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Editorial

The current 11th volume of the *UVCF Bulletin* focused mainly on Research and Innovation in Uganda.



GOVERNMENT, PRIVATE SECTOR AND STAKEHOLDER PARTICIPATION IN RESEARCH AND INNOVATION IN UNIVERSITIES

By Professor Charles Kwesiga, ED, UIRI

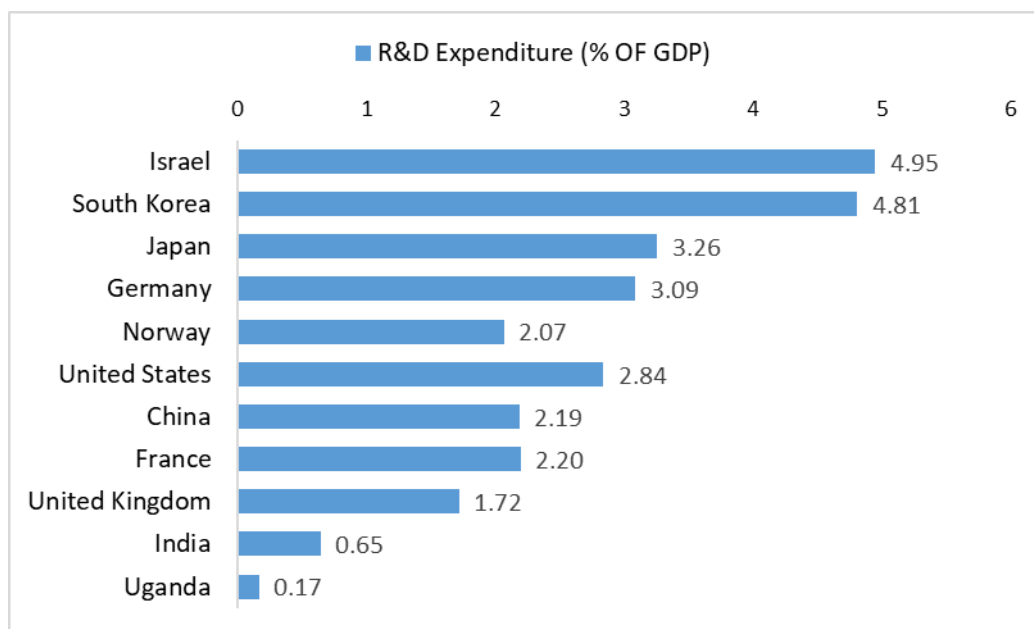
I am glad to be invited again to address the august Vice Chancellors' Forum Conference (Oct. 1st, 2021). The theme of this conference is: "Support for Research and Innovation in Universities, in light of the effect of the pandemic", which is as pertinent as it is opportune. The pandemic has exacted a heavy toll on virtually everything, be it the economy, education, healthcare, and even life itself. To mitigate such a scourge, Universities are uniquely placed to provide research-based interventions. The government of Uganda (GoU) deserves strong commendation for its commitment to funding scientific interventions in mitigating the impact of Covid-19. In the same vein, we must condemn the acts of subterfuge by those self-seekers who distorted procurement procedures and those I consider intellectual miscreants who sought funding without "proof of concept", thereby undermining prospects for the real and proven innovations that await funding.

Research has come to mean many things to the population, and for purposes of my presentation I will apply the (legal) definition of **RESEARCH SUPPORT** as "that compensation allocated to and identified with defined research and development efforts aimed at advancing Licensed Product(s) towards commercialization"¹.

It is a universal truth that R&D is the alpha and omega of development, socio-economic transformation, and the socio-political emancipation of humanity. It is also an immutable fact that investment in R&D is directly proportional to the country's quality of life, and inversely proportional to that country's ranking in the Human Development Index (HDI). Norway ranks number 1 in HDI, while Uganda ranks 159. Their respective investments in R&D (as a % of GDP) are 2.07 (2018) and 0.17 (2014). Clearly the latter is abysmal, and demands action. Meanwhile: **Israel** is recognized as a world leader in research and development. "... It has the highest R&D intensity in the world with gross domestic

¹Law Insider <https://www.lawinsider.com> › dictionary › research-support

expenditure in R&D as a percentage of GDP at **4.7 per cent** compared to 2.7 per cent in the United States and 2.01 in Europe.”² It is no wonder that Israel is the bread basket of the Middle East and beyond, and that the country has turned desert into farmland, while my homeland, Kigezi, is busy turning farmland into desert.



Source: The World Bank, UNESCO Institute for Statistics (uis.unesco.org)

Global spending on R&D has reached a record high of almost US\$ 1.7 trillion. About 10 countries account for 80% of spending. As part of the Sustainable Development Goals (SDGs), countries have pledged to substantially increase public and private R&D spending as well as the number of researchers by 2030. Is Uganda still on course? We may be on course, but we must concede also that we have a long way to go.

In Uganda, we are proud that, “Makerere University in the Financial Year **2019/2020** received special funding worth **UGX 30 billion** (equivalent to US\$ 8.1m) from the GoU under the Research and Innovations Fund (RIF) to support high impact Research and Innovations. This unique initiative was a climax of strategic meetings and continuous engagements involving Makerere University Management and the Government of Uganda.” (source: www.mak.ac.ug). Congratulations MUK! But in comparative terms,

² Why Israel leads the way in R&D | Eolas Magazine <https://www.eolasmagazine.ie> ›



and the facts pointed out above, we still have a long way to go. Also it is worth noting that this bonanza was before the pandemic. Government's response to the pandemic has been exemplary, especially with regard to **funding research** and investing in preventive measures against the pandemic. UIRI was enabled to make significant contributions in lieu of the interventions against Covid-19. I wish to request for more robust collaboration with Universities and Tertiary Institutions in continued efforts to prepare for such calamities, pandemics, and other unforeseen catastrophe. The need is clear: enhanced technology use!

I continue to seek collaboration, especially with our premier Universities, in utilizing the iconic UIRI facilities at Namanve Industrial Park. The project seeks to catalyze metallurgical industry by connecting industrial skills and requisite technology in the production of high precision metallic products, spare parts, and machines. Platform for apprenticeship for technicians and engineers is the unique feature of the project.

The last time I addressed a conference of VC Forum was about 4 years ago, and my topic then was: *Training of University Students for National, Regional, and International Employability*. Since then, there is considerable evidence that our Universities have been growing from strength to strength, and that government's resolve to support R&D sounds solid. Another development is that UIRI itself has undergone its own metamorphosis, especially with commissioning of its Namanve Campus. Also collaboration with some of our Universities have picked up a brisk pace.

On a very negative note, perhaps the most distressing episode in modern times was the onset of Covid-19 pandemic. The pandemic has been as devastating as it has been global. To make matters worse for sub-Saharan Africa is that on the technological front we were caught in the proverbial circumstance of, "The Emperor has no clothes"³. With our low level of technology use, and overdependence on imported technologies, sub-Saharan Africa was in dire straits vis-à-vis Covid-19. The technological debacle notwithstanding, Uganda's leadership, its engineers and scientists, and even some in the bureaucracy, have done a commendable job of mitigating the deleterious effects of

³ This expression is used to describe a situation in which people are afraid to criticize something or someone because the perceived wisdom of the masses is that the thing or person is good or important.



the pandemic. I wish to appeal to academia to work even harder so that, through protracted research, we can develop indigenous technologies, and create our readiness to meet unanticipated developmental challenges. In God and my Country.



COLLABORATION, MULTIDISCIPLINARY RESEARCH, AND INNOVATION IN HIGHER INSTITUTIONS OF LEARNING.

E. Katunguka - Rwakishaya Vice Chancellor, KYU

Introduction

Man has come a long way in his endeavor to advance in every field. All the achievements man has made can be attributed to the curious and inquisitive nature of man. As a result, today our modern society is full of astonishing advancements and magnificent inventions. Globalization and liberalization have given rise to many peculiar and enormous problems and challenges. A solution to these problems can be reached with the help of research in one discipline but a concerted effort of many disciplines. These problems demand assistance, cooperation, and involvement of many disciplines hence multidisciplinary.

Research

Refers to a search for knowledge

A systemized method consisting of defining a problem, collecting the facts, formulating a hypothesis, analyzing them and reaching a certain conclusion.

It is a tedious march for discovery-a movement from known to unknown.

Collaboration

An arrangement where parties, known as business partners/institutions agree to cooperate to advance mutual interests.

Many universities are involved in collaborative arrangements or linkages with agreements in form of Memorandum of understanding.

MOU is a document describing the broad outlines of an agreement that two or more parties have reached. It expresses a convergence of will between the parties, indicating an intended common line of action.

In many cases universities come together to work on common interests which may or may not need external funding.



Multidisciplinary Research (MDR)

MDR is a technique of research in which the tools of different sciences and disciplines are utilized to find an explanation to the issue under study.

MDR is a pursuit of truth with the help of numerous specialized branches of learning which aims at achieving a common goal with the aid of knowledge of other disciplines.

MDR is an investigation or inquiry to a problem for ascertaining the hypothesis combining many academic approaches, fields or methods.

MDR is a search for knowledge through objective and systemic method for an original contribution to the existing stock of knowledge involving a combination of several disciplines and methods.

Differences Between Disciplines

Many academic institutions nowadays are largely organized in ways that promote advancement of individual disciplines or sub-disciplines. Policies that govern hiring, promotion and allocation of resources often work against multidisciplinary.

Different disciplines tend to apply different research methods.

The aim of fundamental research is to gain knowledge and understanding of the world without regard to whether or not the knowledge discovered will be of any practical use.

The aim of Applied research is to carry out a scientific investigation in order to solve a practical problem.

The differences in research objectives between fundamental researchers and applied researchers can lead to major misunderstandings and difficulties in collaboration.

Why Multidisciplinary Research

Modern research is tending to be more and more multidisciplinary due to complex nature of current problems requiring knowledge of all its aspects such as economic, social, political, psychological.

There is increasing dominance of problem solving, project oriented applied research.

An effective multidisciplinary process will require some softer human skills like teamwork, leadership, tolerance of differences and ambiguity and selflessness.



A team of individuals specialized in various fields can be invited so that each aspect of a problem could be analyzed by a particular specialist to arrive at an appropriate and desirable solution to the problem.

Need For Multidisciplinary Research

Human being is the building block of society and all researchers are directed to betterment of the human being. Human life is regulated and determined by knowledge of various disciplines.

Research on human welfare will need knowledge on social, economic and political aspect of a human being but even physical sciences like chemistry, physics, mathematics and engineering have importance on man's way of life.

Various types of incidents-natural and man-made are taking place all around and can only be studied in an integrated manner with the help of MDR.

MDR aims at avoiding the defects of incompleteness. Today's problems are multifaceted and disciplinary approach would give incomplete or no result.

No discipline can be sufficient or complete in itself. Each and every discipline needs to take the help of other disciplines to reach a suitable conclusion.

Benefits of Collaborative Research

- i. Access of expertise via the sharing of knowledge, skills and techniques
- ii. Formal division of labor, sharing tasks, pooling specialized teams
- iii. Transfer of knowledge and skills
- iv. Cross fertilization of ideas, confrontation of points of view which in turn leads to creativity
- v. It brings less isolation to researchers
- vi. Researchers gain an increase in their respective network of contacts in the scientific community
- vii. Increase in the visibility of the work through dissemination actions at both sides of the collaboration
- viii. Access to equipment and resources
- ix. Sharing of financial costs and pooling of resources.



Strengths of MDR

- i. It provides different approaches and perspectives to problems.
- ii. It provides fresh viewpoints, cross fertilization, exchange of methodologies and enhances the vision of researchers on their own discipline.
- iii. MDR projects are a way to acquire insights into other disciplines and contribute to life long learning of researchers.
- iv. MDR projects are a way to acquire a new network of researchers and to approach people from other disciplines and opens new opportunities for new funding contacts.

Weaknesses of MDR

- i. Problems of communication between people from different Disciplines.
- ii. Researchers need to invest more time in reading to understand some concepts of new disciplines
- iii. Physical meetings are very important in order to create better understanding among the partners
- iv. Individuals need to put in more effort to explain things several times, to communicate efficiently the basics of their discipline, to be patient, tolerant and adapt to the custom of other disciplines
- v. In MDR projects, it can be difficult to reach a step where everybody feels that he is gaining something (win-win situation)
- vi. Different competencies mean different approaches to problems which can generate conflicts (need to manage conflicts)

Additional Comments

Educational Institutions are emphasizing MDR for complete and deep study of any problem commonly identified by development partners, policy makers and research funders and is seen as a good thing.

The reality is that it is often very difficult to execute.



The definition and evaluation of outputs (prototypes, patents, papers) vary across disciplines and results of MDR projects may be regarded as below the standard that each individual discipline seeks to impose on its own work

CASE STUDY OF COLLOBORATIVE AND MULTIDISCIPLINARY RESEARCH EFFORTS IN MAKERERE 2004-2013

SWEDISH FUNDING TO MAKERERE UNIVERSITY 2004-2013

Swedish funding was aimed at Poverty reduction and improvement of the quality of life. This was the overarching goal. Focus is on Human wellbeing.

Through various consultative meetings, a decision was taken to support Makerere University to develop her Strategic plan and position herself to receive development funding to meet the development goals.

Makerere University was set to join other universities in Africa that received long-term SIDA funding e.g Dar es Salaam University, Eduardo Mondlane University in Mozambique and University of Addis Ababa in Ethiopia.

Partners in this collaboration

- Makerere University, Uganda (2015, Gulu, MUST, KYU, Busitema Univ.)
Swedish Universities/Institutions
- Gothenburg University
- Linkoping University
- Stockholm University
- Royal Institute of Technology
- Marladen University
- Chalmers University of Technology
- Lund University
- Boras University
- Karolinska Institute



- Swedish University of Agricultural Sciences
- Uppsala University

AREAS OF SUPPORT

Human Resource Development

Training: PhD, Postdocs, Masters, skills development focusing on proposal development, research management, scholarly writing and communication skills, Information competence and management, and supervisor training.

Improvement of the environment for conducting research and disseminating the findings (ICT, library, field sites, research policies)

Research in Technology and Basic Sciences

- Performance of Highway Pavements in the Lake Region
- Development of Environmental Friendly Architecture in the Lake Victoria Region
- Water Quality Management and Pollution Control in Uganda
- Characterization of high Temperature Ceramic Raw Materials in Manufacture of Firebricks
- Sustainable Energy for Rural Development
- Integration of small renewable energy sources
- Geographical Information System databases for Uganda

Research in Health, indigenous knowledge and health systems

- Molecular Biology of Malaria
- Clinical Pharmacology of Malaria
- Degenerative Diseases Particularly Cancer
- Reproductive Health and HIV/AIDS



- Mental Health

Areas of support

Research in Governance, Human Rights and Economic Management

1. Uganda Foreign Policy in the Security Complexes in the
2. Great Lakes Region from 1986
3. Agricultural Liberalisation, Gender Relations and
4. Livelihood Patterns in Central Uganda
5. Gender Vulnerability to HIV/AIDS and Changes in Risk Behavior
6. Conflict and Post Conflict reconciliation in Uganda
7. Public Policy, Changing Gender Relations, Ideologies and Identities in Uganda
8. The Political Economy of Disease

Research in Agricultural production and productivity, Nutrition and food Security and value addition,

1. Livestock Nutrition and Husbandry Project
2. Urban Crop Waste Management
3. Soil Fertility Inputs in Urban and Peri-urban Systems
4. Integrated Pest Management Following use of Crop Wastes
5. Social economic implications of Market Waste Utilization in Urban and Peri-Urban Agriculture

General overview of Achievements

Built a strong research environment through PhD and Postdoctoral training, research collaborations, strengthened networks, enhanced science laboratory equipment and strong research management capacity.



Greatly enhanced research culture: many academic staff writing grant applications for funding, doing research and publishing.

Improved quality of university lecturers and graduates, enhanced capacity to supervise graduate studies as a result of partnership with Swedish institutions.

Increased research publications involving the doctorate students and their supervisors in collaborating institutions.

Modernization of the institution through ICT and enhanced library services (e-resources).

Makerere is now a leader in Science Education and Research in the region with high research output and senior staff profile (85 Full Professors, 145 Associate Professors, 205 Senior lecturers, Holders of PhDs are 957 out of teaching staff of 1500).

Makerere is now very attractive to any serious development partner looking for institutions with capacity to deliver on development partner goals or those of a number of funding agencies and Philanthropists.

Incentives for Collaboration and Multidisciplinary Research

Institutions come together to seek for research funding in response to calls for consortia

Institutions should have in place sound Strategic Plans.

The niche areas or strong areas need to be known and widely disseminated for example;- Kyambogo University with teacher education, Engineering, Science education, Special Needs education.

Functional websites and being able to be seen globally; ranking may play a role.

Capacity to manage funds and to conduct research (staff capacity).

Demonstrable capacity to conduct multidisciplinary research including Policy research.

This is attractive to development partner funding to address societal challenges holistically.



CONCLUSION

Educational Institutions are emphasizing multidisciplinary research for complete and deep study of any problem hence serious and special attention is being paid towards selection of the Problem Topic (Problem identification).

Today, every society particularly educational Institutions have understood the importance of collaborative and multidisciplinary research when dealing with contemporary and future problems.

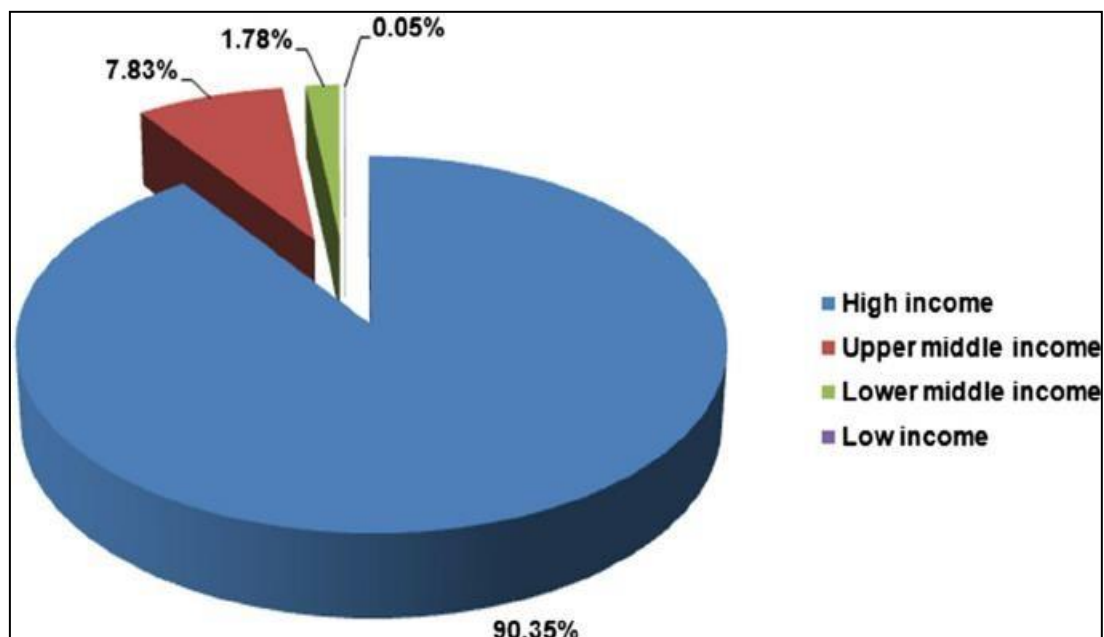
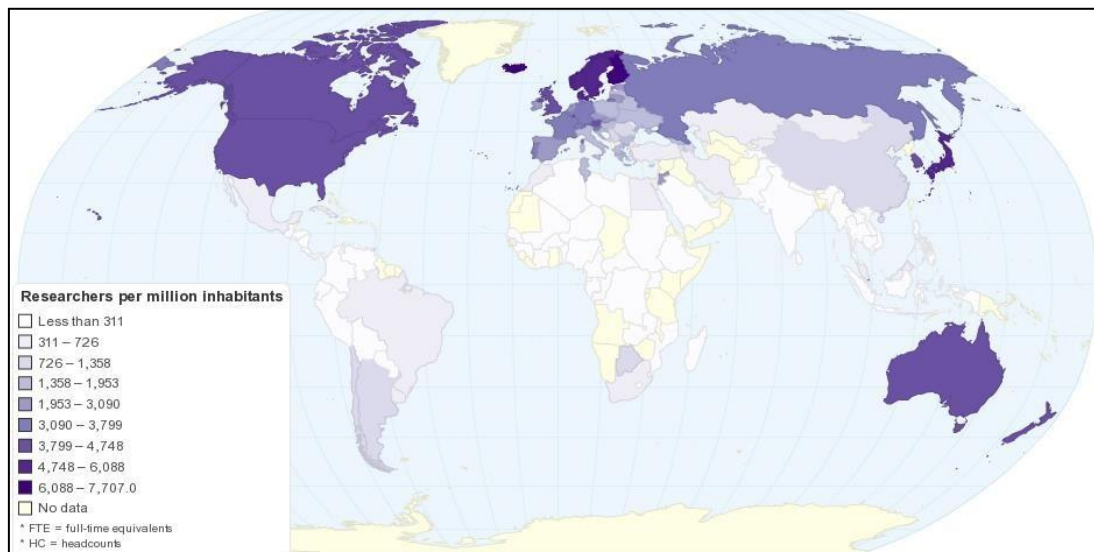
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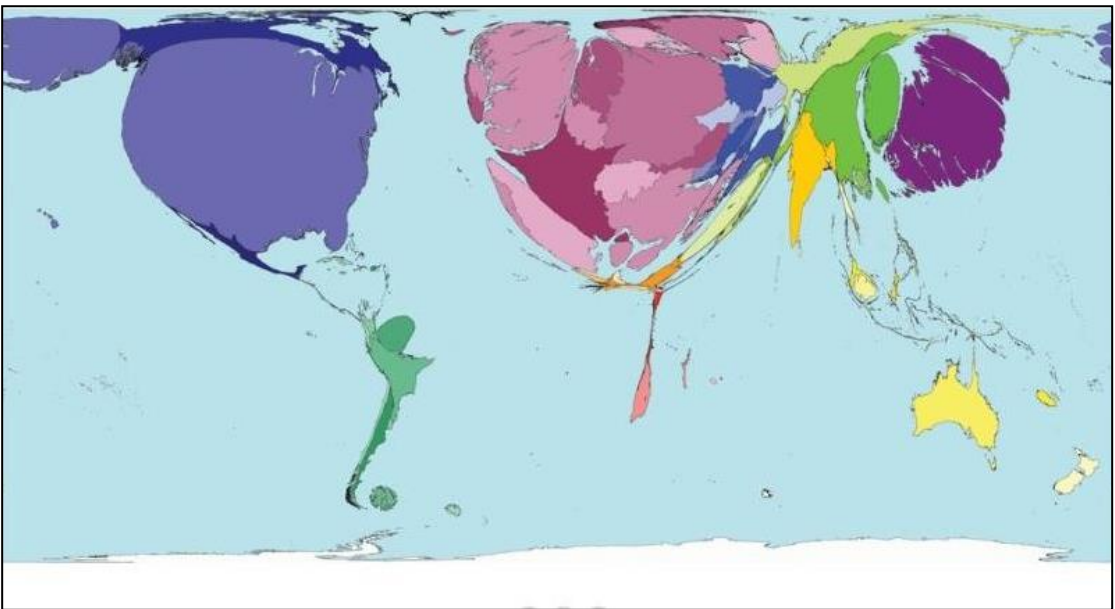
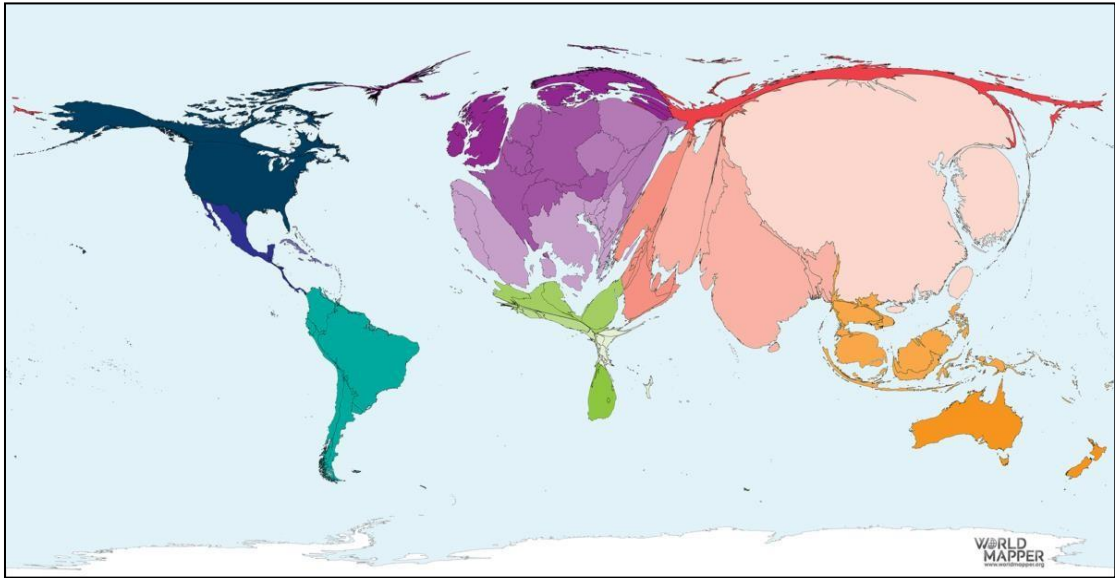


**Support for Research and Innovation in Universities, in light
of the effect of the pandemic**

**PRESENTED AT THE UGANDA VICE-CHANCELLORS FORUM
CONFERENCE ON 1ST OCTOBER 2021**

**BY PROF. BARNABAS NAWANGWE VICE-CHANCELLOR, MAKERERE
UNIVERSITY**





Research: The “Lost Mission” of African Universities” - Harris Andoh

“The first universities in Africa were established with the triple mission of teaching, research, and community engagement. However, between the early 1970s and 2000, teaching became the only de facto mission of many of these African universities.”

Regaining the “Research Mission” - Harris Andoh

“Since 2000, African universities have shifted policies and now embrace global changes in their missions. The advent of university rankings, internationalization, and the issue of massification have all prompted university administrators and national governments to reconsider the “lost” research mission.”

Challenges of doing research in sub-Saharan African universities: digital scholarship opportunities

Researchers in sub-Saharan Africa have poor salaries from government and private institutions of learning.

The research infrastructure is poor in facilitating research in higher institutions in addition to the limited access to information technology.

Whereas Sub-Saharan Africa lacks skilled researchers, there is a challenge of brain drain for the few professionals.

In addition to the challenge of teaching using pure or blended electronic means; evaluation and assessment of academic work electronically; electronic collaborative research; electronic communications, e-journals, e-books: and a variety of databases and digital libraries, sub-Saharan researchers are as well challenged with submission of articles, peer review and publication, all done electronically.

Strengthening Research in African Universities

Research in African Universities can be strengthened through Internationalization and collaboration among African universities, examples include ARUA and RUFORUM.

Staff Development and Research Training in African Universities in addition to improving the research facilities (Infrastructure) will strengthen research in African Universities.

Further on research management, Leadership and funding, supportive policies are all key aspects in strengthening research in African Universities.



Benefits of Engaging in Research

The benefit of engaging in research is to foster critical thinking and analytical skills through hands-on learning.

Through defining academic, career and personal interests research knowledge will be expanded for deeper understanding of chosen fields outside of the lecture room.

The engagement in research develops one-on-one connections with distinguished faculty in their field.

Importance of Research to a University

The importance of research to universities is to discover, elucidate and evaluate new knowledge, ideas, and the technologies essential in driving the future of society and humanity.

Research in a University fosters professional excellence in faculty and it is important for delivering outstanding student education and training.

Research at Universities improves quality of teaching, successful businesses thrive due to research and development.

Though funded research helps the economy grow because it opens up job opportunities, research offers the foundation for almost all government policies. Consequently, in Uganda there is no private sector capacity to fund research.

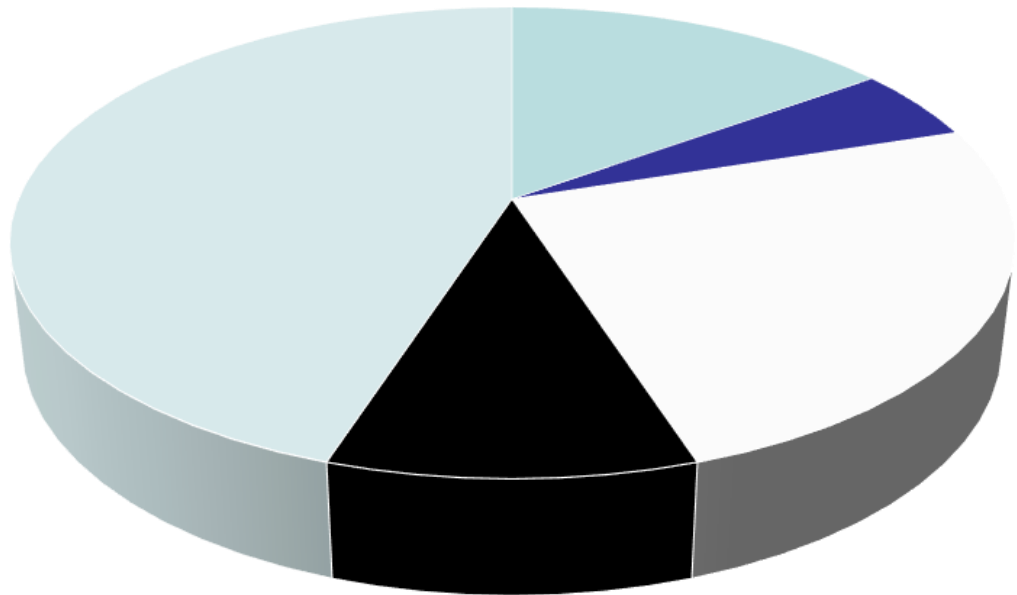
RESEARCH FUNDING AT MAKERERE UNIVERSITY

At Makerere University, the following institutions are the sources of funding; -

- i. Institutional Development Programmes (Sida, NORAD, Carnegie, etc.)
- ii. Bilateral Programmes (Makerere-Bergen, Makerere-Karolinska, Makerere CWRU, etc.)
- iii. Research Funding agencies (NIH, USAID, UKRI, SI, etc.)
- iv. Government of Uganda (RIF)
- v. Individual Applications



Funding Sources



Instit. Prog

Bilat. Prog

Agencies

Government

Individuals

ADVANTAGES OF GOVERNMENT RESEARCH FUNDING

The advantage of government research funding is to address national priorities, implement easier accountability, demonstrate allegiance to the country and present reliable visible results.



Examples of Innovations from the Research and Innovation Fund



The Bulamu Medical Ventilator during the launch by the Minister of Health



The Solar-powered Hands-free Recyclable Water Hand-washing Kit





Information seeking Behavior Secondary School Students during the lockdown in Uganda.
An APP developed by researchers from CHUSS.





Potato and Sorghum Value Addition

Conclusion

In conclusion, research is important for every university and the government of Uganda is the only sure source of research funding. Nevertheless, the private sector and Individuals can as well bring in most of the research funding, but capacity must first be built through government funding. Irrefutably, a research and innovations fund has to be opened for access to all universities in Uganda as a top priority.



UVC Forum Conference

RESOLUTIONS + ACTION POINTS

Prof. John Mugisha

Keynote Speech: Challenges of Doing Research in SSA Universities:
Digital Scholarship Opportunities

- Need to up the ICT infrastructure to support research and innovation
- Embrace blended T&L as part of a permanent new normal
- Increase collaborative research
- Aim to internationalise research (e.g. ARUA, RUFORUM)
- Increase research leadership and training
- Increase funding for research & innovation

Keynote Speech: Prof. Nawangwe (2)

- Government needs to set up a research fund open to all universities
- Enact supportive policies for research and innovation
- Universities need to establish research grants management units
- The Ministry of Science should allocate part of the government research funds to universities so that they can compete for this fund with proposals that can add value

Prof. Elly Katunguka: Collaboration, Multidisciplinary Research & Innovation

- Challenges posed by global challenges cannot be solved by research in a single discipline – hence need for multidisciplinary research
- Need for correct and proper definition of a research problem as *sine qua non* for good and helpful research
- Need for well defined MoU to guide collaborative efforts for research between universities. This should explicate the convergence of ideas and interests but also wthe roles that each party will play.
- Because different disciplines employ different methods for research



and aim to achieve divergent goals, there is need for different researchers to come together and agree on how to mix the methods and achieve multiple research goals

Prof. Katunguka (2)

- Need by researchers to gain insights into other disciplines because human problems are complex and multi-dimensional
- Skills development and training
- Improving the environment for doing collaborative research
- Need to consider postdoc training opportunities to further develop research abilities and enhance their contribution to development
- Need training for research supervisors especially postgraduate research;
- Improve quality of university lecturers and implement the NCHE requirement of having Lecturers with PhD

Prof. Katunguka (3)

- Universities need to start a Graduate Fellows scheme (retaining their best students) and mentor them to raise the level of their own human resource
- Build a research culture within a university community with incentivized research and publications
- Enhance infrastructure for research such as Labs, equipment etc so that they lead to credible results to be attractive to development partners and funding agencies
- Universities to collaborate and learn from leading institutions such as Makerere to build their own capacities.
- Institutions should have in place sound strategic plans because this is what research funders want to see first
- Functional websites showing areas of niche e.g. teacher education, medicine, etc.

Prof Katunguka (4)

- Efforts should be made to up the rankings because some



development partners consider this indicator with all its controversies

- Capacity to manage funds (with evidence of what you have managed)
- Strengthening governance structures because they are considered to be important
- Need to focus on problems that are complex and requiring multi disciplinary efforts to solve

Prof. Charles Kwesiga

Government, Private Sector and Stakeholder Participation in
Research & Innovations

- Universities should place themselves to solve the effects of Covid 19 pandemic
- Without universities coming up with credible research proposals, a gap is created for subterfuges to rise with quack research projects which cannot produce any tangible solutions
- Government needs to increase research and innovation funding to what is already in place; learning from Israel whose R&D expenditure is 0.4% of GDP compared to Uganda at less than 0.5%
- There is proof that with good investment in R&D, other known obstacles to development (war, insecurity, conflict, harsh geographical conditions) get effectively suppressed. This creates an urgent need to invest in R&D

Prof Kwesiga (2)

- Need to create our own appropriate technology and reduce dependence on foreign technology e.g. UIRI made face masks, PPE etc; Makerere efforts at Ventilators etc
- Need to make university education more relevant to industry in production of human capital and crafting curricular that feed into industry needs
- Need to support creation of a strong and robust private sector that can spur growth and lift the country from the current abysmal state we are in;
- Need to take a great leap forward jumping several steps to do



meaningful participation in the 4th Industrial revolution

Debate on presentations: Dr Olive Sabiiti

- Need for the VCs Forum to create a framework to direct and engender collaborative and multidisciplinary research
- Need to strengthen and leverage the RENU to support research and innovation especially in terms of ICT infrastructure
- Need for peer-reviewing among ourselves to raise quality and competitiveness which leads to attraction of R&D support
- Need to take research to a higher level of industrialization which is where tangible products and outcomes can come out
- Need to improve capacity to attract funding from non-government sources because government is bureaucratic and may not be favourable to disruptive research & innovation

