of NHIF-funded healthcare services was a clear policy and adequate funding by the government. Though not very major, additional ones were the integration of stakeholder's views and the availability of

NHIF guidelines on operating modality. The findings hinted at critical areas of focus to make the NHIF program effective in addressing students' healthcare in public secondary schools. The crucial role of NHIF is very clear. It aims to enhance accessibility of healthcare services by all Kenyans. (NHIF, 2019). In that connection, Muriithi (2020) advocated for need for stakeholders such as the government, the NHIF practitioners and others, to create awareness of the program, and increase budgetary allocation exponentially. Muriithi further recommended bolstering the school-based health care platforms by the NHIF, improving health facilities by addressing the barriers affecting enrollment to the scheme.

The government intervention through adequate funding of the scheme was echoed by the County Director of Education, who described it as essential. In addition, Fang, Eggleston, Hanson & Wu (2019) in China reported measures put by the government in addressing health system efficiency for all citizens, including schooling children. Another key measure featured by Fang et al. was the use of common modes of payments to facilitate students' access to health services, for example, arrangements where cost is met by the student directly and is then reimbursed by the insurance company later, as well as the use of direct billing card.

The null hypothesis (*H<sub>0</sub>*) premised that the National Hospital Insurance Fund approach was not statistically significant in addressing students' healthcare in public secondary schools in Meru County. The results were summarized and presented in Tables 4.

Table 4: Linear regression results regarding the efficacy of NHIF approach in managing students' healthcare in public secondary schools

*Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.342 <sup>a</sup>	.117	.108	.52414	1.397

**ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.355	1	3.355	12.213	.001 <sup>b</sup>
	Residual	25.274	137	.275		
	Total	28.630	138			

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.223	.155		14.314	.000		
	X2	.170	.049	.342	3.495	.001	1.000	1.000

a. Predictors: (Constant), X2

b. Dependent Variable: Y

From the results in Table 4, the study variables in this context did not show autocorrelation as shown by the Durbin-Watson value, which is more than 1; hence the model was relevant in the analysis. The ANOVA results show the significance of the NHIF approach in predicting variations in addressing students' healthcare in public secondary schools in Meru County. Results show that the NHIF approach (X2) is statistically significant ( $F(1, 137) = 12.213$ ;  $P = .001$ ) in predicting the variations in the dependent variable (Y, addressing students' healthcare in public secondary schools in Meru County). VIF value of 1 ruled out multicollinearity among the study variables; hence the model was fit for data analysis and interpretations. The results further show the predictor variable's coefficient values (regression weight) and the corresponding level of significance. The unstandardized B-coefficient value rather than the beta coefficient value was used in interpreting data for this model because the constant value for the predictor was significant.

Considering that the ANOVA result shows a  $P = .001$ , which is less than the alpha value/significance level of 0.05, the study rejected the null hypothesis and concluded that there was a positive and statistically significant impact of the NHIF approach in addressing students' healthcare in public secondary schools in Meru County. The results show a prediction value where,  $R^2 = .117$ . This implies that the school-based health clinic approaches account for 11.7% of the impact on addressing students' healthcare in public secondary schools. The regression weights further confirm this finding. It shows that the impact of the NHIF approach on addressing students' healthcare in public secondary schools will always exist at a significant minimum ( $\beta_1 = .170$ ,  $P = .001$ ). The findings have undoubtedly proved that the use NHIF approach is statistically significant in addressing students' healthcare in public secondary schools. Therefore, the initiative by the Government of Kenya to fund the NHIF program for students in public secondary school was a commendable undertaking and was significant in addressing healthcare of students in Kenya.

**Conclusion**

In view of the findings presented above, the study noted standardized practices in using the NHIF approach across all public secondary schools. The program was, however, underutilized by students despite its significance in addressing their healthcare. Students' level of awareness of NHIF services through the EDUafya program was low. This explained why the NHIF in public secondary schools despite the government investing Kes 4 billion in the program. The operationalization of the program was experiencing few structural challenges, which was deterring its effectiveness in public secondary schools. The challenges include poor communication, insufficient guidelines from

the NHIF organization, inadequate NHIF-accredited health facilities, and unaware of students' NEMIS numbers. Students also complained of NHIF biometric cards. Critical factors for the success of the NHIF for learners in public secondary schools included increasing NHIF-accredited health facilities, clear policy and adequate funding of the NHIF program by the government.

### Recommendations

The NHIF organization should liaise with the Ministry of Education to conduct training and awareness to students and other stakeholders about healthcare services and accessibility of the EDUafya program. The study further recommend strengthening and widening the scope of NHIF-accredited health facilities under this program. This implies a need to accredit more local health facilities, including private health centres, which is critical in achieving proximity of access to healthcare services by learners. In addition, the policy on this EDUafya program should be revised to include the coordinating role of principals in ensuring utilization of NHIF by sick students. The procedures and systems for enlisting learners into the NHIF should also be simplified and hastened to encourage utilization. Incremental budgetary allocation by the National Government to the program is also essential. These results have implications on structural, administrative and funding policy for the NHIF program in public secondary schools in Kenya. It further calls for collaborations and partnerships with all stakeholders, which include accredited health providers, parents, principals of secondary school, the Ministry of Health and the Ministry of Education.

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# MACHAKOS UNIVERSITY

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A preferred University of Scholarly Excellence

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## RECAP OF THE 3<sup>RD</sup> MACHAKOS UNIVERSITY (MksU) ANNUAL INTERNATIONAL CONFERENCE\*

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- **Main Theme:** *Responding to Emerging Global Challenges through Research, Innovation and Technology for Sustainable Development*
- **Sub-themes:**
  1. *Strategies for Promoting Sustainable Agriculture and Food Security during a Pandemic;*
  2. *Economic Survival through Responsive Entrepreneurship in the Era of Global Disruption;*
  3. *Catalysing Change for Inclusion and Access to Education during Pandemics;*
  4. *Implications of Climate Change on Sustainable Environmental and Natural Resources Management;*
  5. *Mitigating the Impact of Social Disruption in a Global Pandemic; and*
  6. *Enhancing Post-COVID-19 Recovery Measures in Health, Hospitality and Quality of Life for Sustainable Livelihoods through Science and Technology.*

\*Virtual conference held from 23<sup>rd</sup> to 25<sup>th</sup> June 2021





## HIGHLIGHTS OF THE CONFERENCE: *CHALLENGES...*

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1. PREPAREDNESS
2. RESPONSIVENESS
3. RESILIENCE





## HIGHLIGHTS OF THE CONFERENCE: *CHALLENGE #1*

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### PREPAREDNESS

- Need to anticipate the constant flux in which Tertiary Level/Higher Educational Institutions (HEIs) find themselves;
- Creating and sustaining an institutional/organisational culture that is empathic, robust and open to change; and
- Anticipating novel context-appropriate disciplinary course offerings – especially those that embrace the ‘new normal’.







## HIGHLIGHTS OF THE CONFERENCE: *CHALLENGE #2*

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### RESPONSIVENESS

- Need to anticipate emerging pedagogic and professional [trans]disciplinary trends with the aim of collaborating with other key *Quadruple Helix* partners and actors to generate socially relevant and impactful research;
- Re-equip existing programmes for real-world contribution in line with *CBC* imperatives – e.g. *Income Generating Units* (IGUs); and
- Commercialise intellectual capital and property through applied research at HEIs.







## HIGHLIGHTS OF THE CONFERENCE: *CHALLENGE #3*

### RESILIENCE

- Need to future-proof disciplinary courses by embracing an expanded vision of the potentiality of HEI programmes;
- Leverage existing momentum by building durable, flexible and sustainable disciplinary offerings (i.e. core and elective courses); and
- Benchmarking promising cases and exemplars with the aim of adaptation for optimal fit-for-purpose.





## “THE NEW NORMAL”: *LOOKING FORWARD...*

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- The COVID-19 global pandemic has disrupted the world as we knew it – change is imperative...
  - “[When] the drumbeats change, the dancers must adapt their steps” – Kenyan proverb
- With the “new normal”, there are surmountable challenges as well as unique opportunities for creative, proactive and transformative thinking...
  - “TOMORROW belongs to those who prepare TODAY” – Afrikan proverb
- 21<sup>st</sup> Century T&L skills - *the future is here and it is digital!*
  - 4IR; AI; AR; 5G; ERT; STEAM; ODeL; ePortfolios; Digital Literacy; Knowledge and Solutions Economies; Educational Technology; Blended, Flexible and Hybrid Learning; Flipped Classrooms; Smart Classrooms; Distributed Work/Employment; Nano-Satellites; Distributed Manufacturing; Cloud Computing; Virtual Conferences; Webinars; Machine Learning; Robotics; Remote Diagnostics; TeleMedicine; TeleHealth; Multiple Literacies; Multiple Intelligences; 21<sup>st</sup> Century Lifeskills; Transdisciplinarity; Immersive Pedagogies; Lifelong Learning...





*Thank you...*

