SciencePG
Science Publishing Group

Research Article

The Role of University Academic Innovations in Agriculture and ICT to the Country's Economic Transformation (A Case of Kapasa Makasa University)

Kashale Chimanga[1, *], Nchimunya Chaamwe[2]

[1]Department of Information Technology, Information Systems, Kapasa Makasa University, Chinsali, Zambia
[2]Department of Information Technology, Information Systems, Copperbelt University, Kitwe, Zambia

Abstract

In the recent past, Zambia has seen an increase in the number of institutions of higher learning and Kapasa Makasa University is one such Institution. Kapasa Makasa University (KMU) being the only public university in Muchinga province has put research and innovation at the helm of its daily academic activities. As a result the institution has between 2019 and 2021 developed a number of innovations, which if fully exploited by the government and private sector can have the potential to contribute significantly to the economic transformation of the country. In trying to actualize the implementation of these innovations, Management engaged various stakeholders in the industry to determine whether or not they can help to commercialize these innovations. As its motto state "Learn to Innovate", KMU has put so much emphasis on innovations in the areas of ICTs and Agriculture which if well enhanced can help to contribute significantly to the economic transformation of the nation. Against this background the current study seek to investigate the role of university academic innovations in to the country's economic transformation. To this effect a descriptive survey was conducted on the university population involving members of academic staff and students to determine the evolving role of university academic innovations on the country's economic transformation. The results established that lack of deliberate academic policies aimed at commercializing innovations, inadequate stakeholder's engagement (government and private sector), and lack of proper communication of innovation successes across internal and external audiences as well as limited financial resources are the main factors that hinder the innovations in universities from contributing to the country's economic transformation. Based on the findings the study recommends that there is need to create strong partnership between the university, government and the industry in order to further develop and commercialize the innovations in university. In addition, the university authorities need to create academic policies that are aimed at commercializing innovations as well as deriving a proper and well-coordinated mechanisms to communicate the innovations to both internal and external audiences. Finally the study also concludes that university management need to adequately fund innovations in the institutions if they are to make a positive impact to the economic transformation of the country.

Keywords

Innovations, Economic Transformation, Collaboration, Funding, Universities

1. Introduction

Zambia has in the recent past seen an increase in the number of institutions of higher learning and Kapasa Makasa University (KMU) is one such University. KMU is a public university located outside the line of rail in Muchinga Province. It became operational in 2016 under the administrative oversight of the Copperbelt University (CBU). The University was granted to CBU as a satellite campus in order to facilitate management systems and academic programme growth of the institution. In October 2020, KMU got delinked from the Copperbelt University and became independent.

Since its inception, KMU has put research and innovation at the helm of its daily academic activities. As a result the institution has between 2019 and 2021 developed a number of innovations, which if fully exploited by the government and private sector can significantly contribute to the economic transformation of the country. Most of the innovations done at KMU are in the area of Science and Technology with a particular focus on agriculture and Information and Communication Technology (ICT).

In an effort to actualize the implementation of these innovations, the university has continued to engage various stakeholders in the industry as well as government departments to determine whether or not they can help to commercialize these innovations. As the motto states "Learn to Innovate", KMU has put so much emphasis on innovations in the areas of ICTs and Agriculture and these innovations have the capacity to contribute significantly to the economic transformation of the nation. Against this background, the study sought to investigate the role of university academic innovations in areas such as agriculture and ICTs to the country's economic transformation. According to [1] if private sector and the government can collaborate with the universities, specialists with the skills that best respond to the industry need can be produced.

In support of a more strategic outlook on industry university partnerships, [2] bring to the forefront several key factors required for the success of policies in this aspect by establishing that a stable environment with transparent, predictable regulations, autonomy for universities, government incentives, rewarding and promoting the best universities to further encourage more deals between businesses and universities can significantly enforce the collaboration and thereby creating an enabling environment for the Universities to contribute to the economic transformation of the country.

1.1. Problem Statement

The problem of the study emerges that, despite Zambia having so many Universities that are involved in academic innovations in the areas of agriculture and ICTs not much a has been done to create value and make these innovations contribute to the economic transformation of the country.

According to [3], countries with greater entrepreneurship and innovation capacities perform better economically, and given that universities are sources of innovation, collaborations between industry and universities can lead to greater economic growth. UNESCO also found that improving the quality of education in learning Institutions, by encouraging them to become more involved in the process of industrialization of the country can lead to sustainable economic development [4]. Based on this background, this study sought to investigate the role of University Academic Innovations in Agriculture and ICT in Zambia's economic transformation.

1.2. Objectives of the Study

The following were the objectives of the research:
1. To determine the extent to which communicating university academic innovations across internal and external audiences of the university can contribute to the country's economic transformation.
2. To establish whether or not the universities have deliberate academic policies that aim to commercialize innovations.
3. To determine whether there exist any partnerships between the university, government and the industry.
4. To determine whether or not there is adequate funding for innovations in the university.

1.3. Significance of the Study

The findings of this study have the potential to help universities understand the potential of their innovations in contributing to the economic transformation of the country. In addition, the study provide adequate information about the role of innovations in ICT and agriculture could play in the Country's economic growth. The study will also contribute to the existing literature on university innovations and the growth of the countrys economy.

1.4. Limitations of the Study

It would have been better to consider the universities dotted across the whole country, however due to limited resources and time constraint; the focus was limited to Chinsali District of Muchinga province. The study was also limited by focusing on the ICT and agriculture innovations.

2. Literature Review

According to [5] economic development is about fostering innovation. Estimates by the [6] indicate that as much as 50 per cent of long-term economic progress in its member countries can be attributed to innovation, and this contribution is expected to increase.

Another study by World Bank reviewed that Innovation and entrepreneurship are progressively seen as essential elements for economic and social prosperity [7] The bank reviewed that Innovation is a powerful source of improved productivity and competitiveness, helping to reduce poverty and can stimulate long-term economic progress in any country.

According to [7] a non-partisan leadership organization of corporate CEOs, university presidents, labor leaders and national laboratory directors committed to advancing competitiveness in the global economy innovation will be the single most important factor in determining success throughout the 21st century. The European Parliament envisioned that the future of the countries depends increasingly on their ability to successfully generate innovation and science [8].

In a related studies [9] established that Innovation is the process of putting valuable ideas into useful form and ensuring that users adopt them. Innovation assumes "a new match between a need and a solution; the novelty can be in the solution or the need, or in a new marriage of an existing need and existing solution. The novelty means, new-to-the-world ideas in the technical, market, or business model domain. Innovation is about generating novelty and introduce it into the socio-economic system [11].

The study [10] established that there are many promising psychological interventions on the horizon, but there is no clear methodology for preparing them to be scaled up. Drawing on design thinking, the present research formalizes a methodology for redesigning and tailoring initial interventions. The researchers test the methodology using the case of fixed versus growth mindsets during the transition to high school [10]. The current research provides a model for how to improve and scale interventions that begin to address pressing educational problems. It also provides insight into how to teach a growth mindset more effectively.

Furthermore, according to the framework, innovation refers to the translation of lower-value resources into products, contributing to economic development. In today's changing markets, only those organizations that continuously innovate will succeed [12], and sustain their long-term business competitive advantage.

Finally, [13] in his study revealed that countries that succeed in developing and sustaining strong innovation capabilities and effective systems of governance do well economically while those that fail tend to fall behind. The European Central Bank [14] also stressed the same point when they established that innovation is an essential driver of economic progress because leads to higher productivity resulting in benefits for consumers, businesses and the economy as a whole. Fitzgerald also revealed that innovation is the true engine of economic growth [15].

Based on this background, the current study aimed at investigating the role of university academic innovations in agriculture and ICT to the country's economic transformation. For decades universities have been addressing this challenge

without a clear focus on specific areas of innovation suitable for economic transformation such as agriculture and ICT [19]. This study attempt to address this knowledge gap by adopting a Triple Helix (TH) model.

The Triple Helix (TH) model was proposed by [18] to university-industry-government relations for explaining structural developments in knowledge-based economies. According to the proponents of this model, in a knowledge-based economy as against a political economy, the structure of society is continuously upset by transformations which originate from the techno-sciences. This model will guide the study in measuring the extent to which innovation can become systemic in shaping the economic landscape of the country.

3. Conceptual Model

From the literature review above, the following model as shown in Figure 1 was adopted for this study. The model below depict communicating university academic innovations, academic policies that aim to commercialize innovations, partnership between the university, government and the industry as well as funding for innovations as being the main factors that can help university innovations to meaningfully contribute to the economic transformation of the country.
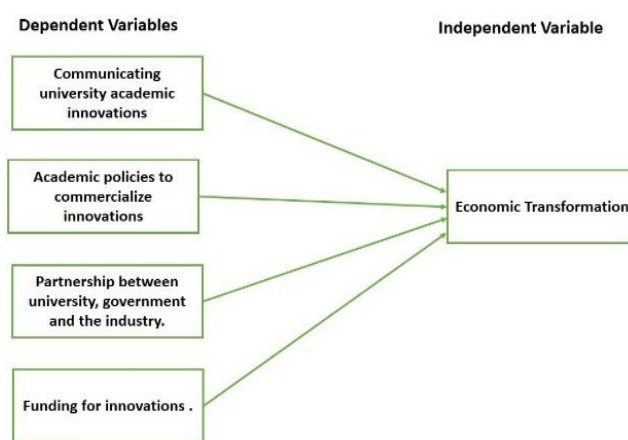
Source: Authors (2022)

Figure 1. Conceptual Framework.

4. Research Method

4.1. Research Design

For the purpose of this study, a descriptive survey design was adopted and all the key stakeholders in the agriculture and ICT at the University were involved. According to [16, 17] descriptive survey design enables the researcher to collect, analyze and link both qualitative and quantitative data in a single study.

4.2. Population and Sample Size

A total population of 134 respondents involving students, staff members and other stakeholders were targeted for this study. Out of this population, a sample size of 100 was arrived at using the raosoft sample size calculator (http://www.raosoft.com/samplesize.html)

4.3. Instrument for Data Collection

The study used questionnaires for data collection. The questionnaires comprised of a five-point likert scale which comprised of scales represented as 1 (Strongly disagree), 2 (Disagree), 3 (Neither Agree nor Disagree), 4 (Agree) and 5 (Strongly agree). The questionnaires used closed-ended questions and covered all the issues relating to the role of University Academic Innovations in Agriculture and ICT and how they can contribute to the country's economic transformation.

4.4. Data Analysis

The data collected was analyzed and coded using the statistical package for social sciences (SPSS) version 2.0 software by conducting an analysis using descriptive statistics, correlations, and linear regression analysis. SPSS is a windows based program that can be used to perform data entry and analysis; and to create tables and graphs among other things.

5. Results Presentation and Analysis

5.1. Response Rate

For this study, 100 questionnaires were distributed to the targeted respondents. Out of the 100, 86 sample respondents filled in and returned the questionnaire while 14 did not return the questionnaires. The 86 represented a response rate of 86%. The response rate demonstrated the willingness of the respondents to participate in the study. Figure 2 below shows the response rate:
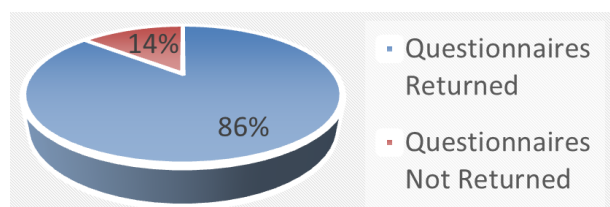

Figure 2. Response rate from respondents.

5.2. Demographic Information

The demographic questions sought to obtain general information from the respondents on their gender:

5.2.1. Gender of the Respondents

The study sought to find out the distribution of gender of the respondents. According to the analysis, 57 (66.3%) respondents indicated that were male while 29 (33.7 %) of the respondents indicated that were females. The results are shown in Figure 3 below.
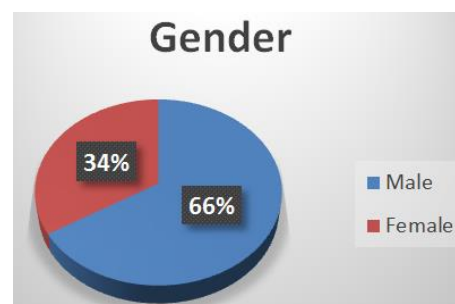

Figure 3. Gender of Respondents.

5.2.2. Types of Innovations

The study sought to know what areas of innovations the university is involved in so as to establish the extent to which they can be supported to contribute to the economic transformation of the country. Figure 4 below shows the results:
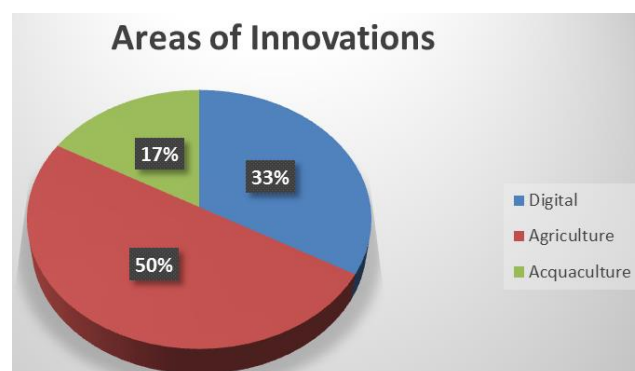

Figure 4. Types of innovations.

5.3. Descriptive Analysis of Variables

This section shows variables as well as statistics from the data that was collected on each of the variables.

5.3.1. Reliability Tests

The reliability of the data collected was investigated using Cronbach's alpha. Cronbach's alpha's values for the variables considered in the study is as presented in Table 1 below. Four variables were under consideration in this study; these include; Communicating university academic innovations, Academic policies to commercialize innovations, Partnerships between the university, government and the industry

and Funding for innovations. The Cronbach's scores for the

variables were 0.762, 0.795, 0.765 and 0.908 respectively.

Table 1. Reliability, normality and mean values.

Variable	Mean Score	A	Z-values	
			Skewness	Kurtosis
Communicating university academic innovations	5.219	0.896	-0.154	0.618
Academic policies to commercialize innovations	4.181	0.793	-0.380	1.584
Partnerships between the university, government and the industry	4.613	0.907	-0.441	1.243
Funding for innovations	2.372	1.916	-0.660	1.195
Economic transformation	2.210	0.951	-0.374	1.480

According to the results depicted in Table 1, the internal consistence of the four variables under investigations was 0.896, 0.793, 0.907, 0.916 and 0.751 respectively. The results shows that all the variables, Communicating university academic innovations, Academic policies to commercialize innovations, Partnerships between the university, government and the industry and funding for innovations are considered reliable as their Cronbach's values were all above 0.70. This implies that, these variables are suitable enough to ensure that innovations contribute to the economic transformation of the country.

5.3.2. Test of Validity

At the same time, to ensure the validity of the correlation, the normality test was conducted using the skewness and kurtosis and Z-values as depicted in Table 1 above. According to the results shown in the table on each variable, the Z-values are within the range of -1.96 and +1.96. This shows that all the variables involved in the study are considered normally distributed.

Table 2. Pearson correlation (n=86).

Variables	Sig.	Economic transformation
Communicating university academic innovations	R	0.564
	Sig. (1-tailed)	0.000
Academic policies to commercialize innovations	R	0.320
	Sig. (1-tailed)	0.022
Partnerships between the university, government and the industry	R	0.304
	Sig. (1-tailed)	0.008
Funding for innovations	R	0.514
	Sig. (1-tailed)	0.010

Sig. (1-tailed) at 95% Confidence level

The study sought to establish whether or not there was statistically significant relationship independent and dependent variables considered in the study. Table 2 above shows the Pearson correlation with the regression and significant values obtained on each of the variables. According to the results, there was statistically significant relationship between communicating of University academic innovations and economic transformation (r=0.564, p<0.05). The table indicates that, there was no significant relationship between entrepreneurial passion and opportunity identification and exploitation (t = 4.883, p < 0.05). The study revealed a moderate relationship between academic policies to commercialize innovations and

economic transformation (r = 0.320, p > 0.05). The table also indicates that, there was also a moderate relationship between partnerships between the university, government and the industry and economic transformation (r = 0.304, p < 0.05). And finally, with regards to funding, the study indicate that there was significant relationship between funding for innovations and there contribution to the economic transformation of the country.

A multiple regression was employed with economic transformation as the dependent variable, Communicating university academic innovations, Academic policies to commercialize innovations, partnerships between the university, government and the industry and Funding for innovations as independent variables. Table 3 below shows the regression results.

Table 3. Regression Analysis.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701a	0.563	0.542	0.6285

Predictors: (Constant), communication of innovations, Academic policies to commercialize innovation, Partnerships between the university, government and the industry, Funding for innovations

b. Dependent Variable: Economic transformation.

The result designates the model's three independent variables (economic transformation as the dependent variable, communicating university academic innovations, and academic policies to commercialize innovations, partnerships between the university, government and the industry and funding for innovations) that were under investigation because they were perceived as predictors of country's economic transformation. The study revealed that the factors under this study explains about 56% of the total economic transformation that can be achieved through innovation as represented by the R^2. This means that the four independent variables can contribute about 56% to economic transformation of the country whereas other factors not studied in this research contribute about 44% in the present study.

6. Results Discussion

The purpose of this study was to assess the role of University Academic Innovations in Agriculture and ICT in the country's economic transformation. According to the results depicted in Table 1 above, the mean values of all the four variables of academic innovations considered to have an effect on the economic transformation of the country included 5.219, 4.181, 4.613, 2.372 and 2.210respectively. According to the results obtained, it was observed that the majority of the respondents indicated that communicating university academic innovations across internal and external audiences of the university can contribute to the country's economic transformation. The reason for this is that, potential customers from the industry could take advantage of these innovations and scale them thereby contributing to the country's economic development, the finding of this study correlate with that of World Bank (2013) which established that Innovation is a powerful source of improved productivity and

competitiveness thereby helping to reduce poverty and can stimulate long-term economic progress in any country. The respondents further reviewed that if universities can have deliberate academic policies that aim to commercialize research output and innovations, their contribution towards the country's economic transformation can be achieved (M=4.181). The respondents were of the view that, deliberate academic policies to commercialize innovations should be implemented in the universities. This finding, is supported by Trott (2016) who said that innovation assumes "a new match between a need and a solution which the university can enforce. With regards to partnership between the universities, government and the industry, it was established that there is no much partnership between the trio (M=2.372). It was argued that the lack of partnership between these institutions makes it hard for the innovations being undertaken in the universities to contribute effectively to the economic transformation of the country. Finally the study reviewed that, funding for innovations are not readily available thereby making it hard for the innovations done in the universities to contribute to the economic transformation of the country (M=2.210). This study is supported by the study conducted by Santos and Michele Cincera (2015) whose results indicate that public support for innovation can be analyzed from four dimensions: (i) financial support for research and development activities; (ii) development through innovation; (iii) support for sectorial programs; and (iv) university–industry–government collaboration.

7. Conclusion

The objective of this study was to determine the role of university academic innovations in Agriculture and ICT to the country's economic transformation. To this effect, a descriptive survey was conducted on 100 randomly selected

stakeholders in the field of agriculture and ICT to understand their views on how the innovations being carried out can be scaled up in order to contribute to the economic transformation of the country. The results established that communicating university academic innovations across internal and external audiences of the university can contribute to the country's economic transformation of the country as the innovations will be exposed to potential clients who could adopt them. It was further observed that deliberate academic policies that is aimed at commercializing research output or innovations can help to guarantee that these innovations add value to the country and consequently contributing to the economic transformation. The study also concluded that, lack of partnership between the universities, industries and government have a negative impact on how academic innovations in agriculture and ICT can help to transform the economy. Finally, the study revealed that, there is inadequate funding in the universities towards innovations particularly in the area of agriculture and ICT.

8. Recommendations

Based on the findings the study recommends the following:
1. That there is need to create strong partnership between the university, government and the industry in order to further develop and commercialize the innovations in universities.
2. In addition, the university authorities need to create academic policies that are aimed at commercializing innovations as well as deriving a proper and well-coordinated mechanisms to communicate the innovations to both internal and external audiences.
3. Finally the study also concludes that university management need to adequately fund innovations in the institutions if they are to make a positive impact to the economic transformation off the country

9. Areas of Further Research

Considering the fact that this is the first study to look at the Role of University Academic Innovations in Agriculture and ICT in the country's economic transformation at the university, there is more study that is needed to be done in the following areas: A study to determine how the use of ICTs in can help in the economic transformation of the country, a similar study should be conducted on the application of digital technology on agriculture and its impact on economic transformation of the country.

Acknowledgments

Conflicts of Interest

The authors declare no conflicts of interest with regards to this work.

References

[1] Sampson, H. A., Aceves, S., Bock, S. A., James, J., Jones, S., Lang, D., ... & Wallace, D. (2014). Food allergy: a practice parameter update—2014. Journal of Allergy and Clinical Immunology, 134(5), 1016-1025.

[2] Edmondson, A. C. (2012). Teaming: How organizations learn, innovate, and compete in the knowledge economy. John Wiley & Sons.

[3] Müller, M. (2015). Assemblages and actor-networks: Rethinking socio-material power, politics and space. Geography compass, 9(1), 27-41.

[4] United Nations Educational, Scientific and Cultural Organization (UNESCO). (2016). Global education monitoring report summary 2016: education for people and planet: creating sustainable futures for all.

[5] Bercovitz, J., & Feldman, M. (2006). Entpreprenerial universities and technology transfer: A conceptual framework for understanding knowledge-based economic development. The journal of technology transfer, 31, 175-188.

[6] Union (2007) Hyper-connectivity: Intricacies of national and international cyber securities, 248.

[7] World Bank Group. (2013). Global financial development report 2014: Financial inclusion (Vol. 2). World Bank Publications.

[8] Hanouz, M. D., & Khatib, S. (2010). The Arab world competitiveness review 2010. Geneva: World Economic Forum.

[9] Kassim, H., Connolly, S., Dehousse, R., Rozenberg, O., & Bendjaballah, S. (2017). Managing the house: The presidency, agenda control and policy activism in the European Commission. Journal of European Public Policy, 24(5), 653-674.

[10] Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., ... & Dweck, C. S. (2016). Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school. Journal of educational psychology, 108(3), 374.

[11] Fransman, J. (2018). Charting a course to an emerging field of 'research engagement studies': a conceptual metasynthesis. Research for All, 2(2), 185-229.

[12] Amabile, T. M., & Pillemer, J. (2012). Perspectives on the social psychology of creativity. The Journal of Creative Behavior, 46(1), 3-15.

[13] Fagerberg, J., & Srholec, M. (2008). National innovation systems, capabilities and economic development. Research policy, 37(9), 1417-1435.

[14] Hartmann, P., & Smets, F. (2018). The first twenty years of the European Central Bank: monetary policy.

[15] Claeys, G., & Demertzis, M. (2017). How should the European Central Bank 'normalise'its monetary policy? (No. 2017/31). Bruegel Policy Contribution.

[16] Nteere, K., Namusonge, G., & Mukulu, E. (2012). Pedagogical Approaches Determining the Performance of Entreprenurship Education in Kenya Public Universities.

[17] Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. Journal of counseling psychology, 52(2), 224.

[18] Ranga, M., & Etzkowitz, H. (2015). Triple Helix systems: an analytical framework for innovation policy and practice in the Knowledge Society. Entrepreneurship and knowledge exchange, 117-158.

[19] Yu, W. (2017). Creative industries development and efficiency in China. In MATEC Web of Conferences (Vol. 100). EDP Sciences.