

Nexus Between University Financial Sustainability and Commercialization of Research Outputs in South-West of Nigeria

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ABSTRACT

The nexus between university financial sustainability and commercialization of research outputs in South-West of Nigeria was investigated in this study. Three research questions and one hypothesis guided the study. A correlational research was applicable and adopted for the study. The population of this study comprised the management and academic staff of public universities in South-West of Nigeria. Multi-stage sampling technique consisting of simple random sampling was used to select 8 universities comprising three Federal and five State owned universities and stratified sampling technique was adopted to select 8 deputy vice-chancellors and a total of 1292 academic staff making a total of 1300 respondents as study sample size. Self-developed questionnaire title: Questionnaire on University Financial Sustainability and Commercialization of Research Outputs with 0.91 was used for data collection. A total of 1300 copies of the instrument was administered and only 1200 were retrieved. Descriptive statistics of mean and standard deviation were adopted in answering research questions while hypothesis was tested using Pearson Product Moment Correlation. The findings indicated that the level of universities financial sustainability and research output commercialization in South-West of Nigeria were low. Also, that academic staff capacity building, academic staff perception towards research output commercialization, entrepreneurial innovation and team work, university-industrial mutual relationship, adequate funding and university technological advancement were among the likely success determinants of universities research outputs commercialization in South-West of Nigeria. The finding further revealed that there was significant relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria ($r = 0.909, p < .05$). The study recommended amongst others that universities need to widen and deepen engagement with industry and other potential financial supporters at the inception stage of any research with commercial potential as active partners.

Keywords: University Financial Sustainability, Commercialization of Research Outputs, Public Universities, South-West

INTRODUCTION

Financial sustainability is described as the organization's ability to push annual budgets without constraints. Within the context of universities, financial sustainability implies that these institutions generate revenue that is greater than the costs of providing educational services. That is, the income generated by these universities is sort of what is required to cater for salaries, wages and allowances of staff additionally to procuring educational materials and services (Ng'ang'a & Kibati, 2016). Financial sustainability seems to represent one of the significant challenges confronting government owned universities in Nigeria. As such, institutions with robust and sound financial structures and stable incomes are those which can fulfill their missions and answer challenges caused by dynamic environment. Thus, financial sustainability aims at ensuring that a

learning institution is even a position to urge adequate income to enable the institution to discharge its operations efficiently and invest in its academic and research activities without over relying on external sources of funding like government subventions. It is noted that institutions of upper learning like universities should inspect three key pillars so on confirm financial sustainability, that are identifying and better understanding of costs of all activities and projects, maintain reasonably diversified income structure and more so sufficient, reliable and sustainable public funding with adequate accountability measures (Estermann & Pruvot, 2011).

Public universities within the foremost developed and a couple of developing countries have recognized that income from industry and trade are becoming increasingly significant sources of revenue which slowly account for a greater proportion of total revenue towards financial sustainability (Kalomo & Chama-Chiliba, 2022). Universities around the world are typically funded either by the taxpayer or by individual students and their families. However, university education has become so costly everywhere that there is much debate today about which funding model or combination is economically feasible and sensible, realistic and moral in any given context towards the attainment of monetary sustainability. University funded by the state or federal budget differs relying on the character of the funding framework. For a couple of countries, funding for university education is provided by state or local budgets that use their own budgetary tools, although certain funds might be obtained from the federal or national budget, which is that the case in Germany, the UK, Sweden and Norway. Throughout the United States of America (USA), about 50 per cent of the overall funding for university education comes from public sources as compared, in Germany, the share of state support for university education is 94%, with the Federal and States accounting for 88.7% of the support, while private sources buy 1.9% of the funding (Maria & Bleotu, 2014).

Developing countries around the world with universities education funding in most cases being supported only by central government budgets, for instance, in Zimbabwe, government funding of the university sector constitutes about 40% of the institutions' income while in Nigeria government allocates a paltry sum of 5 – 7% of the whole budget to education, as against the recommended United Nations standard of a minimum of 27% of annual budget of a nation to education. So, the extent of commitment of resources to education doesn't match our desire for educational development. One of the idea causes of the matter of inadequate funding is as a results of state policy of abolition of tuition fees in Nigerian federal universities in 1977. Today, there is an unprecedented growth of federal universities cum students' enrollment/ population, without a corresponding increase within the budgetary allocation. Public opinions have clamoring for re-introduction of tuition fees to federal universities in Nigeria as a way of putting an end to annual ASUU strike mostly caused by inadequate funding by the Federal government; however, (state and privately owned universities have already introduced their own). The matter of inadequate funding has led to a general decay in infrastructural development and maintenance. This seems to be affecting the financial sustainability of the public universities in Nigeria. Records have shown that this among other factors fuelling annual ASUU strike within the public universities. Literature have suggested that

for public universities in developing countries to experience financial sustainability; the system (universities) must begin to look inward as the way to extend their financial status and one of such readymade avenues is through the commercialization of research output (Kalomo & Chama-Chiliba, 2022).

University research may be a crucial source of great technological innovations that have commercial value (Khademia & Ismaila, 2013). From the knowledge economy point of view, universities are mentioned as talent promoters, which are operating towards building such capacities for nations and regions to survive and prosper during this context (Wonglimpiyarat, 2010). Moreover, the commercialization of research output is treated to be because the method during which ideas, knowledge, and innovations would be conveyed to tangible assets including benefits that satisfy society and economy at large scale.

The commercialization of university research output is thus a key element of the innovation system both as an individual's capital provider and a seed-bed of latest firms; and to know the benefits of knowledge and to receive returns from these investments, the resulting innovations or inventions must be sold, or commercialized (Ayisi, Kivengea & Ombakho, 2016). For emerging countries, the creation of conditions conducive to innovation and successful technology transfer is not any more a choice, but a crucial factor that can drive university financial sustainability (Rodriguez-Pose & Hardy, 2014). Research is thus, a crucial component of the mission of universities, and indeed academic institutions conduct a substantial volume of research that is funded by government, industry and philanthropic agencies (Vanderford & Marcinkowski, 2015). The commercialization of research output should even be a key component of universities research mission such novel ideas, knowledge, skills, innovation, technological advances and products, particularly so within the enabling technologies like information and communications technologies, biotechnology and nanotechnology which can enter the marketplace for the advantage of a selection of stakeholders including inventors, universities and society. Thus, the assembly, distribution and use of knowledge and knowledge will increasingly be a distinguishing factor of strong economies and robust societies within the 21st century.

Across the world, universities are therefore being positioned as strategic assets in innovation and economic competitiveness, and as problem solvers of socio-economic challenges affecting their countries, thus placing them at the centre of the national innovation systems (OECD, 1997). Traditionally, teaching and research are the universities main roles. However, commercialization of research output or entrepreneurial science also mentioned as, technology/knowledge transfer, third stream, third mission or engagement, has emerged as an extra role for universities as stimulators and facilitators of knowledge transfer (Perkmann & Salter, 2012). The third stream is about the interactions between universities, industry and thus the rest of society, and should be said to be the stimulation and direct application and exploitation of knowledge for the advantage of the social, cultural and economic development of society (Ayisi, Kivengea & Ombakho, 2016). According to Ghebregiorgis and Mehreteab (2018), commercialization of research output is, in effect, the process of converting the

output of research and development into products that can be exposed to consumer markets, aiming to increase their odds of capturing demand in those markets and thereby generating sales and revenue. The sales and distribution of these new innovative products ultimately generate economic benefits not only for the developers and marketers of the new products, but also the end user, and for the overall economy (Nordicity and The Evidence Network, 2012).

More specifically, Downie and Herder (2007) defined commercialization of research output as the conversion of research results into products, services, and processes that can be the object of commercial transactions. Transferring the knowledge and skills between universities and business and the wider community increases the economic and social returns from this investment. Academic knowledge is essentially a global public resource, and highly educated workers are the primary source of application of global academic knowledge to the domestic economy. This knowledge may be used to generate innovation, and that this innovation leads to productivity improvements in the economy. These productivity improvements translate directly into economic growth, and, hence, standards of living (Ghebregiorgis & Mehreteab, 2018).

Minh and Van (2022) lamented that the efficiency of commercializing research output in universities is not high in developing countries. The rationale is that universities almost exclusively specialize in training and scientific research tasks. Additionally to the active communication system, modern universities within the world also specialize in other jobs like linking with the business and gradually play an important role within the economic development of the country ethnic. Accordingly, many universities have focused on the commercial exploitation of recent companies through scientific research activities, which not only greatly contributes to their revenue size but also to process of development and process of providing cutting-edge technology upgrades to industry players. Among the models of commercialization of scientific research, the establishment of subsidiary enterprises by universities is taken under consideration an important mechanism to reinforce this efficiency. This was first developed in England in the nineteenth century and quickly gained attention and application in developed countries around the world (Minh & Van, 2022).

Studies of Khademia and Ismaila (2013) found that the success of university research output commercialization is influenced by several factors including researchers' perception, time, entrepreneurial team, networking, technology stage, funding, and market research; while Ayisi, Kivengea and Ombakho (2016) assessed the initiatives to commercialize research outputs by Kenyan universities, a cross-sectional study was administered in 17 well established universities (15 public and a few of private), all accredited by the Commission for University Education, Kenya. They acknowledged that the bulk universities are taking precursory steps to incentivize and encourage entrepreneurial activities among their academic staff and students, albeit the extent of resources dedicated to them is low. Ghebregiorgis and Mehreteab (2018) findings indicated that commercialization efforts result in substantial benefits such as increased industrial growth in revenues, net income, and number of employees;

better health and environment and improved quality of life by obtaining certain health and safety products, services, and processes; and more general economic growth leading to lower taxes and greater individual wealth overall. The paper further argued that commercialization of research output could lead to an improvement in a country's competitive position regionally or globally. Bogovin and Vidishcheva (2021) revealed that the commercialization of research output and development outcomes are indispensable to the strategic development of any organization which the insufficiently effective realization of innovation potential in Russia is actually because of the detachedness of innovation activity in education institutions from practice and a scarcity of interest from business – a key agent of innovation commercialization. Parker (2022) assessed the impact of public university commercialization on research engagement and practice relevance and revealed that university research now primarily conducted for the private rather than public good, researchers being subject to and tailoring their endeavors to evolve with proliferating metrics focused university control systems. Irani, Hayak and Asetmal (2018) investigated barriers to commercializing researches and innovations in East Azerbaijan University with AHP Techniques and providing appropriate strategies and found that cultural barriers and international exchange of knowledge were among the various factors affecting university ability to commercialize research output. Ismail and Sidek (2019) examined determinant factors for commercializing research products within the Malaysian public universities and located that impactful factors with regard to facilities and supports from the university, competency of the tutorial researcher, innovative research product and a strong collaboration between university and industry as factors predicting research output commercialization. Abdulmalik (2020) findings indicated that there's weak and unorganized institutional framework to midwife and nurture linkages between university and industry. Ibeme (2020) examined the effect of linkages between university and industries on commercialization of innovations of upper education in Nigeria with evidence from Enugu State, South-East Nigeria and thus the author concluded that government policies had significant effect on the quantity of property rights sold or bought; that human resource development had significant effect on the quantity of scientific conferences or training sponsored by the government or firms. Globally, despite significant numbers of studies on the university financial sustainability and commercialization of research outputs, less attention are reported among public universities in South-West of Nigeria. This study was an effort to filled the knowledge gap created; therefore the necessity for the study.

Statement of the Problem

Public universities in Nigeria have been facing series of challenges such as brain-drain, blockages university autonomy, inadequate financing, deteriorate infrastructure among others. Evidences have revealed that inadequate financing of public universities in Nigeria seems to be among the factors fuelling annual ASUU strikes in Nigeria. Even, observations revealed that part of the reasons given Nigeria set back in terms of technological advancements is the lopsided attitudes of the government towards adequate

funding of universities education in the country. However, government with support of ASUU innovation and ideas have developed policies that seem to be aiding financial status of the universities through the creation of the Tertiary Educational Trust Fund (TETFund) in which public limited companies in the country have to pay a certain percentage of their annual profit in financing education in the country. Despite that, the issue of inadequate university financial sustainability still persists. This challenge motivated the researchers to consider possible ways public universities could enhance their financial sustainability in Nigeria. Therefore, this study was an attempt to examine the nexus between university financial sustainability and commercialization of research outputs in South-West of Nigeria.

Objectives of the Study

The main objective of the study was to examine the nexus between university financial sustainability and commercialization of research outputs in South-West of Nigeria. Specifically, the study sought to examine the:

1. Level of universities financial sustainability in South-West of Nigeria.
2. Provision put in place for universities' research outputs commercialization in South-West of Nigeria.
3. Success determinants of universities research outputs commercialization in South-West of Nigeria.
4. Relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria.

Research Questions

1. What is the level of universities financial sustainability in South-West of Nigeria?
2. What provisions are in place for universities' research outputs commercialization in South-West of Nigeria?
3. What are the likely success determinants of universities research outputs commercialization in South-West of Nigeria?
4. What is the relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria?

Hypothesis

There is no significant relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria.

METHODOLOGY

The area of study was South-West of Nigeria. The region has six states (Lagos, Ogun, Osun, Ondo, Ekiti and Oyo) and dominated by Yoruba people. More reasons some called the region Oduduwa or Yoruba nation. South-West of Nigeria has a total of 47 universities comprised of eight Federal, 12 states and 27 private universities. A correlational research was applicable and adopted for the study. The justification behind the usage of descriptive survey research design was that the opinions or responses of stakeholders in universities system were needed towards achieving objectives of the study. The population of this study comprised the management and academic staff of

public universities in South-West of Nigeria. Multi-stage sampling technique consisting of simple random sampling was used to select eight universities comprising three Federal and five State owned universities and stratified sampling technique was adopted to select eight deputy vice-chancellors and a total of one thousand, two hundred and ninety-two academic staff making a total of 1300 respondents as study sample size.

A researcher' self-developed questionnaire title: Questionnaire on University Financial Sustainability and Commercialization of Research Outputs (QUFSCRO) was used for data collection. The instrument (QUFSCRO) was divided into four subsections. Section 1 was based on demographic characteristics of the respondents such as gender, university name, highest qualifications, status and length of service. Sections 2, 3 and 4 presented items on the level of universities financial sustainability, level of universities research outputs commercialization and the success determinants of universities research outputs commercialization. The instrument (QUFSCRO) was validated by experts from Enugu State University of Science and Technology, Agbani, Enugu, Nigeria. Test and re-test methods were carried out among 40 academic staff of Lagos State University (LASU), Lagos State. The data collected were subjected to Pearson Product Moment Correlation (PPMC) and a reliability coefficient of 0.91 was realized. This was a proof that the instrument (QUFSCRO) can elicit required and needed data towards achieving objectives of the objectives. Respondents were briefed on the reasons for the study and procedures in filling the questionnaire and these were done through the help of eight research assistants. However, administration of the instrument (QUFSCRO) took the researchers two months before completion. A total of 1300 copies of the (QUFSCRO) were administered and only 1200 were retrieved. Success rate was 92.3% while mortality rate was 7.7%. Data analyses were based on success rate. Descriptive statistics of mean and standard deviation were adopted in answering research questions while hypothesis was tested using Pearson Product Moment Correlation (PPMC).

RESULTS

Research Question 1

What is the level of universities financial sustainability in South-West of Nigeria?

Table 1

Descriptive statistics on the level of universities' financial sustainability in South-West of Nigeria (n = 1200)

Items	Mean	SD	Decision
University income improve overtime on			
Internal Income generation	2.87	.896	Agreed
Student fees	3.13	.820	Agreed
Research and consultancy	1.87	.495	Disagreed
Business ventures	2.13	.482	Disagreed
Research output commercialization	1.88	.718	Disagreed
Cluster Mean	2.38		

Source: Field Survey, 2022

Result from Table 1 shows that out of five items raised, only two were agreed by the respondents while they disagreed with the three items. The cluster mean is 2.38 which is

less than bench mark mean value of 2.50. The implication of this was that the level of universities financial sustainability in South-West of Nigeria was low.

Research Question 2

What provisions are in place for universities' research output commercialization in South-West of Nigeria?

Table 2

Descriptive statistics on the provisions in place for universities' research output commercialization in South-West of Nigeria (n = 1200)

Items	Mean	SD	Decision
University has			
Financial goals on commercialization	2.55	.799	Agreed
Vision and mission on research output commercialization	1.87	.762	Disagreed
Innovation policy on research output commercialization	1.90	.510	Disagreed
Efficiency guidelines on commercialization	2.64	.793	Disagreed
Cluster Mean	2.24		

Source: Field Survey, 2022

Results from Table 2 revealed that provisions put in place for universities' research output commercialization in South-West of Nigeria. The results further indicates cluster mean of 2.24, less than bench mark mean of 2.50 and that out of four items raised, only one was agreed by the respondents. This implied that the provisions put in place for universities' research outputs commercialization in South-West of Nigeria was low.

Research Question 3

What are the likely success determinants of universities research outputs commercialization in South-West of Nigeria?

Table 3

Descriptive statistics on the likely success determinants of universities research outputs commercialization in South-West of Nigeria (n = 1200)

Items	Mean	SD	Decision
Academic staff capacity building	2.78	.593	Agreed
Academic staff perception	1.54	.510	Disagreed
Entrepreneurial innovation and team work	2.98	.646	Agreed
University-industrial mutual relationship	2.52	.495	Agreed
Adequate funding	2.60	.482	Agreed
University technological advancement	2.65	.538	Agreed
Cluster Mean	2.51		

Source: Field Survey, 2022

Result from Table 3 shows that out of six items raised as the likely success determinants of universities research outputs commercialization in South-West of Nigeria, five items were agreed by the respondents while respondents disagreed on only one item. The cluster mean is 2.51 which greater than bench mark of 2.50. The implications of this result showed that academic staff capacity building, academic staff perception towards research output commercialization, entrepreneurial innovation and team work, university-industrial mutual relationship, adequate funding and university

technological advancement were among the likely success determinants of universities research outputs commercialization in South-West of Nigeria.

Hypothesis

There is no significant relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria.

Table 4

Relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria (n = 1200)

Variables	n	Mean	SD	df	r-value	p-value
University financial sustainability		7.81	2.02			0.037*
Commercialization of research outputs	1200	12.70	2.99	1198	0.909	Significant

Source: Field Survey, 2022

From Table 4, it was observed that there was significant relationship between the independent variable and the dependent variable in the order of ($r = 0.909$, $p < .05$). On this premise, the null hypothesis is hereby rejected and the researchers concluded that significant relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria.

DISCUSSION OF FINDINGS

The findings of the study indicated that the level of universities financial sustainability in South-West of Nigeria was low. These findings corroborate with Kalomo and Chama-Chiliba (2022) who reiterated that the major sources of revenue for university financial sustainability such as students' tuition fee, entrepreneurial enterprises, IGR among others fell below what the system needed for its financial sustainability and engagement in Nigeria.

The findings of the study based on research question two showed that the level of universities research outputs commercialization in South-West of Nigeria was low. These findings corroborate with Vladislav and Evgeniya (2021) findings suggested that the level of universities research outputs fell below expectation in Rusia.

From research question 3, the findings of the study indicated that academic staff capacity building, academic staff perception towards research output commercialization, entrepreneurial innovation and team work, university-industrial mutual relationship, adequate funding and university technological advancement were among the likely success determinants of universities research outputs commercialization in South-West of Nigeria. These findings were in consonant with Khademia and Ismaila (2013) who found that institution capacity on entrepreneurial engagement, effectiveness in ICT usage, adequate funding for research and researchers' attitude and perception towards research development.

The findings of the study based on hypothesis revealed that there was significant relationship between university financial sustainability and commercialization of research outputs in South-West of Nigeria. These findings correlate with Ayisi, Kivengea

and Ombakho (2016) that if all been equal, university research output commercialization has direct relationship with the financial sustainability of the system.

CONCLUSION

Public universities financial sustainability has been one of the issues affecting the growth and development of the system in Nigeria. When compared with their counterpart in the world, the issues of commercialization of research output have played significant role in mobilization of financial resources for the universities financial sustainability. This issue prompted the current study to examine the nexus between university financial sustainability and commercialization of research outputs in South-West of Nigeria and come to conclusions that the level of universities financial sustainability in South-West of Nigeria was low. It was also showed that the level of universities research outputs commercialization in South-West of Nigeria was low and that academic staff capacity building, academic staff perception towards research output commercialization, entrepreneurial innovation and team work, university-industrial mutual relationship, adequate funding and university technological advancement were among the likely success determinants of universities research outputs commercialization in South-West of Nigeria.

RECOMMENDATIONS

1. It is recommended that building capacity in entrepreneurship among academic staff and committing more resources to Research and Development (R&D) activities hold potential to increased commercialization of university research outputs in Nigeria.
2. Universities also need to widen and deepen engagement with industry and other potential financial supporters.
3. Additionally, industries and other research output users need to be brought on board at the inception stage (of any research with commercial potential) as active partners, while governments need to take responsibility for architecting a national innovation system with appropriate frameworks and policies that govern and incentivize university-industry interactions to market commercialization of research outputs in Nigeria.

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