

EDUCATION, RESEARCH AND HUMAN DEVELOPMENT IN NIGERIA: THE CHALLENGES AND MISSING LINK

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1.0 APPRECIATION

I consider it a great honour to be invited to deliver the Convocation Lecture at the 18th convocation ceremony of this great and reputable institution. I am particularly delighted at the opportunity to interrogate a burning national topic and personal passion of mine viz the place of education in our national development trajectory and the inevitable and compelling role of research and innovation in realizing our true potential as a nation in the global knowledge economy.

May I seize this opportunity to express my deep and profound appreciation to the Vice-Chancellor, Prof. Aloysius Michaels Okolie, the Governing Council and all members of the university community for this unique and gratifying gesture. I intend, in the course of the lecture, to engrave my thoughts and convictions on the subject matter in the minds of this warm audience and indeed learners across the country and beyond.

2.0 INTRODUCTION

Several scholars have advanced their views about the definition of education. According to sources, education is a word derived from the Latin word, "educatio" meaning breed, train, tutorage or rear (Veschi, 2020); while John Dewey

(1978) refers to education as "All one with growing, it has no end beyond itself (meaning that Education is everything along with growth, education itself has no final destination behind itself). Others define education as the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs and habits. There is absolutely no doubt that humanity and society have made tremendous progress since the introduction and adoption of education as a catalyst for developing and harnessing the human capital input. History is replete with the actions, struggles and the efforts made by man to improve his well-being through constant enquiry into phenomena, exploration of the environment and the exploitation of natural resources contained therein. The transition from the stone age to the iron age, the invention of agriculture, the advent of traditional and modern technology, developments in natural and health sciences, communication and energy have all been attributed to knowledge and to education. From age to age, man has sought to improve his living condition by ordering and mastering his environment and has succeeded due mainly to improvements in the methods and scale of the acquisition of knowledge and its application.

The desire by man to dominate his environment has resulted in discoveries in various fields. These inventions have been the result of intellectual activity and constitute the essence and reason for education. Knowledge, even in primitive societies, has been critical to survival and sustenance; as society progressed, its transformation became inevitable. The quest for and importance of knowledge continued to occupy an important place in the scheme, affairs and plans of societies and nations.

Over time, education and the quest for knowledge became formalized in different parts of the world due to the critical role it plays in the provision of requisite skills for survival. Citizens were expected from childhood to start the process of

acquiring education to earn a living and to contribute to nation building. Through different periods, particularly during the renaissance (the rebirth of learning or enlightenment era), modern ideas of government, learning and scholarship spread widely across Europe and were to later lead to the emergence of nation states. The emerging nation states were saddled with various responsibilities that included the creation of capable bureaucracy and a thriving economy which all required certain skills and knowledge. The idea of government itself conferred on it the responsibility to provide for the welfare of the citizens including education, healthcare and other social amenities like water and electricity or energy etc. This necessitated the establishment of schools from primary to tertiary levels in Europe. In Africa, and in nations like Nigeria, knowledge and learning have existed in different forms, transmitted through oral tradition and apprenticeship, but not necessarily with reading or writing.

In the post-colonial period, countries like Nigeria struggled to create a modern economy and bureaucracy that would match the demands of the new society, especially after the industrial revolution in England [1760-1840] when technology became a factor that determined the economic growth of various nations. It is the ability to create, invent and produce that shaped the post-industrial revolution world.

In Europe, universities became the incubating centers of technology and inventions in the sciences, in the fields of agriculture, medicine, pharmaceutical sciences, engineering etc. In recent times most inventions and innovations are the products of research in universities and research institutes across the world, and this ties education to research and human capital development. Even governance has transformed and requires a level of computer literacy or digital education. As such many nations including Nigeria found it absolutely imperative that the capacity of the

citizenry must be enhanced to meet the demands of the times in which we live. Otherwise, such nations risk becoming economically and technologically dependent and inferior to those nations that made the transition.

3.0 EVOLUTION OF EDUCATION SECTOR IN NIGERIA

Prior to the conquest and subsequent imposition of British colonial rule in Nigeria, the concept of western or formal education had been completely absent. What prevailed before contact with explorers and missionaries in the form of education was because of the incursion of Islam particularly in what is known as northern Nigeria. The Sokoto caliphate had spread and extended to Oyo in the south-west bringing with it learning in Arabic and Quranic studies. The advent of formal education coincided with European incursion and missionary activities that started from the coast. The Portuguese had been part of the slave trade that flourished in the Atlantic and traded in slaves with the people of the Benin Kingdom, Oyo, and the states in the Delta.

It was around 1807 that the British parliament enacted a law that prohibited its citizens from participating in slave trade. It was reported that the legislation contributed to the collapse of the Oyo Empire [countrystudies.us]. By 1842, Christian missionary activities of spreading the gospel had begun in parts of Nigeria. Amongst the early missions were the Church Missionary Society [CMS], Baptist Roman Catholics and the Seventh Day Adventists. Many other mission groups continued to move into Nigeria and continued to expand their activities. These activities apart from preaching the gospel, came to include trade and education. The missions began to establish missionary schools in different parts in southwest and southeast Nigeria before exploring the hinterland. Schools for Biblical studies were established in different parts of Nigeria such as the CMS Grammar school Lagos, 1859, Methodist Boys High School Lagos, 1878, Baptist Academy Lagos, 1885, Hope Waddell Training Institute Calabar, 1895,

St John's School, Bida, 1904, Kings College, Lagos, 1909, Barewa College, Zaria, 1921, Methodist College Uzuakoli, 1923 and several others numbering about 24 different schools in different locations across what is now considered geographically as Nigeria [AbduRafiu, 2021].

The Berlin Conference [Nov. 15, 1884-Feb. 26, 1885], convened by European powers, partitioned the African continent among themselves [Britannica]. The conference followed the establishment of the International Association for the Exploration and Civilization of Central Africa by King Leopold II of Belgium in 1876 [study.com]. As a fallout of the conference, Nigeria became a British colony, just as the rest of Africa came either under British, French, German, or Portuguese rule. This was followed by the full establishment of colonial structures and governance in Nigeria. The Native authority system of administration also became fully established after the amalgamation of Nigeria in 1914. At the start of colonization, the colonial government began to assist the efforts of the missionaries regarding education in Nigeria and it was followed by the promulgation of an Ordinance in 1882 that declared the establishment of formal education across Nigeria and as such by 1914, 91 missionary schools, 59 government elementary schools and 11 secondary schools have been established across Nigeria [E. Samuel, 2021].

The establishment of these schools became necessary as the colonial government would inevitably have to create the manpower needed to fill positions or take up responsibility by Nigerians in the new administrative and economic set up that included banking and insurance. The colonial administration basically established formal education with a view to creating the manpower, capacity, and competencies to run the new economic, social, political, and administrative set up that had been introduced to Nigerians and Africans in general. This led to the expansion of primary and secondary education and the introduction of tertiary education in Nigeria by the

colonial administration. The Elliot Commission set up in 1943 by the colonial administration recommended: -

- (i) establishment of universities in Nigeria
- (ii) increased production of teachers
- (iii) provision of technical and commercial education in the curricula of secondary schools; and
- (iv) establishment of a Commission for universities side by side a National Manpower Board [Opera News, 2021].

Schools and institutions in Nigeria continued to increase in number and enrollment across the country up to the attainment of independence in 1960. In 2006, reports indicated that there were about 87,941 primary schools in Nigeria, with an enrolment of about 24, 604,538. There were also about 27,000 senior secondary schools with enrolments of about 5.2 million students in 2018/2019. By 2018/2019, the enrolment in junior secondary school was put at 7.4 million. The number of universities in Nigeria was put at 170 in 2021, with about 1.8 million students in 2018/2019 and 247,000 post graduate students [Statista.com, 2021]. At present, there are about 170 universities, 159 polytechnics and 152 colleges of education in Nigeria both public and private.

4.0 HUMAN DEVELOPMENT AS AN OFFSHOOT OF EDUCATIONAL INVESTMENT

Human capital is the stock of competences, knowledge and personality attributes embodied in the ability to perform so as to produce economic value. It is the attributes gained by an individual through education and experience. Human capital is a means of production, into which additional investment yields additional labour. Human capital includes human resources such as knowledge, skill-sets, attitudes, drive motivation, resourcefulness, etc. It also refers to productivity engendered through knowledge and skills

acquired from education, training and experience. Human capital can also be defined as that intangible factor of the production process that contributes to human intellect, skills and competencies in the production and provision of goods and services. Anything that contributes to the improvement of human productivity, stimulates resourcefulness and enhance life while refining attitudes, is an integral part of the human capital resource of any nation.

Human capital compared to and contrasted with material capital such as machinery, land, minerals resources and other raw materials is intangible. It is intrinsic and cannot be directly measured. It is manifested in terms of the prosperity of the nation, material and social well-being of citizens, efficiency of institutions and systems as well as the quality of human development indices that can be assessed. The human capital status of any nation will directly influence and positively correlate with economic and social indicators such as gross domestic product, income per capita, balance of trade, life expectancy, literacy rate, level of industrialization and the quality of infrastructural provisions. It can also have great impact on political stability, national peace and harmony as well as the prevailing ethos. The more a nation has knowledgeable, skilled and resourceful individuals contributing to national growth and development the higher the value of the human capital of that nation.

Human capital development also refers to human capital formations or Human-Resource development. According to Jhingan (2007) "it is the process of acquiring and increasing the number of persons who have the skills, education and experience which are critical for economic and political development of a country". Human capital development is associated with investment in man and his development as a creative and productive resource. Formally organized education at the elementary, secondary and higher levels has been identified as one of the plausible ways of engendering

human capital development. This development must essentially be catalyzed and stay afloat by the instrumentality of research.

5.0 OVERVIEW OF THE CONCEPT OF RESEARCH

Research is the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis, and interpretation of data. Research is oriented towards discovering the relationships that exist among the phenomena of interest to a researcher (Osualla, 2001). Others have defined research as the search for knowledge, truth, similarities, and relationships and finding solutions to problems through the systematic collection, analysis, and interpretation of data. Research is an activity that involves observation and description of the characteristic properties of objects or events for the purpose of discovering relationships between variables and developing generalization that may be used to predict future occurrences. Research involves identification of problems, gathering new data, finding solution to a problem through carefully designed procedures and logical analysis Okeke (2004). Research therefore is an intensive and extensive search for solutions to problems in a society. The problem could be in education, business, agriculture, medicine, engineering, politics, etc. Approaches may differ but essentially the aim is the same; to provide new insights of understanding or attempt to provide solutions that could be temporal, intermediate or permanent. The overarching goal is to promote development on targeted fronts.

6.0 THE EDUCATION-RESEARCH-DEVELOPMENT HELIX

When properly harnessed, education, research, and development synchronously represent a triple helix for advancing the frontiers of institutional and national development. The critical positions of education and research in sustainable development underscore the basic reason for inter- and intra-regional collaborations between researchers. According to Bachiorri (2016), achieving sustainable

development requires knowledge through good research. Research and education bring solutions to challenges nations face in their sustainability. The research function of academia remains a prime source of knowledge and is highly critical to sustainable development across all strata of human development. Research in higher institutions is essential for many reasons: to enhance the institution's image and reputation and contribute to the indigenous knowledge base. It is undoubtedly considered a significant academic task; and viewed as a vital area of the educational system that is dispensable for career advancement (Turk & Ledić, 2016). Despite this, Nigeria is confronted with increased demand to grow her research and knowledge base to meet specific areas of our institutional and national development. Good and effective research generated and incubated in our tertiary educational institutions will not only solve societal problems but also attract the attention of industry. The latter, with the support of the Government, will translate the products of research to goods and services to be consumed by citizens. The end result is a higher standard of living and shared prosperity for all. The added bonus will be the increased relevance of academic and research institutions to sustainable natural developments.

7.0 NEXUS BETWEEN EDUCATION, RESEARCH AND HUMAN CAPITAL DEVELOPMENT

Several theories have emerged to explain the importance that education occupies in the scheme of things, and in life, and for nations and societies in general. Nelson Mandela describes education as the most important tool with which to change the world. These theories and studies have also tried to explain the relations that exist between education and development as a concept and to other areas of human capital development that includes research which is a component of education. The link between education and research, whether basic, applied or experimental development research (R&D) are both symbiotic and mutually

reinforcing. In a broader sense, research is further classified into Mode 1 research, which is explained as unfettered pursuit of knowledge without clear commercial effect and Mode 2 research which is understood as goal and activity centered and is carried out in a context of application with emphasis on solutions in various practices and contexts [M, Elken., S, Wollschied, 2016].

The first serious attempt to quantify the role of education in economic growth was initiated in 1925. However, it was not until the 1960's that scholars in the United States tried to investigate the nature of changes taking place in the different sectors of the U.S. economy and they discovered that the growth in the GDP of the U.S.A for about half of the 20th century could not be explained solely by economic factors. It was surmised that the important qualitative changes and improvements that had taken place in the labor force were the result of the impact of formal education that resulted in an increase in productivity levels. This was later explained by scholars as the 'human capital theory'.

Proponents of this theory believe that formal education is instrumental to the improvement of the productive capacity of the population. As such, attempts at enhancing the productivity of the population are considered as investments in capital. The proponents of the theory further contend that the most efficient path to national development lies in the improvement of human capital through education. Thus, educational activities, including research, were seen as investments to contribute to the efficiency of the population. From this perspective, education is seen to develop an individual's productive skills and yields benefit to the individual overtime and to the society [UKEssays, 2018].

Another theory that sought to explain the importance and role of education in the development of society is modernity theory. The theory argues that modernization is the social

psychological process through which a country becomes modern, and this happens after its population has adopted modern habits, attitudes, values, and beliefs. Adherents of the modernity theory appear to have placed high emphasis on the role of education as an agent in the production of skilled manpower and the modern attitude and values necessary for the existence of a modern society or country. Modernity theory is considered as a description and explanation of the process of transformation from traditional or underdeveloped society to a an advanced one. A leading proponent described the theory as ‘historically a process of change towards those social, economic, and political systems that have been developed in western Europe and north America from the 17th and 19th centuries and spread to other parts of the world, including Africa [UKEssays, 2018].

These theories have highlighted the importance of developing critical manpower or what is generally considered human capital. In recent times, knowledge and advanced skills remain critical determinants of a nation’s economic growth and standard of living especially as the outcomes of learning are transformed into goods and services, greater institutional capacity, a more effective public sector, stronger civil society etc. According to a report of the World Bank, higher education is instrumental in fostering growth, reducing poverty, and boosting shared prosperity. The report maintains that higher education benefits not only the individual but the entire educational system. Tertiary education is considered the highest level of education and critical to human capacity or capital development.

The goals of tertiary education as stipulated in the Nigeria Education Policy document are among other things to contribute to national development through high level manpower training and to develop the intellectual capacity of individuals to understand and appreciate their local and

external environment. It involves the acquisition of both physical and intellectual skills which enable individuals to be self-reliant and useful members of society. As such the major role of tertiary education through its institutions is that of manpower development or human capital, which involves the task of inculcating the skills, aptitude, attitude, knowledge, morals, values, creative ability, etc. they are also expected to promote research and contribute to the development of the host communities. In achieving these roles, there is need for effective teaching and learning, research development culture, effective staff development programs and dissemination of knowledge in Nigeria's tertiary institutions.

8.0 THE PARADOX OF AFRICA

Africa is the world's second largest and second most populous continent, after Asia. It occupies 20% of the earth's surface, with 60% of the world's arable lands and 30% of the world's reserve of minerals. It is estimated that more than half of global population growth between now and 2050 will recur in Africa.

Sadly, Africa currently accounts for only 3% of global GDP, less than 3% of international trade (mainly primary commodities and mineral resources) and shoulders 25% of the global disease burden (Katampe, 2022). The continent contributes only 2% of world research output, accounts for only 1.3% research spending and produces 0.1% of all patents. Nigeria is the most populous and consequential country in Africa (215million) with one of the largest youth populations in the world. It is blessed with an abundance of natural resources including the largest natural gas reserves on the continent and its biggest oil exporter. Yet, it has some of the worst socio-economic indicators including high infant mortality rate, low life expectancy, low school enrolment, high unemployment, high poverty rate etc.

These sets of contradictions afford Nigeria and indeed Africa, a unique opportunity for accelerated development through research and innovation.

9.0 CHALLENGES OF RESEARCH IN NIGERIAN UNIVERSITIES AND HIGHER INSTITUTIONS

In the post-colonial period, across many countries in Africa, including Nigeria, it was widely believed that higher education was a leading instrument that would promote development. The founding fathers of the new African states had clearly understood what role higher education could play in the newly created countries. The year 1960 when Nigeria became independent was declared the year of Africa and referred to as the development decade and the role universities as drivers of development was made clear and this led to the establishment of national universities in several countries including Nigeria. Years later, it was argued that universities across Africa did nothing to change the narrative in terms of the development of their respective countries. In the 1990's and 2000's efforts were made to revitalize the role of higher education in the development of the African continent. It was in 2009 that the Association of African Universities organized a conference in Abuja, Nigeria with the theme '*Sustainable Development in Africa: The Role of Higher Education*'. The conference praised the efforts of African universities but called for combined efforts with other international partners with a view to prioritizing the effectiveness of responses to Africa's development needs [AAU, 2009]. The 1980's and 1990's saw an uncoordinated expansion of higher education across Africa and in Nigeria with absent or decayed infrastructure, deteriorating work conditions, declining academic standards and as a result the capacity for research and knowledge production was significantly weakened. Africa as a continent, accounts for less than 1.5% of the total global publications in International scientific journals. A study in 1999 and 2008 showed that the 54 countries in the continent produced 27, 600 publications

in scientific journals and that in the Netherlands alone, 27,000 publications were made in the same period [T.Reuters]. Research output is recognized as the basic criterion for ranking institutions across the world.

Universities all over the world have traditionally been known as centers of research and learning and have been instrumental to so many inventions and discoveries in different fields of medicine, agriculture, pharmaceuticals, engineering etc. Teaching, learning, research and discovery, synthesis, and creativity, understanding and engagement, service and outreach have all been described as the core elements to the mission of great universities [Rosowsky, 2022]. Research in universities has been identified to contribute to economic development, clinical, commercial, and business opportunities. Universities can attract businesses into their countries and communities and can launch and incubate startup companies or license to sell their technologies to other companies.

In Nigeria it is generally agreed that in the 1960's and 1970's, Nigerian academics were research productive and had many publications and books to their credit in different fields including medicine. In the reports of the World Bank and other organizations, Nigeria was recognized as leading the whole of sub-Saharan African countries in research. The decline in research across higher institutions in Nigeria began in the 1980's. It was reported that Nigeria's total number of publications in scientific journals stood at 1062 in the same year and by 1995 this number had dropped to 711. Publication in scientific journals by South Africa was 3,413, 14,883 for India, and 5,440 for Brazil. In the period 2001-2004, 8 countries were selected and compared in terms of research output in scientific journals among African countries and Nigeria ranked 5th with a total of 2,309, while South Africa ranked 1st with 14, 809 publications in scientific

journals as seen in the table below. Senegal occupied the last position coming with only 618 [Yusuf, 2021].

Nigeria's performance in scientific publications among selected African countries (2001-2004).

<i>Country</i>	<i>Total publication</i>
<i>output</i>	
South Africa	14,809
Egypt	9,895
Morocco	3,535
Tunisia	2,857
Nigeria	2,309
Kenya	2,067
Ghana	641
Senegal	618

Thanks to TETFund's interventions, a significant improvement was recorded in 2021 as captioned in the SJR International Science Rankings (Scopus 2022) as follows:-

<i>Country</i>	<i>Total publication</i>
<i>output</i>	
South Africa	372,646
Egypt	302,626
Nigeria	135,504
Tunisia	113,626
Morocco	93,468
Kenya	49,757
Ghana	34,018
Uganda	25,278

In a comparative analysis of research output by six Nigerian universities within the period 1997-2006, in both local and international journals, it was discovered that the highest research output was 12.17 publications per head recorded in one university and the lowest 8.13 in another university over the 10-year period. It was noted that even the best scenario of the mean of 12.17 would only have translated to 1 publication per academic staff per year [Yusuf, 2021]. This generally explains the situation regarding research in Nigeria's higher education system or across Nigerian universities. The QS World university rankings have always ranked universities in accordance with a set of criteria that

includes academic and employer reputation, faculty/student ratio and number of research citations. In the coming year [2023], about 1,400 universities will be featured in the ranking. [Laura,2022]. Also, the Times Higher Education World University Rankings performance indicators recognized research as second only to teaching. [Times Higher Education, 2022]. In 2022, only four universities in Nigeria featured in the Times Higher Education top 1000 ranking. These universities include University of Ibadan, University of Lagos, Covenant University and Bayero University Kano. The dismal performance was attributed to several factors including poor governance, deficits in research culture and infrastructure as well as the disposition of the academic staff of tertiary institutions.

10.0 OVERCOMING PROBLEMS ASSOCIATED WITH RESEARCH IN NIGERIA'S HIGHER INSTITUTIONS

At the heart of the neglect and negligible impact of research in Nigeria's, national development efforts is the lack of clear-cut philosophy and goal for sustainable development of the Nigerian state. The conduct of research in the nation's higher institutions has not been accorded the seriousness and attention it deserves. Political instability has been responsible for inconsistent policies and plans. This, coupled with frequent disruption of the academic calendar as a result of strikes or other unnecessary closures has taken a toll on the orientation, focus, timing and process of quality research in the nation's ivory towers.

Poor research output is a natural consequence of the absence of infrastructural facilities. Conducting research requires a conducive atmosphere or environment. In many institutions basic infrastructure such as laboratories, instruments and equipment, internet connectivity etc are either absent or dilapidated. Similarly, the capacity of academics across higher institutions in Nigeria to carry out meaningful

research is lacking. Many universities, polytechnics and colleges of education lecturers lack the basic ability, skill and motivation to carry out standard research in many fields. They are equally handicapped to access any grants or research funds either within or outside their institutions due to lack of capacity.

The situation is compounded by lack of credible and timely data absence of legal frameworks for research, low uptake and implementation of research results, academic corruption including protracted supervision of postgraduate students and low computer literacy amongst scholars.

Again, successive governments in Nigeria invested very little in education and in research specifically. Many advanced countries dedicate a significant part of their national budget to education and to fund research activities in diverse fields. Public expenditure on education as a percentage of the GDP in Nigeria has been 1.5 in 1960, 1.7 in 1985-1987 and 0.7 in 1995. However, in Jamaica, it was 4.9 in the period 1985/1987, and 7.5 between 1995-1997. In Malawi, it was 3.5 in 1985-87 and 5.4 in 1995-97 [Odia & Omofonmwan, 2013]. A report of the British Academy of sciences in 2009 emphasized on the need to revitalize and strengthen the knowledge capacity of African universities to build and expand networks across institutional, disciplinary, and national boundaries. There is growing convergence of transnational education partnerships and international development and is built upon a set of principles that include local ownership, capacity building, knowledge sharing, multi stake-holder participation and sensitivity to local demands [McGrath, 2002].

11.0 THE MISSING LINK TO HUMAN CAPITAL DEVELOPMENT

It is widely acknowledged that no nation can rise above the quality of its education. Traditionally, universities as ivory towers have three core mandates which are teaching, research and community service. Our universities tend to devote more attention to teaching, this limiting their ability to provide community service, since impactful research

tailored at the nation's priorities is the tool for addressing societal challenges.

Research creates and rediscovers knowledge, which is deployed to impact on community, whereas teaching helps in transmission of knowledge. A focus on innovative and problem-solving research is a proven tool for human capital development.

The missing link between education, research and human capital development in Nigeria can be attributed to lack of effective interactions between the Academia (the University), Industry, and Government (the Triple Helix) to foster economic and social development. In contemporary globalized economy, nations world over has recognised that sustainable national growth and competitiveness largely depend on continuous technological improvement and innovation, driven by vibrant research and development system which integrates research and training capacities of higher institutions with the needs of industry and the larger society under an enabling environment created by government.

In Nigeria, impactful research activities have been at a very low level, due to declining quality of research infrastructure such as the absence of modern scientific laboratories where cutting-edge research can be conducted, declining quality of the academia, dearth of funding and the lack of incentives for relevant publications. The problems that have militated against the role of the universities in the triple helix are institutional in nature, whereas some arise from the long-established classical approach to research and development within the university system.

For too long, there has been a profound and worrisome disconnect between the academia and the industry, such that research being conducted in our tertiary institutions had obviously become a mere tool for promotion to climb the academic ladder, whereas it is more convenient for industry to shop for innovations and research outcomes outside the shores of the continent. This unproductive and unpatriotic disposition tend to undermine the nation's developmental efforts and aspirations. Our universities as bastions of intellectualism should be the breeding ground for creativity, original thinking and innovation that shape and define civilizations as well as drive economies and development.

Nations that recognise and apply the Triple Helix Model that espouses synergy among academia/research institutions, industry and government in national development drive have the ability to and play active role in a knowledge driven economy. Academia and industry must interface in a sustainable manner that produces goods and services for local consumption and export as well as guarantee human capital development.

Globally, the transition towards the knowledge-based economy is propelled by dynamic connectivity between government, higher educational institutions and the industry with each sphere of the triad gaining as a result of more interaction, collaboration and support in other spheres. In this process, specialized firms capable of utilizing research output are created and strong protection of intellectual property right is institutionalized.

Higher education and research institutions should integrate into the production sector and into society in many ways. They need to conduct research and development for industry, create spin-offs firms, get involved in capital formation ventures, such as technology parks and business incubator facilities et cetera. They should introduce entrepreneurial

training and encourage students to transform research outputs into enterprises and commercial values. This approach is inherently based on the strong interdependence of academia, industry and government.

Another major missing link is lack of an established national institution devoted to Research and Development as a deliberate effort to enhance human capital development and fast track economic advancement of our nation through the instrumentality of science and technology. To spur the nation's drive towards making research and development the ace and game changer in our national development agenda, there is the compelling need for a robust institutional framework for a sustainable funding of R&D to accelerate the nation's industrialization drive and enhance human capital development. Our R&D spending must be scaled up to support impactful and problem-solving research. This is a challenge for the recently established National Council on Technology and Innovation.

The realistic response to addressing the missing links between education, research and human capital development lies in effective and focused funding for research and development; provision of modern facilities and equipment to facilitate cutting-edge research for impact; and effective support to accelerate uptake of research outcome to feed the industry, create wealth and enhance human capital development.

Although there is a gradual increase in the allocation of funds for scientific research in the country, such investments will be wasted if they are used mainly for basic research rather than product innovation. Basic research is not irrelevant, to the contrary, but a part of a larger strategy that initially focuses on product development and commercialization as obtained in industrialized nations.

I am pleased to report that at TETFund, we firmly believe that nothing should be spared in the pursuit of a conscious investment drive in research and development as it remains the most compelling strategy for accelerating sustainable growth. Accordingly, and in line with its commitment to addressing the identified missing link, TETFund established the Department of Research and Development/Centres of Excellence to promote the institutionalization of R&D through effective support for research and innovative partnership between tertiary institutions/research institutes, industry and government as a national response towards technological revolution, human capital development and sustainable economic competitiveness.

TETFund also introduced the National Research Fund (NRF) intervention intended to fund impactful research across the three (3) broad thematic areas of Science Technology and Innovation; Humanities and Social Sciences; and Cross Cutting, which will contribute to national developmental efforts as well as tackle global challenges.

To boost uptake of research outcomes with potentials for commercialization, the Fund in 2021 sponsored the TETFund Alliance for Innovative Research (TETFAIR) programme, an initiative designed to pull researchers, innovators and inventors from various beneficiary institutions to accelerate their researches, innovations and inventions with the aid of state-of-the-art innovation hub, experts and mentors to enable them transform their ideas into inventions, innovation or solution up to Proof of Concept and Prototypes that can be pitched to investors for commercialization. The successes recorded from the initial TETFAIR programme motivated the Fund to commence the second phase in 2022.

In the same vein, to enhance the capacity of our lecturers for innovative and impactful research to address societal challenges, the Fund has sponsored some selected lecturers of beneficiary institutions across the geopolitical zones of the

country for intensive capacity building programme on Research for Impact. The initiative is intended to groom a dynamic generation of Researchers, Innovators and Inventors within the academia. The programme is designed to provide participants with an in-depth insight into the necessity, principles, processes, platform and procedures of research and development ideation and implementation, as well as prototyping.

In its effort to enhance the capacity of our scholars for innovative research to attract international research grant and benefit from other funding windows for research across the globe, TETFund has sponsored 1,761 academic staff of beneficiary institutions from across the country for the train-the-trainer capacity building programme on Research Proposal Writing and Grant Management held in various countries between 2019 and 2022. This laudable programme is being stepped down locally across the geopolitical zones to ensure that more lecturers of beneficiary institutions benefit from it.

The recognition of the role of Centres of Excellence in Institutionalization of R&D has motivated the Fund to establish twenty-four (24) Centres of Excellence in our beneficiary institutions with twelve (12) Centres in selected Universities, six (6) Centres in selected Polytechnics, and six (6) Centres in selected Colleges of Education specializing in various aspect of national needs across the geopolitical zones. The initiative is provoked by the belief that Centres of Excellence invariably define research and innovation priorities of any country for local, regional and national needs. This new thinking by the Fund underscores the unwavering commitment of TETFund to promote the interface between the academia and industry, on the premise that the Centres would ultimately partner with research institutions and the industry, being an organizational environment that strive for high standards of protocols and

methodical benchmarks in the field of research and innovation.

Plans are also afoot to establish Entrepreneurship Hubs and Innovation Hubs/Parks in our beneficiary institutions and link them with industry to enhance entrepreneurship, innovation and employability in line with contemporary global best practice. The Hubs/Parks are expected to provide the enabling environment for conducting ground-breaking research and development of innovative technologies and solutions to drive national development through R&D innovations, initiatives and stimulate the Triple Helix Synergy in Nigeria.

12.0 CONCLUSION

This paper has attempted to highlight the importance of education and research, and the nexus that exists between human capital development and the attainment of overall socio-economic advancement of any society. It showed how and why education developed across the world and the benefit that it has brought to mankind by creating the needed human capital for the progress achieved so far. It has particularly shown how the Nigerian education system evolved and expanded overtime and explored Nigeria's potential to develop an enduring research culture to underpin its future greatness.

We have identified the absence or lack of a philosophy in national planning, frequent change in government and government's policies, inadequate funding and investment by both government and the private sector as being responsible for the absence and decline in research activities in Nigeria's higher education institutions. Poor or dilapidated infrastructure including steady power, lack of facilities and capacity to carryout research by the teachers/scholars have also been identified as major challenges coupled with the inability of our institutions to foster international

collaborations and expand research networks across borders and disciplines.

Concrete steps will have to be taken to address these problems if the nation is to achieve and build the needed human capital to develop the country. One of the most important steps is creating the needed atmosphere or environment for research activities in the country by government. The provision of basic infrastructure and facilities, which goes hand in hand with increased budgetary allocation to the education sector and to research specifically, has become imperative. Understanding the specific context and diversity of individual research systems and how it relates to partnerships and international cooperation remains key to effective research and capacity building among the nation's academics. Developing national systems for research to identify needs is also necessary. It is through such systems that research results and local impact are known and measured. Building research capacity becomes paramount and can be carried out through fostering collaborations, partnerships and networking among local and international researchers, sharing and managing research and funding research [Global Research Council]. There is also the need for Nigeria's higher institution to focus on research that is aimed at solving local problems instead of struggling to publish papers for promotion.

The triple helix model of Government-academia industry collaboration is the panacea for transforming research and education generally in our Country. That to my mind is the mission link as it will simultaneously address issues of focus, funding and relevance.

I thank you all for your kind attention.

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