

**THE FUTURE OF EDUCATION: THE IMPACT OF TETFUND
INTERVENTION ON PROVIDING EMERGING TECHNOLOGIES IN
TERTIARY INSTITUTIONS IN NIGERIA.**

A paper presentation by the

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Introduction

It is with great pleasure that I welcome you all to this very important engagement. Such events like this always give an avenue for strengthening our commitment of providing the enabling environment for the needed manpower that will put the nation on the path to economic development and growth. Programs of this nature will continue to deepen our understanding and educate us and society of our responsibilities as citizens and as scholars and will consistently remind us of our obligations to nation building.

Technological advancement is unambiguously correlated with globalization. The information age has increased the rate of globalization like never before, as the rapid expansion of the Internet creates an irreversibly networked world. The rapid spread of technology fueled by the Internet has led to positive cultural changes in developing countries. Easier, faster communication has contributed to the rise of democracy, as well as the alleviation of poverty. Globalization can also increase cultural awareness and promote diversity. The diffusion of technology has become a phenomenon that has necessitated the use of technology across shores and nations-especially with the advent of several electronic gadgets such as televisions, cameras, mobile telephones and computers etc.

This leaves nations and peoples with no alternatives but to invest in the development of technology and the skills needed for citizens to compete globally. No nation in this age can survive without technology and the requisite skills that accompany it, including Nigeria. It is only through investment in science and technology through education that the economy of Nigeria can be transformed, and it is for this reason that the government has been struggling over the years to ensure that quality education is provided to citizens at all levels of education and at the tertiary level. Nigeria as a nation must develop the capacity of its citizens to cope with current trend in technology development across the world.

The adoption of technology by developing countries it is believed will have a profound effect on their economies, such as reducing the national costs of production, establishing standards for quality, and allowing individuals to communicate across the globe. Nigeria and other third world nations must not only adapt to these technologies but also focus attention on innovation. In addition, the need for technologies appropriate to the capabilities of developing countries has been recognized due to peculiarities and level of growth and this allows for countries to plan and grow at their own pace.

In order to participate in a high-tech marketplace, developing nations require individuals with technical expertise. It is for this reason that institutions such as the Tertiary Education Trust Fund were established by government to support in the

provision of the kind of education that will produce competent individuals with these skills that are required in today's technology driven world. Over the years, the government has been consistent in its support to TETFund to achieve its mandate of improving the condition and quality of all public tertiary institutions in Nigeria.

Education, Technology and National Development

The importance of Education and Technology in our society cannot be over emphasized. Education is an important issue in one's life. It is the key to success in the future and to have many opportunities in our life. Education is quite noteworthy for the development and growth of a country. No nation could be developed without education. Education plays a vigorous and vivacious role in the progress of a country. The role of education in nation-building is pivotal. Nigeria's biggest problem prevails in the area of education. This problem will lead to the biggest hurdle in the way of national development.

All advanced nations and societies lay emphasis on the attainment of knowledge. This is because it is the key to success. Education is a significant component in the course of development and change. It contains a protuberant position in all social orders. It is for this reason that the modern world is profoundly concerned with the task of growth and expansion of knowledge. Education is the synthesizing factor that builds both common ethos and institutions which are of paramount importance for national growth and security, whether political, economic, social or cultural, as Mahatma Gandhi said "Education without character is evil."

Technology on the other hand, is a means of harnessing and exploiting our understanding of nature for our own benefit. It is an application of knowledge for practical purpose. It is used to improve human condition, natural environment or to carry out other socio-economic activities. It could also be defined or refers to all processes dealing with materials and their end products. One important attribute of technology is that it does not just happen; it is developed and learned whether in the form of manual skills or as an applied science. It is the systematic application of collective human rationality to the solution of human problems through the assertion of control over nature; technology is the engine of growth. Technology can be traced historically to the beginning of time to be man's quest to improve his way and quality of life. According to Egbogah (2012), Technology is the total and complete application of man's knowledge, skills, tools and materials. It is the use of scientific knowledge to develop and produce goods and services useful to man. It is practical problem-solving enterprise, which is propelled by scientific discovery or by societal needs.

In Nigeria, plans regarding the development of the country began in earnest under the colonial administration. Administrative and bureaucratic changes made it necessary for citizens to acquire western education to be able to fit into the new and emerging structure. In realization of the enormous responsibilities that comes with self-rule, the need for education to cater for the manpower needed by Nigerians to manage the economy and all sectors became glaring to all, including of course the European colonizers. At the tertiary level, plans were made for the establishment of polytechnics to promote technological development and boost the nation's drive towards industrialization. Nigeria's public tertiary institutions also continue to provide the basic knowledge in various fields and the manpower needed for the technological development of the country. Several engineering and science related courses in these institutions were designed to prepare citizens to contribute to the technological development of the nation in various areas.

The major setback facing education in Nigeria presently includes; poor funding, poor governance, corruption, politicization of education, lack of infrastructure, lack of teaching aids, and unaffordable education, while the hinderance in technological development presently includes; poor electricity, poor internet quality, government policies, identity management, funding, and data security. Addressing these challenges would give rise to technological growth in our country Nigeria. The technology that will take us forward can be built on sound, ethical, smart principals. It can invite unique perspectives. It can provide empowerment, knowledge, awareness, access, and community.

As we develop the technology of the future, we can work towards creating a better world long term. This means many different things as technology merges with all parts of our lives. For example, EdTech (education technology) can make knowledge more accessible globally and algorithms have the potential to remove or alleviate human bias. Technology can be a force for good in the world. But we have to ensure that all people are represented when developing that technology. By creating systems that encourage diversity and value equality now, we can help to ensure that technology, innovation, and the future, will be better. Essentially, technology is the primary engine of economic growth. It is the key and fundamental requirement for value addition to raw materials and people. It provides the key to unlocking any country's potential in terms of decreasing over-head costs associated with out sourcing and creating employment opportunities. Science and technology education will not only prepare the Youths of Nigeria and indeed any other nation, for fulfilling career prospects, but also train their minds to address social problems with scientific mind. Youths equipped with science and technology education are also

endowed with high employment opportunities. Many developed and advanced countries did progress much because of their heavy investments on science and technology. The United Kingdom and France benefited immensely from the industrial revolution in the 19th century. Similarly, the United States emerged from an agrarian economy in the 19th century into an industrial superpower in the 20th century. More recently, Taiwan and Korea have exploited advances in silicon microelectronics from the early 1960s. China and India have emerged as industrial leaders in manufacturing and information technology respectively. Malaysia has also followed in the footsteps of these later Asian successes. It is necessary to emphasize here that in recorded achievements all these countries invested heavily in people, factories and infrastructure that provided the foundation for today's industries. These successes were all based on carefully designed roadmaps of plans and strategies.

Basically, TETFund since its establishment has continued to support public tertiary institutions in Nigeria to achieve the objectives for which they were established. It has focused its support and intervention in universities, polytechnics and colleges of education across the country to improve conditions of the institutions and promote and create a conducive atmosphere for learning and research through its diverse intervention lines as would be seen.

TETFund and the promotion Technology in Tertiary Institutions

The Tertiary Education Trust Fund was originally established as Education Trust Fund (ETF) by Act No 7 of 1993 as amended by Act No 40 of 1998 (now repealed and replaced with Tertiary Education Trust Fund Act 2011). It is an intervention agency set up to provide supplementary support to all levels of public tertiary institutions with the main objective of using funding alongside project management for the rehabilitation, restoration and consolidation of Tertiary Education in Nigeria. The main source of income available to the Fund is the two per cent education tax paid from the assessable profit of companies registered in Nigeria. The Federal Inland Revenue Services (FIRS) assesses collects the tax on behalf of the Fund. The funds are disbursed for the general improvement of education in federal and state tertiary educations specifically for the provision or maintenance of:

- Essential physical infrastructure for teaching and learning;
- Institutional material and equipment;
- Research and publications;
- Academic staff training and development, and;
- Any other need which, in the opinion of the Board of Trustees, is critical and essential for the improvement and maintenance of standards in higher educational institutions.

Technology as we know is a product of research, innovations, discoveries of ideas. This been stated, TETFund has been providing emerging technologies in the various tertiary institutions in Nigeria through different intervention lines especially in the area of Research and Development/Centres of Excellence and ICT support interventions. These various interventions have helped in providing technological support in the different beneficiary institutions.

The Department of Research and Development/Centres of Excellence in TETFund was established in 2014. In 2011, the Fund launched the National Research Fund (NRF) with a seed fund of N3Billion as its take-off grant to support cutting edge research in areas of critical national need and development; and 2015, N1Billion was added. Following the approval of TETFund Board of Trustees in 2019, the NRF allocation became annual and N5Billion was approved for that year. In 2020, President Muhammadu Buhari approved additional 50% increase in allocation to the NRF, being N7.5Billion for that year and N8.5Billion in 2021. So far, a total sum of N9Billion has been accessed by lecturers to finance their research activities. A total 457 research projects have been approved across the country; some have been completed while some are still ongoing. Apart from the above intervention mentioned, the Fund also allocates funds on an annual basis to support Academic Research Journals and Institution Based Research (IBR) for research projects that are not more than N2Million per projects across public tertiary institutions. So far, about 2,175 projects have been approved for institution Based Research and 342 Academic Research Journal projects were undertaken between 2011 and 2021.

Furthermore, it is important to note that TETFund has been playing a significant role in Covid 19 Research in the country and drug development in general, in partnership with research institutes in the country. At the outbreak of the covid 19 pandemic in Nigeria in 2020, the Fund in collaboration with the Nigeria Centre for Disease Control (NCDC) formed the National Covid-19 Research Consortium (NCRC) with the secretariat located in TETFund office in Abuja. The sum ranging from N250million to N450million was approved for four mega research clusters in response to COVID-19 Vaccines and Drug Research, Security/Defense and Diary R&D in the 2021 budget.

TETFund is promoting the adoption of people-centric triple helix model involving partnership between government, academia and private sector in research and development for the benefit of society. Strong industry-academia partnerships promote economic development and many of the world's strongest economies derive their economic strength largely from strong collaboration between the academic and private sectors. Industry-academia partnership is very weak in Nigeria's agricultural R&D. Strong multi sectorial, multi actor partnerships coupled

with collaboration with regulatory agencies, professional associations, international development partners, donor agencies, non-governmental organisations (NGOs) such as World Fish and International Union of Food Science and Technology (IUFOST) and community based organizations (CBOs) that are expected to provide support in project implementation, advocacy, monitoring and evaluation and other activities will strengthen agricultural R&D in Nigeria.

Twelve (12) Centers of Excellence; two in each of the six geopolitical zones, mainly, first, second and third generation universities. The 12 TETFund Centers of Excellence in various disciplines, mainly in STEM disciplines, with significant number in food science and technology, some of them in marine, artificial intelligence, of course medicine, pharmaceuticals, etc. The establishment of all these centres of excellence is tailored to achieving new innovations and discoveries that would aid developments in the nation through modern technologies.

Laboratories, Entrepreneurship and Equipment Fabrication Intervention

The establishment of various laboratories in most of our beneficiary institutions has also shown commitment of the Fund towards developing and creating enabling facilities for students in discovering solutions to problems in health, and other related fields. We can never write off the health sector as part of a segment in nation building. Between the years 2020 to 2022, a total number of 329 laboratory buildings has either been constructed or renovated, 634 equipment/furniture have been procured for laboratories for our beneficiary institutions across the six geopolitical zones, amounting to over **N239,893,793,431.96** that has been spent towards achieving this. Furthermore, 67 entrepreneurship intervention and 61 equipment fabrication intervention has also been accessed by various beneficiary institutions in the six geopolitical zones. These various interventions are given to our institutions to support the growth of technological innovations and discoveries. These discoveries that have been made has also aided technologically development in our tertiary institutions.

ICT SUPPORT

ICT Support intervention of the Fund kicked off with Year 2016 – 2018 allocation for the provision of ICT capacity building and website redesign in Beneficiary Institutions. A total of 201 Nos Approval-In-Principle and 196 Nos. First Tranche payments were processed to Universities, Polytechnics and Colleges of Education

A total number of 77 AIPs has been given to different universities and 74 of the first tranche disbursed, for polytechnics, 58 AIPs have been given with 58 first tranche also disbursed while for colleges of education, 66 AIPs given and 64 first tranches

disbursed. This total to about **N 4,065,125,000.00** been disbursed for ICT support intervention between the year 2016-2018.

The Fund has been able to execute some ICT projects which include Digitalization, Optimization, Automation and General Upgrade of the Funds ICT capacity towards the attainment of an enhanced service delivery. Digitization, Automation and General upgrade of ICT infrastructure cum services for Beneficiary Institutions, Sensitization and capacity of Beneficiary Institutions on ICT infrastructure and Digitization of Thesis/Dissertation projects. Some of the deliverables including the following which have been either completed or ongoing:

- Website and internet service upgrade
- Implementation of work flow automation
- Procurements of scanners, software licenses, laptops, desktops
- ICT GAPs and assessment
- Impact tracking and monitoring
- Provision of LAN, digitization/infrastructure and services across all Beneficiary institutions of the Fund

All these projects are geared towards supporting our tertiary institutions in providing technology.

Infrastructure Development

Infrastructure has been given special attention because of its decay and collapse across public tertiary institution in Nigeria. A careful observation will reveal that the Fund has between January – December 2020 alone carried out 16,982 various infrastructural projects across beneficiary institutions. Considering the projects carried out since inception, based on annual allocation to institutions over the years (2011-2021), it is estimated that a total of over 152,838 various infrastructural projects have been carried out across various public tertiary institutions. These projects include construction of lecture theatres, classrooms, hostels, offices, laboratories, road network and fencing of institutions in different parts of the country. Tertiary institutions across the country are dotted with TETFund projects which bear the insignia of the Fund distinctly inscribed on each project.

Academic Staff Training and Development

TETFund has sponsored over 10,632 lecturers in the local Ph.D. program, as well as over 9,072 lecturers in the local master's degree programme across the country between 2011 and year 2020. The Fund has also sponsored well over 4,485 lecturers to overseas institutions for PhD programs and over 3,192 Master's degree candidates also overseas across tertiary institutions within the same period. The

Fund has further supported 71,263 Lecturers in Federal and State Colleges of Education under its teacher supervision program, bringing it to a total number of 98,644 academic staff across public tertiary institutions that have benefited from the academic staff training and development program of the Fund. The Fund has sponsored an estimated 17,121 academic staff across tertiary institutions in the country to foreign conferences, 4,459 non-academic staff of public tertiary institutions have also benefitted from the same sponsorship. In addition, 17,410 academic staff were sponsored to attend local conferences within the country, while about 28,660 non-academic staff were sponsored by the Fund to attend local conferences workshops across beneficiary institutions in the country, all in the effort to build the nations capacity, skills, and manpower. In all, the Fund has sponsored a total of 67,650 academic and non-academic staff of public tertiary institutions to local and overseas conferences between 2011 and year 2021.

Library Development

The Fund's Library intervention programs also recorded tremendous impact, including the academic manuscript development to books. Between year 2011 and 2021, the Fund succeeded in procuring 2,080,041 books for use in libraries of public tertiary institutions across the nation, to equip students and lecturers of institutions with resources required to impart the necessary knowledge required in the 21st century. TETFund also between 2011 and 2020 procured 152,844 E-Resources and 380,778 equipment and furniture distributed to various public tertiary institutions across the country. In the area of academic manuscripts to books, the Fund supported and approved a total of 1,362 manuscripts to books across 149 public tertiary institutions in the country, all intended to build the capacity of academic staff and students, as well as to stimulate research and publication across public tertiary institutions in Nigeria.

Conclusion

No doubt, technology holds the key to the present and future development of any nation including Nigeria. Technology is achieved through a combination of knowledge, methods, tools and skills. This four-element definition of technology offers the details and clarity required for technology enhancement planning that must necessarily include knowledge and skills upgrade (training) and acquisition of human elements (knowledge and skills) and the tangible elements (methods and tools) of technology form the basis for our thinking and working processes. We must ensure adequate development of man power in science and technology to guarantee the efficient utilization of abundant natural

resources and reduce the drain on our treasury and independence on outside sources for industrialization. The nation should be technologically self-reliant in the production of capital and consumer goods and raw materials. The educational system shall emphasize science at all levels and re-orient the entire society towards scientific thinking in order to develop new technologies and adapt existing ones to improve societal well-being and security. Technology-based developments can occur only with concerted efforts to revitalize education, develop personnel and create integrated industries that will involve close collaboration between government, industry and academia. Considering the roles of technology in national development, it become important to stimulate demand for technology from private sector, renew emphasis on the creation of linkages between firms and knowledge institutions, reform enabling environments for better use of knowledge, setting priority and evaluation right, promoting transparency, objectivity, selectivity and international best practices in science and technology funding, increasing access to ICTs and Government as a consumer of knowledge.

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