MACHAKOS UNIVERSITY

Soaring Heights in Transforming Industry and Economy

BIANNUAL RESEARCH AND INNOVATION BULLETIN



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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

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Editorial team

Dr. Wycliffe Amukowa - Chairman
Dr. Elijah Muange - Member
Ms. Nancy Ingoshe - Member
Ms. Elizabeth Mbatha - Member
Mr. Moses Marwa - Member
Ms. Rachael Kibe - Member

Editorial

We are pleased to present our third issue of the series of Machakos University Biannual Research and Innovation Bulletin. The Editorial Board has, in its unrelenting spirit, again assembled a diverse group of articles that provide something of interest to our varied readership. We would like to thank the University Management, the entire Machakos University fraternity and our strategic partners for support towards enhancing research, innovation and technology transfer. In this Third Edition, we sum up our aspirations with the poem below:

In my dreams there are smoke
detectors and crashes and lies.
There is a kiss in an atrium right
before it catches fire. There is placate,
stay straight, evacuate.
Neodymium nitrate always smells
a certain way and always looks
a certain blue. Why does an alarm
go off after I dream I've kissed you,
but never if you kiss me?
What doesn't my brain want me to see?
As Orion slinks into view
I stand mixing solvents at the centrifuge.
There is always a healthy dose
of things I don't know. Always something
for Orion to pin with her next arrow.
If I am not here, asking questions of the world,
demanding answers from what I put
into test tubes,
the next thing could be you

On behalf of the Editorial Board, I would like to thank our contributors for their efforts and hope our readers continue to find useful and interesting information in this Second Issue



Dr. Wycliffe Amukowa, PhD
(Registrar- Research, Innovation &Linkages)
and Chairman, Editorial Board

FROM THE DEPUTY VICE-CHANCELLOR (RESEARCH, INNOVATION AND LINKAGESS)

As we pursue research and innovation agenda one cornerstone outcome is the creation of new knowledge, discoveries and inventions that become the drivers of sustainable development. These new knowledge, discoveries and inventions call for responsibility. In April 17, 1707, John V decreed that anyone trying to copy his work would receive the death penalty. This historical example shows that "responsible" use and control of technical inventions should be limited to those that are supposedly deemed able to act responsibly. As we may be aware, technical inventions up to modern times are still considered with a view on "who is in control" and "who can make use of it". Negative consequences of the technology are notably associated with who can use/misuse the technology, rather than with the properties of the technology itself. Whereas technological inventions where, historically, controlled by a central agent to avoid abuse, modern innovations are distributed through market mechanisms whereby property rights allow, in principle, the further improvements of the innovations by other market operators over time.

For modern innovations, responsibility for the consequences of implementation is primarily related to the properties and characteristics of the products or the technology and less to the privileged owners and creators of the technology. On the contrary, all informed citizens should be able to make (safe and responsible) use of it and the "benefits" of new technologies are determined by their success on the market. Modern technological innovation therefore receives its specific form by technology which has been democratized in its use and privatized in its production. Competition on the market should ensure product improvement for the benefit of all, rather than a demonstration of the capabilities of a single actor and its establishment of superiority.

It is against the above backdrop that I wish to call upon researchers and innovators at Machakos University and beyond, to embrace responsibility in their endeavours, for it is with this, that sustainable development obtains it purpose: the wellbeing of human beings and the environment.



Prof. Peter N. Mwita, PhD,
Deputy Vice Chancellor,
Research, Innovation and Linkages

MACHAKOS UNIVERSITY HOSTS INNOVATION WEEK AND OPEN DAY

Machakos University held its second innovation week from 24th to 28th February 2020 at the University's Sports Grounds. The Theme of the event was: "Innovation and Technology Transfer for the Big Four Agenda". The event was officially opened by Dr Tom Mboya Okaya, on 26th February, 2020. Dr. Okaya is the founder and convener of MUSPRA 2 STEM and Teachers Service Commission (TSC) Director at Kangema. Hon. Lazarus Kivuva, the Machakos County Executive Committee Member (CECM) – Education, Skills Training and Social Welfare, presided over a colourful Closing Ceremony on 28th February, 2020.



Participants getting to ready to staff the procession to mark the official opening of the Machakos University 2nd Innovation Week and Open Day

The official opening was preceded by a procession from the University gate to Machakos Town and back, as part of publicity efforts. The procession was flagged of by Prof. Peter Mwita (Deputy Vice Chancellor, Research Innovation and Linkages) on behalf of the Vice-Chancellor, Prof. Lucy Irungu. .



The Deputy Vice-Chancellor (RIL) Prof. Peter Mwita who also represented the Vice-Chancellor, Prof. Lucy, together with Prof. Joyce Agalo (Deputy Vice-Chancellor – Academic and Students' Affairs) lead the procession to mark the official opening of the Machakos University 2nd Innovation Week and Open Day

Talking on behalf of the Vice-Chancellor of Machakos University, Prof. Lucy Irungu, the Deputy Vice-Chancellor (Research, Innovations and Linkages) Prof. Peter Mwita, noted that innovation requires not only giving people incentives but also creating enabling environments where ideas are nurtured with the right and friendly ecosystem where all people including innovators, employees and entrepreneurs are supported and provided with right tools..

On his part, Dr. Tom Mboya stressed on the importance of innovations in realizing the Big Four Agenda. He said that innovations are shaping the modern world and appreciated Machakos University for taking the forefront. While encouraging students to invest their thoughts in innovations, Dr. Mboya mentioned that the current initiation of Huduma Number in Kenya stems from an innovation done by a high school. In this regard, Dr. Mboya said that the only world without limits is the world of innovations as in it, the mind has plenty to explore.
.



Prof. Mwita (left), Dr. Tom Mboya Okaya(Centre) and Prof. Joyce Agalo at the Official Ceremony of Machakos University 2nd Innovation Week

Several community stakeholders participated in the event, among them: Machakos Women Prison, Machakos Technical Institute for the Blind (MTIB), Masaku School for the Physically Disabled (MSPD), Emploi, Tribus TSG (Ajiry app), TME Education, Leafy Life Ltd, I Choose Life Africa and African Art Best.









The Chief Guest Dr. Tom Mboya Okaya visits various stands to see the innovations during the Official Opening Ceremony

During the event several innovations were displayed, which included:

a) The iVoting- an innovation that can solve problems of voting in Kenya.
b) Extraction of Mercury from waste- an innovation that can reduce cases of cancer from the vegetables we consume daily.
c) Generating clean energy for cooking and heating from recycled diapers and papers, solving both the problem of waste disposal and environmental pollution.
d) Mystical making of beads using legs by the Machakos School for the Physically Disabled. A moving exhibition from the school was one in which a girl draws, writes and does presentations using her fool. Below is her photo being greeted by Hon. Lazarus Kivuva.
e) The Shiatsu (Japanese Massage) by MTIB – a medical innovation that can assist society in medical issues related to joint aches, sprains, arthritis, neck and back pain, sinusitis and bronchitis, among others.
f) Digital platforms for education, payment of house rent and utility bills, and linking employers and job seekers, that can solve the problem of high levels of manpower development, youth unemployment and transaction costs.



Machakos County Health Minister, Hon. Ancent Kituku admires some of the exhibitions. Taking him around is the Deputy Vice-Chancellor (Research, Innovation and Linkages) Prof. Peter Mwita and Prof. Joyece Agalo (Deputy Vice-Chancellor- Academic and Students' Affairs











A cross -section of innovations

Apart from innovations, Machakos University academic programmes were also showcased. High school students and their career teachers from various schools toured the exhibitions and attended Open Day. They were taken through the career clinics for career and academic mentorship. In addition, the students given a tour of the University Library.





(Left) Students from Katoloni Secondary School take part in the procession. (Right) Students from Ikutha Girls Secondary School in a Group Photo



Students and teachers from Holy Ghost Secondary School in a group photo after visiting the University Library.

While delivering his closing remarks, Hon. Lazarus Kivuva promised that Machakos County would give financial assistance to needy pupils with disabilities from institutions that participated in the event. The CECM challenged Machakos University to organize a much bigger Innovation Week and invite more training institutions from the county and the general public to participate. He also intimated that the County was ready to support the event.



Deputy Vice-Chancellor (RIL) Prof. Mwita and the Chief Guest Hon. Lazrus Kivuva follow proceedings of the Closing Ceremony




Prof. Mwita (left) and the Chief Guest Hon. Lazrus Kivuva (right) make Closing Ceremony remarks

Best projects were awarded prizes, with the overall winner taking KSh.10, 000, second best KSh.8, 000 and third best KSh.7, 000.






Machakos University Receives Hardwares for the Luban Workshop

On 6th June, 2020. Machakos University received last batch of equipment from Tianjin City Vocational College, China towards fully operationalization of the Luban Workshop. The equipment was received by Prof. Peter Mwita, the Deputy Vice-Chancellor (Research, Innovation and Linkages) on behalf of the Vice-Chancellor, Prof. Lucy Irungu.

The Kenya Luban Workshop at Machakos University, was initiated on 14th December 2019 when the two institutions signed a memorandum of understanding. The workshop is the 9th in the world after Cambodia, Portugal, India, Thailand, Pakistan, and Djibouti, Britain and Indonesia and the 2nd in Africa after Djibouti Luban Workshop. As different Luban workshops are established with special focus to the needs of the local communities, the Kenya Luban Workshop will specialize in Cloud Computing and Information Security. The total cost of hardwares so far received for the workshop is US$421,739 (approximately KShs. 44,413,300).



(To the left)Prof. Peter Mwita, the Deputy Vice-Chancellor (Research, Innovation and Linkages) accompanied by Dr. Wycliffe Amukowa (Registrar-Research, Innovation and Linkages) and Prof. Henry Embeywa, inspects the seal to verify delivery details (To the right) Prof. Henry Embeywa excitedly takes a look inside the delivery truck

Speaking at the delivery session, Prof. Mwita noted that the workshop will enhance Professional, skills training, teaching and establish research infrastructure for cloud computing and information security in the university. It will therefore act as catalyst for innovation in the digital space, knowledge and Student Exchange programs.



Prof. Peter Mwita (in middle) and his team take a photo after offloading the equipment from the delivery truck.



Part of the Equipment inside the Luban Workshop

Machakos University Wins Wildlife Tracking Cube-Sat Project for a Wildlife Satellite Tracking System in Kenya (SIMBA) Project

Machakos University in partnership with Sapienza University of Rome, University of Nairobi, Kenya Space Agency and Kenya Wildlife Service developed, submitted and successfully won a proposal on Wildlife Tracking Cube-Sat Project for a Wildlife Satellite Tracking System in Kenya (SIMBA). This was in response to a Cubesat launch opportunity which was offered by IAF (International Astronautical Federation) to student teams based in developing countries.



Dr. Stanley Makindi

Commenting on the award, Dr. Stanley, one of Machakos University involved in the project said that the project seeks to equip wild animals with an appropriate electronic module comprising a Geographical Positioning System (GPS) receiver, a satellite transmitter and power system (solar cell+battery) to facilitate data collection and monitoring. "The Cubesat was to be launched at Machakos University in May 2020 but postponed until when COVID-19 Pandemic eases and this will link the University to the international scientific and technological arena." Dr. Makindi explained

ENHANCING RESEARCH INFRASTRUCTURE

The Research Infrastructures are key investments in research in all areas as they meet both the demand of the scientific community for state-of-the-art resources for supporting excellent science, and the demand of knowledge transfer for innovation at social and economic level. They are often generators of large volumes of data that have prompted technical and policy solutions to curate, document, preserve and make available these data upon request by other scientists or developers. Machakos University responds to this by continuously equipping the laboratories with modern research equipment. Recently the University acquired and installed the following:

(a) Soxtherm for Fat Analysis



Dr. Patricia Muendo

The University acquired and successfully installed Soxtherm for the extraction of a lipid from a solid material. Explaining how it works, Dr. Patricia Muendo from the Department of Biological Sciences said that Soxtherm automates and speeds the extraction process and can evaporate and recover the solvent. By immersing the sample in hot solvent the extractable material is removed more quickly than the traditional method.

"The solvent is re-circulated to rinse the extractable material into the bottom of the beaker. Finally the solvent is removed by evaporation automatically and recovered for safe disposal or reuse." Dr. Muendo explained.





Soxtherm installed in the Science Laboratory

(b) Ultra-High Performance Liquid Chromatography (Ultra HPLC)



Prof. Zachary Getenga

With support from The Alexander Von Humboldt Foundation of Germany, Machakos University purchased and installed Ultra High Performance Liquid Chromatography (Ultra HPLC). While inspecting the installation process, Prof. Zachary Getenga from the Department of Physical Sciences said that the equipment is the latest equipment in the market with high sensitivity and is used across many disciplines in Sciences, Agriculture, and Environment among others. "This equipment will enhance the quality and accuracy of research output in the University." Prof. Getenga said.



NEWS FROM THE LIBRARY

Officials From Commission For University Education Visit The Library

Led by Prof. Grace Njoroge, Deputy Commission Secretary, officials from Commission for University Education visited the library 6th March, 2020 when they came to the University as part of their mission to have new academic programmes accredited.

Speaking during the visit, Prof. Njoroge lauded the University in enhancing library resources and access to the users. She noted that these initiatives builds confidence in the quality of Machakos University's academic programmes and that of her graduates.

"Always remember that the library is the custodian of all information materials that are used for teaching and research and such, it must be a priority for the University." The Deputy Commission Secretary said.



CUE commissioners Professor Grace Njoroge and a colleague, DVC-(RIL)and DVC (ASA) after visiting schools whose programmes were assessed and vital facilities such as the library

Mapping Out Library Preparedness To Serve Users Living With Disability

The Chairman Disability Council Machakos County Mr John Nzomo Nzioka visited the library on 12th February 2020, to access the level of preparedness towards provision of services to users living with disability. Speaking to library staff during the library tour, Mr Nzomo said that he was happy that the University is cognizant of the studying needs of persons with disability and is taking every step to ensure they access the Libray.

"I wish to request that a special room should be set in the library ground floor to cater for physically disabled students and be fitted with approximately three computers fully installed with internet connectivity, Job Access with Speech (JAWS) software and Duxury Braille Translators (DBT). The room should be fitted with comfortable furniture to assist the learners while studying." Mr. Nzomo said.

Mr. Nzomo further recommended installation of a ramp and special toilets for users living with physical disability.



From right is Mr. Jones Kisengi who is the Head of e-resource Department, Mr Nzioka and his Personal Assistant and far left is Mr Boniface kaleli the systems librarian.

Library Open Day

The library hosted six schools during the university innovation and open day held on 24th to 28th February,2020 . It is during such library tours that students acquire library skills thus enabling them to embrace a positive reading culture.Speaking during the library visit by students from various schools the university librarian indicated that cultivation of a positive reading culture was in line with recently established Competence Based Curriculum(CBC) whose emphasis is not only on good performance in examinations but on acquisition of knowledge for creativity , innovation and problem solving.In this regard the librarian also congratulated the students who had already showcased their various innovations and noted that the "sky was not the limit".Later in the afternoon, the students also benefitted from academic guidance offered by the office of career services in the university.



Matungulu Girls High School after visiting the library during the University Innovation Week and Open Day held on 24th to 28th February, 2020



Katoloni High School after visiting the library during the University Innovation Week and Open Day held on 24th to 28th February, 2020



Wakaela High School after visiting the library during the University Innovation Week and Open day held on 24th to 28th February, 2020



Ikutha Girls High school after visiting the library during the University Innovation Week and Open day held on 24th to 28th February, 2020

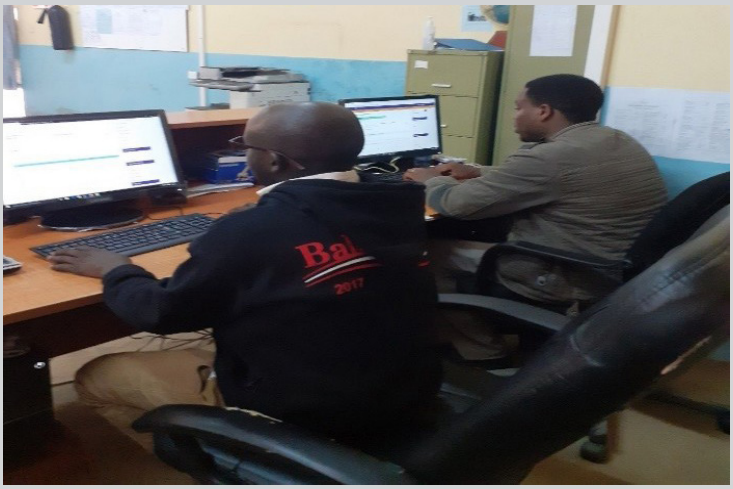
Internal Library ISO Audit Conducted

Internal ISO Audit was conducted on 11th March, 2020. Internal audit is conducted every quarter of the financial year with an aim of enhancing service delivery in the library. Speaking during the opening meeting of internal audit held on 10th March, 2020 the Director University Quality Management System (QMS) indicated that internal audits were meant to prepare the university for external audit which is conducted twice in a financial year by the national standards certifying body; Kenya Bureau of Standards (KEBS).Internal auditors however lauded the library for not recording non-conformity during the exercise..



Staff members preparing for internal ISO Audit

Library Embraces Digital Repository To Improve Knowledge Management



Library staff populating the repository

As part of knowledge management initiative the library had populated 6,181digital documents as of 20th June, 2020. All documents uploaded in the institutional repository have been indexed. They can be accessed via Google scholar search engine. This facilitates Webo metrics ranking of the institution. In this regard the university was ranked 12th position nationally in July, 2020 University webo metric ranking. This was an improvement from position 16 in July, 2019 which saw the Deputy Vice Chancellor (Research, Innovation and Linkages) lauding the library for her effort towards enhancing global visibility of the university through populating of the repository.

Web Conference Training

Eleven (11) library staff were trained by ICT Directorate on Thursday 21st May, 2020. The training was aimed at sensitizing the members on the use of conferencing tools to host meetings and also to support e-learning initiatives in the institution. Speaking in her opening remarks of the training the Deputy Vice Chancellor- Academic and Student Affairs (ASA) emphasized on the need of the library to offer the necessary e-resource support to students remotely especially in the wake of covid-19 pandemic. In this regard, the library Information literacy training, orientation programmes and all user advisory services are offered online.



Library staff attends web conference training

Enhancing Access To Library Resource: Post Graduate Students' Virtual Training



Systems Librarian conducts online training on Turnitin and Remotexs to postgraduate students

The library staff trained Forty (40) post graduate students on RemoteXs off campus e-access platform and Turnitin plagiarism software on Friday 29th May, 2020. Previously, the library has conducted face to face trainings for users. However, in her effort to curb the spread of covid-19 virus by promoting social distancing all trainings are to be conducted virtually.

This supports recommendations that were made at a workshop on preparedness of University libraries and other facilities in readiness to reopening universities that was called by Chief Executive Officer (CEO) Kenya Library Association (KLA) on16th July, 2020 .During the workshop, Universities were urged to operate physical libraries within covid-19 health guidelines.

VARSITY JOINS HANDS IN THE WAR AGAINST COVID-19

Following the declaration of the COVID-19 as a pandemic in the country, and subsequent closure of the University, the Machakos University Income Generating Units (IGUs) began laying strategies to ensure that the university community is safe from COVID-19 infections after reopening. These strategies are aligned to the Ministry of Health guidelines that recommend wearing of facemasks, regular washing of hands and sanitizing of hands and surfaces, among other measures.



1.Production of hand washing detergent – this is a KeBS-certified scented product produced by the Soap and Detergent Production Unit and is packaged in 500 ml bottles. A bottle retails for KSh 200 and has been selling at the University gate. The Production Unit plans to produce the detergent for use in the University once the institution reopens. Purchase can be made at the gate anytime during working hours and orders can be made through: +254 720 250 440.

2.Development of hand sanitizer – Some students under the guidance of a staff member and the Soap and Detergent Production Unit staff have recently developed an alcohol-based hand sanitizer. The sanitizer has since been certified by KeBS and is ready for commercialization. Besides its ability to fight corona virus, the sanitizer has antibacterial activity, making it a broad-spectrum sanitizer. Plans are underway to start production, and the University community will be notified once the product is available. The Soap and Detergent Production Unit is preparing for mass production of the sanitizer for use in the University upon reopening of the institution.

3.Design of facemasks – The FADMA production Unit in conjunction with the Department of Fashion Design and Marketing have designed woven cotton facemasks. The masks come in different shapes, colours and materials and have been additionally designed for comfort and fashion. The FADMA production Unit and the Department of Fashion Design are in the process of making plans for mass production of the masks for use by students and staff upon reopening of the University.







MACHAKOS UNIVERSITY CELEBRATES THE 2020 INTERNATIONAL WOMEN'S DAY IN A CORRECTIONAL FACILITY

Machakos University celebrated International Women's Day 2020 in a unique way by joining inmates and members of public for the celebrations held at the Machakos Women Prison on 1st –7th March 2020. Celebrated under the banner "An Equal World is an Enabled World", the event was organized by Machakos Women Prison, in partnership with Machakos University and several other institutions including the Kenya Institute of Management, Wangondi Foundation, Machakos Main Prison, Alfany Reach Out CBO, Angels Paradise Counseling Centre, Clean Start, Anglican Church of Kenya (Machakos), African Inland Church-Bomani, ABSA Bank-Machakos, Kenya Women Finance Trust-Machakos, Zambezi Hospital, Nafisika Trust, Crime Si Poa and Law Society of Kenya-South Eastern Branch, among others.

Machakos University Vice-Chancellor Prof. Lucy Irungu who was invited to give a keynote address on 6th March was represented by Dr. Wycliffe Amukowa – Registrar, Research Innovation and Linkages. During the weeklong celebrations, the contribution of Machakos University was through providing financial support and active participation in planning and coordination of event activities; training inmates on modeling; adjudicating beauty pageants and sports.



Hon. Joyce Kamene (5th left) flags of the event procession on 7th March 2020, at Mulu Mutisya Garden, Machakos, flanked by SP Jostina Mwang'ombe, Officer in Charge, Machakos Women Prison (4th left) and Dr Elijah Muange, Machakos University (2nd Left).



Pupils from Machakos School for the Deaf join in to carry Machakos University banner during the Procession in Machakos Town on 7th March 2020.



SP. Mwang'ombe (right) flanked by Chairman of the steering Committee, Dr Elijah Muange (Machakos University), welcomes participants to the celebrations on 7th March 2020



Chief Guest, Hon. Joyce Kasimbi delivers her speech



Hon. Joyce Kasimbi, cutting a cake to mark International Women's Day, on 7th March, 2020.



A model from Machakos University takes part in the beauty pageant on 7th March 2020. She won the first runners up position.



Machakos University Models adjudicating the beauty pageant during the celebrations on 7th march 2020.



Chief Guest, Dr Wycliffe Amukowa fetes Miss IWD-Machakos from the Kenya Institute of Management.



Machakos university Models during the celebrations. The models trained Machakos Women prison models, entertained participants and adjudicated beauty pageant



A section of Machakos University Students who participated in the celebrations on 7th March 2020



Rev. Gideon Musyoka of ACK Machakos ministers to inmates and other faithful to mark the start of the week long celebrations



Dr. Muange Crowns Miss Machakos Women Prison to participate in beauty pageant during the International Women's Day.



SP Mwang'ombe (Centre) and Dr. Muange (left) join Zambezi Hospital for cancer screening of male inmates at Machakos Main Prison during the week of celebrations.



2020 Research Quote

"Afrog decided to raech the top of a tree.
All frogs shouted,
"It's impossible, It's impossible."
Still the frog reached the top.
How...?
Because he was deaf and he thought
everyone was encouraging him to
reach the top."

"BE DEAF TO NEGATIVE THOUGHTS
IF YOUR AIM IS TO REACH YOUR GOAL"

Machakos University
P.O. Box 136 – 901 00,
Machakos (KENYA)

Telephone: +254 799 086 901
Email: admin.ril@mksu.ac.ke
Website: www.mksu.ac.ke

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