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Linkage and Advancement Services and Commercialization of Innovations of Tertiary Institutions in Bayelsa State

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ABSTRACT: *The study examined linkage and advancement services and commercialization of innovation of tertiary institutions in Bayelsa State. A descriptive survey design was adopted for the study. The study was guided by three (3) research objectives and corresponding questions. The population of the study comprise all academic and non-academic staff across all ranks of the 7 tertiary institutions in the state. Structured questionnaire was used to collect data from respondents respectively. The data gathered was analyzed using mean and standard deviation via Statistical Package for Social Science (SPSS) version 26. The instrument was subjected to pilot testing. Experts in Measurement and Evaluation and the field of Education validated the instrument. The result of the pilot study was used to establish the reliability of the instruments via Cronbach Alpha Formula and a coefficient of 0.81 was obtained. The findings revealed the available linkage and advancement services, the extent to which they are utilised and the factors hindering linkage between industries and tertiary institutions in Bayelsa State.*

KEYWORDS: linkages, advancement, commercialisation, innovations, tertiary institutions

INTRODUCTION

The need to improve the synergies between tertiary institution and industries via commercialization of innovation from the former has caught the attention of researchers in recent times. Bayelsa, a state endowed with crude oil and active youth population is yet to advance economically. Up till this moment, the state does not have any national or globally branded product or service that has emanated from its indigenous knowledge and institutional effort (Charles-Owaba, 2020). While educational and knowledge infrastructure abound in the state with 4 universities (3 state and 1 federal), 2 Polytechnics, 1 College of Education, 1institution of Tourism the Economy is still technologically weak. Maintaining partnership between tertiary institutions and industry on one hand and industry and government on the other hand is one of the most effective and efficient strategies for technology development in developed nations. Such partnership takes different forms which vary from joint execution of research projects award of research contract development of curricula and provision of idea-

based educational system (Ibeme, 2020). Mouton, (2015) submitted that synergies between higher education institution and industries can play a critical role in securing and leveraging additional resource for higher education, promoting innovations, technology transfer and ensuring that graduate have the skill and knowledge required to navigate real work life.

However, it is worthy of note that partnership between industries and higher institution is not a common practice in Nigeria generally and Bayelsa in particular. At such, the transformation of research result to products or services that will benefit the institution's immediate environment is rare. Charles-Owaba, (2020) noted that the few instances where synergies between industries and tertiary institution are maintained is usually in engineering and technology-based department (mechanical, electrical etc.). This has made other department such as education and social science appear like disciplines that does not have impact on the society.

This research therefore, intends to develop empirical evidence on how linkage and advancement services of our tertiary institutions could foster commercialization of innovations in Bayelsa State. Hence, this study intends to examine linkage and advancement services and commercialization of innovations in tertiary institutions in Bayelsa State.

Purpose of the study

The main purpose of the study is to determine the linkage and advancement services and commercialization of innovations of tertiary institutions in Bayelsa State. Specifically, the study achieved the following:

1) Determine the extent to which advancement and linkages services associates with commercialization of innovations in tertiary institutions in Bayelsa State.
2) Determine the factors affecting advancement and linkages services in tertiary institutions in Bayelsa State.

Research Questions

The following research questions were formulated to guide the study:

1) To what extent does the advancement and linkages services associates with commercialization of innovations in tertiary institutions in Bayelsa State?
2) What are the factors affecting advancement and linkages services in tertiary institutions in Bayelsa State?

REVIEW OF RELATED LITERATURE

Conceptual Framework

Innovations

This simply refers to the outcome in the form of special knowledge that results from research efforts, be it, basic research, applied research or development researcher carried out by higher institutions of learning, research institutes, or industrial firms (Bentley, 2018). In the linear model of innovation, public research especially in the universities generates basic knowledge,

which leads to inventions and inventions when commercialized, become innovations (Adeoti, 2016b). Innovation, on the other hand, is defined as the application of basic knowledge acquired through science and technology research and investment to achieve physical production of goods and services (Roggers, 2007). It must be noted that this knowledge might be acquired through learning, research or experience. But until this knowledge is applied in physical production of goods and services and translated to development, it cannot be considered to be innovation. From this simplistic view of the innovation process, the research activities in the universities and public research institutes are isolated from industry. Industrial research and development (R&D) activities that contribute to the real technological change required for economic progress are located outside the ivory towers. However, several studies that illustrated the NSI framework have proven that economies that are innovation-driven (i.e. knowledge economies) are characterized by evident strong university-industry collaborations, especially in strategic sectors of the economy.

Commercialization of Innovations

Commercialization of research results has become the new catch-cry in most advanced economies as they embrace innovation as a key driver of economic policy. The transfer, exploitation and commercialization of public research results have become a critical area of science, technology and innovation. The knowledge and research generated by public research system is diffused through a variety of channels among which are the mobility of academic staff, scientific publications, conferences, contract research with industry and the licensing of university inventions. Effective commercialization of research results in any nation depends on rapid technological innovation, effective strategic management of knowledge and a clear focus on value-added goods, services and industries. According to Bently (2013), the world faces major issues such as climate change, limited natural resources and changing age demographics. Thus, the need for transition to a more sustainable economy is creating global market opportunities for entirely new solutions. Advancement in technology development has radically altered the economic system in the world. Nations and businesses that can achieve higher levels of performance in innovation will be well placed to be leaders of tomorrow. Thus, wealth is no longer being measured in terms of physical winch alone. It must be measured by the degree of access to, and timely use of, knowledge and technology that leads to intensive value-added capabilities. Thus, commercialization of research findings is becoming an important aspect of economic development. However, while commercialization has led to substantial investments in public research in America, the perception in Europe is that the continent has failed to benefit from its substantial investments in public research. European governments have responded by introducing policies to promote commercialization such as introduction of University courses on entrepreneurship for future academics and a range of other programmes to encourage technology transfer by promoting formal contractual relationships between the business sector and public science (Appiah, 2017). In India, the development and commercialization of new technologies have become very important in the research agenda. Even though India started the development of its scientific infrastructure in a planned way immediately after independence, commercialization of technology attracted the attention of policy makers only in 1980s. According to Kumar and Jain (2013), venture capital funds were established in the 1980s and a technology policy statement was also introduced in

1983 to provide risk-sharing funds as well as managerial expertise for technology development and commercialization.

Linkages and Advancement Services in Tertiary Institutions in Nigeria

The Directorate of Linkages and Advancement functions primarily as an interface between the tertiary institution and its affiliate collaborative agencies both nationally and internationally. The Directorate is responsible for exploring linkages/collaborations/partnerships with institutions, donor agencies and organizations, the industry as well as individuals within and outside the country for overall development and advancement of the institution as a leader in technological and entrepreneurial education.

Specifically, the Directorate of Linkages and Advancement has the following objectives:

1. Promote fruitful linkages between institutions and various public or private sector establishments and organizations nationally and internationally for purposes of qualitative manpower training, capacity building, and scientific/technological advancement.
2. Provide a platform for effective upgrading and marketing of institutions' academic programmes at national and international levels, especially through a purpose-oriented curriculum, collaborative research and mutually beneficial staff and students exchange partnerships.
3. Collate and publicize information on various linkage activities and attainments of institutions for the attention of local, national and international beneficiaries, interested stakeholders and target end-users.
4 Support and facilitate productive cross-country technical, academic and administrative interactions and exchanges involving undergraduate and post-graduate traineeship schemes, plus other collaborative arrangements as may be worked out between institutions and agencies.

Tertiary institutions- industry linkages can take various forms and levels of partnerships from contract or sponsored research, to joint research, professional courses, consultancies to creating opportunities for student placements, staff exchange, and joint curriculum development. Today universities are considered not only as centres of knowledge and learning, but as key institutions in national innovation systems (Nelson, 2006). In order to plan their role within the innovation system, tertiary institutions need to be welllinked to enterprises, other research institutes, and supported by government policies.

The USA, for example, has enacted key legislations such as the 1980 Bayh-Dole Act to incentivize patenting, licensing, and technology transfer of tertiary institutions research. Through state intervention, Brazil has helped centre universities as technology incubators (Etzkowitz, 2008). At the tertiary level, technology transfer departments, technology incubators, and science parks have been set up to encourage and manage entrepreneurial activities (Schiller, 2007).

Theoretical Framework

Diffusion of Information (DOI) Theory According to Rogers (2003), this theory seeks to explain how, why, and at what rate new ideas and technology spread through cultures. This

theory was developed and popularized by F.M. Rogers (1962) in his book, Diffusion of Innovations. He opines that diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system or specific population. Rogers (2003) explained the process of innovation diffusion as one which is dictated by uncertainty reduction behaviour amongst potential adopters during the introduction of technological innovations. Innovation Diffusion Theory (IDT) consists of six major components: innovation, characteristics, individual user characteristics, adopter distribution over time, diffusion networks, innovativeness and adopter categories, and the individual adoption process. Arguably, the most popular of the six components of IDT centers on the characteristics of the innovation itself. After analyzing a variety of previous innovation diffusion studies, Rogers singled out the five characteristics of innovations that consistently influence the adoption of new technologies.

The New Growth Theory (NGT)

The New Growth Theory is championed by Romer (1994). The theory is, of course, an offshoot of the classical theory known as Human Capital Theory, which defined human capital as the stock of individual knowledge, ideas, skills, capabilities, and core competencies that is acquired through education and training and also include talents, intelligent quotient (IQ), practical experiences etc (Dosi, 1993; Grossman and Helpman, 1994; Marshal, 1920). The New Growth Theory holds that unlike physical objects, knowledge and skills or technology are characterized by increasing returns, and these increasing returns drive the process of growth. The Theory emphasizes that economic growth results from the increasing returns associated with new knowledge. Knowledge has different properties than other economic goods (being non-rival, and partly excludable). The ability to grow the economy by increasing knowledge rather than labour or capital creates opportunities for nearly boundless growth. Markets fail to produce enough knowledge because innovators cannot capture all the gains associated with creating new knowledge. Obviously because knowledge can be infinitely reused at zero marginal cost, firms which use knowledge in production can earn quasi-monopoly profits. All forms of knowledge, from big science to better ways to sew a shirt exhibit these properties and contribute to growth. This new theory addresses the fundamental questions about what makes economies grow: why is the world measurably richer today than a century ago? Why have some nations grown more than others? Because ideas can be infinitely shared and reused, we can accumulate them without limit. They are not subject to what economists' call ―diminishing returns‖. Instead, the increasing returns to knowledge propel economic growth.

New Growth Theory helps us make sense of the ongoing shift from a resource-based economy to knowledge-based economy. It underscores the point that the economic processes which create and diffuse new knowledge are critical to shaping the growth of nations, communities and individual firms. Ultimately, all increases in standards of living can be traced to discoveries of more valuable arrangements for the things in the earth's crust and atmosphere. No amount of savings and investment, no policy of macroeconomic fine-tuning, no set of tax and spending incentives can generate sustained economic growth unless it is accompanied by the countless large and small discoveries (rooted in ideas or knowledge) required to create more value from a fixed set of natural resources (Romer, 1993b: 345).

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METHODOLOGY

Descriptive survey design was adopted in this study. The population comprised all academic and non-academic staffs across all ranks in tertiary institutions in the state. The area of the study is Bayelsa State. Specifically, all tertiary institutions in Bayelsa State were used. The subjects or the unit of analysis.

A sample of 140 respondents was used in the study. Quota sampling technique was used to select 20 respondents consisting of 15 lecturers and 5 staff from the directorate of linkages and advancement from the 7 tertiary institutions in the state. The Instrument for data collection was a structured "Impact of Linkage and Advancement on Commercialization of Innovations Questionnaire (ILACIQ)" developed by the researchers. The instrument consists of two part 1 and 2. Part 1 was designed to elicit demographic data from the respondents, while part 2 was styled on a 4-point scale of major (M), Moderate (Mo), Undecided (UD) and Minor (Mi) with corresponding values of 4, 3, 2, and 1 respectively for research question 1 and 2. For the research question 3, the items were styled as Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE) which is rated as 4, 3, 2 and 1. The instrument was validated by experts in measurement and evaluation. It was subjected to pilot testing and the outcome was analyzed using Cronbach Alpha, which yielded a coefficient value of 0.72. One-on-one mode of questionnaire administration was adopted and 100% return rate was achieved. Mean and standard deviation were used to answer the research questions. Mean values of 2.50 and above were considered major, while the values below 2.50 were considered minor, for research question 1 and 3. Mean values of 2.50 and above was interpreted as high extent, while, below 2.5 was interpreted as low extent.

ANALYSIS AND RESULTS

Research Question 1

To what extent does the advancement and linkages services associates with commercialization of innovations in tertiary institutions in Bayelsa State?

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Table 1: Mean and standard deviation of respondents on extent to which advancement and linkages services associates with commercialization of innovations

S/N	ITEMS	X	SD	REMARK
1	Promote fruitful linkages between institutions and various public or private sector establishments.	2.2549	0.43688	LE
2	Collate and publicize information on various linkage activities and attainments of institutions for the attention of local, national and international beneficiaries, interested stakeholders and target end-users.	1.5637	0.49714	L.E
3	Provide a platform for effective upgrading and marketing of institutions' academic programmes at national and international levels.	1.4363	0.49714	L.E
4	Support and facilitate productive cross-country technical, academic and administrative interactions and exchanges involving undergraduate and post-graduate traineeship schemes.	1.4363	0.49714	L.E
5	Commercialization of research findings, inventions and innovations.	1.5673	0.49714	L.E

Source: Fieldwork (2023)

Results presented in Table 1 above indicated that the mean of each item was lower than the criterion means of 2.5 which implies that all respondents agreed that the extent to which **advancement and linkages services associates with commercialization of innovations** in tertiary institutions in Bayelsa State was low.

Research Question 2

What are the factors affecting advancement and linkages services in tertiary institutions in Bayelsa State?

Table 2: Mean and standard deviation of respondents on affecting advancement and linkages services in tertiary institutions

S/N	ITEMS	X	SD	REMARK
1	Poor funding	3.1549	0.43688	Major
2	Lack of appropriate policy framework	3.2637	0.49714	Major
3	Lack of synergically enhanced mindset	3.4363	0.49714	Major
4	Support and facilitate productive cross-country technical, academic and administrative interactions and exchanges involving undergraduate and post-graduate traineeship schemes.	3.4363	0.49714	Major
5	Differences in Political interest	1.5673	0.49714	Minor

Source: Fieldwork (2022)

Results presented in Table 2 above indicated that the mean of item 1, 2, 3 and 4 were greater than the criterion means of 2.5 which implies they are major factors affecting advancement and linkages services in tertiary institutions in Bayelsa State. Also, item 5 had a mean value of 1.567 which is lower than the criterion mean value of 2.5 which implies that it is minor factor affecting advancement and linkages services in tertiary institutions in Bayelsa State.

DISCUSSION OF FINDINGS

Findings in research question 1 revealed that the extent to which advancement and linkages services enhances commercialization of innovations in tertiary institutions in Bayelsa State was low. Findings in research question 2 revealed that poor funding, Lack of appropriate policy framework, rigid execution of approved curriculum, inadequate interface of learning material with the real multicultural and multilingual workplace and lack of synergically enhanced mindset are major factors affecting advancement and linkages services in tertiary institutions in Bayelsa State. These findings are consistent with Ibeme (2020), Charles-Owaba (2020) and Sindiso & Nhlanhla (2018) who submitted independently, that a great lack of synergy exists between tertiary institutions and industries.

CONCLUSION

This study has established the available linkage and advancement services, the extent to which the services associates with commercialisation of innovations and the factors affecting linkage and advancement of tertiary institutions in Bayelsa state.

Recommendations

Based on the findings of the study, the following recommendations were made:

1) Measures need to be taken by all stakeholders to address the constraints on all sides that inhibit the partnership.
2) Government has to create the enabling environment and policies for this smooth linkage between Industry and institutions. These constraints are in general derived from the scarcity of financial resources, the absence of relevant human resources in local industries, negative attitude towards local ideas and the nature (size and ownership) of the industries.
3) Strategies on how to renew the mindset of both students and lecturers on the issues of linkage and advancement should be encouraged.

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