

Technological Innovation And Socio-Economic Development In Nigeria: Issues And Perspectives

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Abstract

Nigerian economy has been experiencing low real gross domestic product (RGDP) over the years, resulting in increasing unemployment and poor standard of living of the people. This is further exacerbated by poor technological innovation in the productive sector of the economy. Thus, the paper examined the impact of technological innovation on the socio-economic well-being of the citizenry. The study adopted the qualitative approach. This has to do with the content analysis of secondary. The paper revealed that Nigeria has made noticeable achievements in technological innovations, especially in the area of Information and Communication Technology (ICT) and financial technology. However, the study concludes that these innovations are not far-reaching enough in the wider spectrum of the economy to enhance the socio-economic conditions and well-being of the people. Thus, government/policy makers must necessarily invest in research and development (R and D) to engender massive technological innovation to cover a wider spectrum of the productive sector.

Keywords: *Technological innovation, Socio-economic development, unemployment, productivity, investment, research and development*

Introduction

Today's socio-economic development efforts are globally driven by high pace of technological innovations. Across the nations of the world, especially the third world countries, leaders and economic planners have identified the importance of innovation in the socio-economic development of their nations. Innovations can make a difference in addressing urgent socio-economic developmental challenges such as providing access to drinking water, eradicating neglected diseases and reducing hunger (Organization for Economic Co-operation and Development (OECD), 2012). Many growth-enhancing innovations also address social challenges. For example, poverty-related effects can substantially influence the opportunities to engage in entrepreneurial activities. Ill health for example, reduce the potential productivity of workers. So, the addressing of social challenges can also encourage growth processes. In India's Green Revolution of the 1960s, innovations led to the introduction of high-yield varieties of seeds, and the increased use of fertilizers and irrigation also resulted in a substantial increase in grain production. The innovations did not only raise agricultural productivity but also directly addressed food scarcity among the country's poor (OECD, 2012).

Siyanbola, (2008) asserts that more than 50% of the wealth created in developed countries emanated from technology innovations. From a strict political economy perspective, technology is the pivot on which socio-economic activities revolve. In fact, technological transformation in countries such as the United States of America, China, France, United Kingdom, India, and South Korea has undoubtedly contributed significantly to the listing of these countries among the top 20 economies in the world. These technological transformations can be linked to high-level innovation in the afore-mentioned countries. Technological innovations, leading to the creation of new goods, new processes and new knowledge, are the major sources of technical changes (Guellec and van Pottelsberghe, 2001). Innovative activities also entail the creation of new knowledge and the absorption of existing technology, which further lead to a reduction in the existing cost of production and improvement in the quality of products.

One of the important lessons of the past two decades has been the pivotal role of technological innovation in socio-economic development. Thus, the build-up of innovation capacities has played central role in the growth dynamics of successful developing countries (OECD, 2012) and Nigeria is not an exception. In Nigeria, within the space of the last two decades, innovations in the Information and Communication Technology sector, experienced unprecedented progress. According to Other Credit and Charges

Consulting (2018), innovations in Information and Communication Technologies grew from less than 1 percent of GDP in 2001 to almost 10 percent of GDP in 2018. Nigeria also surpassed South Africa to emerge as a premier investment destination with 55 active tech hubs, raising a total of US\$ 94.9 million, while South Africa raised US\$60.0 million with 59 active start-ups (Usman, Choi, and Dutz, 2019). Nigeria is also Africa's biggest technology market and accounts for 23 percent of internet users in Africa with 122 million people online in December 2018 (Internet World Stats, 2019). It also has the largest number of telecommunications subscribers, with a teledensity figure of almost 90 percent (Nigerian Communications Commission, 2019).

The growth of the technological innovation in the Information and Communication Technological sector offers new possibilities for Nigeria's growing labour force, in terms of employment and entrepreneurship development. The potential benefits derived from the adoption of innovations in Information and Communication Technology and the importance to socio-economic development in Nigeria have been pointed out in many contexts, including commerce, health, education, to mention only few. Many business practices have been altered due to rapid developments and the popularity of innovations in information technology. Konga (<http://www.konga.com/>) and similar e-commerce websites, where customers buy products and pay for them on the Web, have grown rapidly and become a critical channel for reaching consumers. These activities have positively affected the socio-economic development of Nigeria. With the above background in mind, therefore, this paper seeks to explain the impacts of technological innovations on the socio-economic development in Nigeria. Efforts will therefore be made to look at the innovations in ICT and their contributions to socio-economic development in Nigeria.

Technological innovation

Technology is the organization of knowledge for practical purposes. Over time, technology or knowledge that is useful and effective, may become obsolete and require innovation or improvement. According to Audrey and Jaraji (2016), technology includes the use of materials, tools, techniques, and sources of power to make life bearable or more pleasant, and work more, productive. Technology focuses on making things happen. Technology can be internal or external. In the external view, technology means the systematic discourse about practical art, and in the internal view technology, means the systematic reasoning of practical art itself (Audrey and Jaraji, 2016). On the other hand, to define innovation, one might return to the Latin origin of the word innovation or 'innovate', which means 'to make something new'. The Latin concept is quite cryptic for the better understanding when divided into three parts. To make something new one has to:

- Generate or realize a new idea (invention and creativity)
- Develop this idea into a reality or product (realization)
- Implement and market this new idea (implementation)

Again, innovation is described as any good, service or idea that is perceived by someone as new (Kotler, 2003). According to Rogers (1995), innovation takes time to spread through the social system, and innovation diffusion process is the spreading of a new idea from its source of invention or creation to its ultimate users or adopters. Baker (2002) posits that the primary drivers of innovations include, financial pressures to decrease costs

and increase efficiency, increase competition, shorter product life cycles, value migration, stricter regulations, industry and community needs for sustainable development, increased demand for accountability, community and social expectations and pressures, demographic, social and market changes, rising customer expectations regarding service and quality, greater availability of potentially useful new technologies coupled with the need to keep up or exceed the competition in applying these new technologies, and the changing economy.

Therefore, technological innovation can be defined as the process of developing new ideas, products, services, and processes which exploit technology.

It may be driven by a new technology (How can we use this?) or by needs (What technology might we apply to improve this?). At its best, technological innovation creates valuable products and services no one has yet asked for, or creates "disruptive" change (major leaps in the way things are done) (Audrey and Jaraji, 2016).

Walsh and Linton (2002) assert that technological innovation is a unique technique or manufacturing process owned by a company, which allows it to react quickly to an environmental shift. Burgelman, Christensen and Wheelwright (2004) posit that technological innovation designates the capability of an organization to choose, diffuse and then improve its technology. It is a progressive process of experience-accumulation including the use of technology, the improvement and application of existing technology. Yam, Guan, Pun and Tang (2004) emphasize that technological innovation is the skill involved in realizing and supporting a company's technological innovation strategy. In their study, they also propose seven dimensions for measuring technological innovation which include: technology learning, research and development (R & D), resource allocation, manufacturing ability, marketing skill, organizational skill/strategy and scale related ability, Archibugi and Coco (2005) point out that technological innovation is the ability to access and digest external knowledge into some unique skill or knowledge, then use it in a dynamic way to improve or develop a new product and launch it successfully. It is in this regard Harry and Kalagbor (2019), opine that the place of research and development in the entire process of technological innovation need not be overemphasized.

Development and socio-economic development

Today's economic environment has engendered a different definition of development. Development, therefore, is not restricted to building bridges, constructing roads and building houses. These activities, according to Kalagbor (2017), are regarded as artifacts of development. Therefore, in the conceptualization and operational interpretation of development, it is only imperative for development to encompass all sectors of human endeavours. Essentially, development must represent the entire changes by which an entire social system turns to the diverse basic needs and desires of both individuals and social groups within the system (Kalu, 2018). This can also represent moves for a condition of life generally considered as unsatisfactory both mentally and materially so that sustenance and improvement occur and are abreast with the progress of the time (Kalu, 2018). Rodney (1972) asserts that development in human society is a many-sided process which differently implies at the level of individuals and at the level of social groups. According to him, development at the level of individuals implies increased skill and capacity, greater

freedom, creativity, self-discipline, responsibility and material well-being. While development at the level of social groups, implies an increasing capacity to regulate both internal and external relationships. He added that development in the past has always meant the increase in the ability to guard the independence of the social groups and indeed to infringe upon the freedom of others - something that often came about, irrespective of the will of the persons within the societies involved (Omosulu, 2013).

Enemuo, (2011) opines that development refers to the initialization and improvement of the general well-being of the people through encouragement and utilization of local potentials. Enemuo's emphasis on utilization of local potentials is critical to the socio-economic well-being of the people since development in all intents and purposes is expected to be human-centred. In stressing on what constitutes development, Kalu (2018) emphasizes that development is conceived and explained as multi-dimensional process involving changes in structures, attitudes and institutions, as well as, the acceleration of economic growth, the reduction of inequality and eradication of absolute poverty. Sen (1999) defines development with the aid of three central concepts: functioning, capacities and freedom. Functioning refers to what a person does or can do with the commodity of given characteristics that he possesses or controls. Capacities imply the freedom that a person has in terms of functioning. They are determined by income, health and educational standards. Freedom means, freedom of choice or control of one's life. This includes: political freedom, economic facilities and social opportunities. From the foregoing view points, development can be conceived as the capacity to function. It is concerned with enhancing the lives people live, and the freedom they enjoy. At the core of all development effort is freedom of choice by enhancing people's capacities to attain higher standards of health, knowledge, self-respect and the ability to participate actively in community life (Sen, 1999).

Socio-economic development

We are confronted with what will constitute the meaning of socio-economic development. According to Eme (2014) socio-economic development means an increase in per capita income and changes towards modernization. Such changes toward modernization are the rise in productivity, an improvement in attitudes, institutions and structures, and a reduction in poverty, economic inequality and unemployment. It is important to note that a rise in the real income per capita, per head is still the best available indicator of socio-economic development (Eme, 2014). Moreso, economic development is generally measured by the amount of production in a country or region over a certain period of time. Put differently, the rate of change of gross domestic product (GDP), which may be positive or negative growth, determines economic development (Stanley, 2012). Socio-economic development is seen both as a policy and profession. Rodney (1972), observes, that a society develops economically as its members increase jointly their capacity for dealing with the environment. This capacity, as Rodney (1972) puts it, depends on the extent to which they understand the laws of nature, on the extent to which they put that understanding into practice (innovation), by devising tools (technology) and the manner in which work is organized. Taking a long-term view, it can be said that there has been

constant socio-economic development with human society. Man has multiplied enormously his natural environment, though he impacts on other sectors of development, by working hand in hand with the economy to ensure a better economic development. Such other sectors of development are electronic development, technological development, political development, etc.

Thus, where there are lapses in these sectors, modern socio-economic development will not be achieved. Developing socio-economically also has to do with being advanced further, by producing more and becoming wealthier.

Generally, every nation has shown a capacity for independently increasing their ability to live a more satisfactory life through exploiting the resources of nature. Rodney (1972), rightly observes that every continent can point to a period of socio-economic development. The overall tendency was towards increased production, and at a given point in time, the increase in the quality of goods is associated with a change in the quality or character of society (Rodney, 1972). In general, the Schumpeterian point of view approaches socio-economic development as a qualitative changes-process, and consequence of innovation. Thus, J. Schumpeter addresses innovation as a function of entrepreneurial activity, in which “new combinations” of existing resources occur. The definition offered by Schumpeter in the *Theory of Economic Development* (1934) is continuing to be referential in associating “new combinations” of production factors of new products and services, introducing new production processes, marketing and business organization (Mihaela, 2011).

Technological innovation and socio-economic development

Innovative capacity is a key determinant of economic competitiveness of nations. At the same time, innovation is the engine of socio-economic progress and welfare. Innovation is an instrument to solve current global challenges related to environment and health domain (Mihaela, 2011). In this regard, socio-economic development of any nation is largely dependent on the creativeness and imaginative sense of its population to invent and generate new ideas in supporting and increasing production, employment and environmental protection. Furthermore, socio-economic development is in part due to increased capital investment and in part to population growth. The main driver has been technological progress – getting more output from the same quantity of capital and labour or getting the same output from less capital and labour (Bingqin and David, 2018). As Romer (2008) puts it “Socio-economic development occurs whenever people take resources and rearrange them in ways that make them more valuable... We consistently fail to grasp how many ideas remain to be discovered”. In another dimension, if the demand for goods and services is constant, then less labour will be employed; this may be shorter working hours for everyone or it may be total unemployment for a bigger share of the labour force (Bingqin and David, 2018). The reason most developed economies, especially in Asia, do not experience mass unemployment is that demand for goods and services has not been constant but has been rising steadily. Certainly, the development of the motor bus led to a collapse in demand for horse-drawn buses and many who fed, shod or rode horses lost their jobs; but the demand for motor buses, drivers, and mechanics

went up, as did the demand for housing Out of the city centres in locations that motor buses made attainable (Bingqin and David, 2018).

Methodology

The study employed the qualitative design, or library/documentary research design. The design is considered appropriate for the study, because it enabled the collection of data from mainly secondary sources.

The processing and analysis of data collected, was based on the content analysis method. The method was used to analyze the data collected from books, newspapers, magazines, and online journals.

Discussion

State of modern technology in Nigeria

Technological development in Nigeria evolved through the years after political independence in 1960; followed by the concern for economic independence. The aim was to gradually reduce Nigeria's dependence on Britain, her former colonial master, that dominated the production and distribution process in Nigeria at that time. Economic development was to progress in an orderly manner without dislocation in the system. The existing companies were to be encouraged and new ones were to be attracted to increase investment in Nigeria (Uwaifo and Uddin, 2009). Foreign investments were therefore to be vigorously encouraged. Nigeria was to be non-aligned so as to attract capital from both East and West. This, it was thought, would gradually reduce the grip Britain had on Nigeria's economy (Uwaifo and Uddin, 2009).

Today, new technological equipment has opened up new opportunities for Nigerians, who possess the required skills to provide expert-oriented services such as data entry, data processing and software development, as well as, innovations in the Information Communication Technology (ICT) sector such as Konga, Jumia, Online Exchange (OLX), etc. These technological equipment and innovation provide job opportunities for many Nigerians for the economic and social development of the country. According to David (2004), countries that have electronic communication networks, arising from innovations in information technology, have made practicable online access to a variety of technical and non-technical information, and have turned the world into a virtual workplace. In Nigeria, many government agencies are now using websites to provide information on the activities of government. Today the people of Nigeria can go to the internet and get any information they want. Jobs, contracts, and government activities are posted to websites for public knowledge. This has greatly improved productivity, thereby making the economy of Nigeria increase its capabilities, particularly in the service sector, which accounted for 53 percent of real GDP in 2019. Moreso, Nigeria is certainly on a promising path. Already, it is Africa's largest technology market by internet users and mobile subscriptions, and it boasts the second-highest tech-startup density on the continent (Elo.2020). Lagos is fast-becoming a tech hub, with more than 400 startups valued over \$2 billion. Add to that a burgeoning population, and Nigeria is beginning to look to like India five years ago (Elo, 2020).

Nature of technological innovation in Nigeria

According to the Global Creativity Index, technology rankings are determined by looking at investment levels in research and development (Stephen, Chukwunonso, and Emilia, 2016). Countries that score highly on the Global Creativity Index have higher levels of productivity (measured as economic output per person), competitiveness, entrepreneurship, and overall human development (Stephen, Chukwunonso, and Emilia, 2016).

While reporting on the nature of technological innovation in Nigeria, the United Nations Conference on Trade and Development (2015) asserted that ICT firms reported higher innovation rates when compared to health care and pharmaceuticals. Obviously, it is true that the ICT sector in Nigeria, especially the ICT firms such as Globacom, Airtel, International Business Machine (IBM), Dataflex, etc, have contributed more to technological innovations in the country.

It cannot rightly be said that Nigeria has had unprecedented technological innovation in the past two decades, as other sectors in the economy such as agro, textile, manufacturing, etc, were lagging behind in terms of creativity, because ICT in these sectors is low.

It is also argued that Nigeria, at present, lacks, innovation, capacities and capabilities in information technology (IT) management and hardware maintenance. This is due to poor or low investment in research and development in the country. Therefore, the country's capacity to generate new ideas, knowledge, and competencies are tremendously low, hence the low level of technological innovation. This notwithstanding, the country has been importing and using a wide range of durable consumer electronics, computers and telecommunication equipment. Concerted and deliberate effort at technological innovation through R and D would have enhanced the capabilities to produce these products in the country to create jobs and improve the socio-economic status of the people. According to Kayode (2010), the shortage in manpower has remained a major setback to Nigeria's technological breakthrough in these sectors. This shortage is linked to the imperial educational system that gave little or no consideration to the technological needs of a rapidly-changing industrial economy. Nigeria today relies heavily on foreign assistance and expertise at the expense of local industrial research and developmental institutions. The cumulative effect is the graduation of half-baked engineers and technicians that know little or nothing regarding the practical application of knowledge (Afolabi 2009). Hence, the problem is not lack of resources, but the lack of productive investment, ability and clear imaginative orientation which has hindered the gap between reality and aspiration.

Improved technology and socio-economic development in Nigeria

The idea that improved technology fosters economic growth is broadly shared and accepted among economists worldwide. According to Federal Ministry of Science and Technology (2010), technological innovation has become a yardstick for measuring competitive advantage and a major determinant of enhanced productivity at both the firm and national levels. In Nigeria, the past decades experienced rapid changes in technological innovation, especially in the Information Communication and Technology sector. Improved technology has been utilized in so many different industries such that it is often regarded as its own unique industry subset, with applications across various businesses. Today, in Nigeria, improved technology is involved in industries as diverse as

food ordering applications, taxi-booking applications, e-learning platforms, retail-product design and a host of others. Again, large numbers of jobs, both formal and informal have been created in this sector due to the high rate of creativity in the sector. One of the creativities in the ICT sector in the case of Nigeria is the invention of Konga. Konga is a Nigerian electronic commerce organization founded in 2012 with headquarters in Ikeja, Lagos State (Vincent, 2018).

It offers an outsider online marketplace, and also first-party direct retail spreading over different categories including consumer electronics, fashion, home appliances, books, children's items, and personal care products. Konga was founded in July 2012 by Sim Shagaya, with 20 staff (Vincent, 2018).

Generally, Konga Nigeria is one of the today's Nigerian one-stop online retail shops offering a wide selection of products including mobile phones, computers, electronics, home appliances, toys, books, wears and numerous other items and conveying them to customers' doorstep (Vincent, 2018). The Nigerian economy still stands to benefit from the improved technology in supply and usage of Digital Financial Services (DFS). The DFS providers are better positioned to address the needs of the poor. They also create the 'rails' that enable digital entrepreneurs from other sectors to market their products. Because of the regional and pan-African footprints of Nigerian financial institutions, the country has an opportunity to export its digital financial ventures beyond its borders, diversifying the economy and fostering the regional integration within the ECOWAS (World Bank Group, 2019). According to the World Bank Group (2019) better DFS can also mean stronger links with the Nigerians in diaspora, boosting the inward remittance streams, encouraging investments, and facilitating the exchange of human capital. One technological invention that is very loud in the financial sector is Paystack. Paystack is one of the leading online payment gateways in Nigeria that allows businesses to collect payments from customers using MasterCard, Visa and Verve cards anywhere in the world. The Paystack integration tool is for small and medium scale businesses and individuals that are looking for quick and efficient ways to get paid online. With Paystack, you can accept online payments in the following currencies: Nigerian Naira (NGN) and US Dollars (USD).

Conclusion

Based on our discussion above, it is therefore an indisputable fact to state that technological innovation in any economy whether developed or developing, helps to drive socio-economic growth and as well as address socio-economic challenges including poverty. Ultimately, it would be more rewarding for Nigerian policy makers to realize the need to look inward, recognize the technological needs of the nation, and use same to develop a highly competitive manufacturing and industrial sector toward socio-economic development so as to move Nigeria upward to first world status. Thus, the conclusion of this paper is that the level of technological innovation in the country has not been far-reaching enough to engender socio-economic development. To achieve this, government/policy makers must make deliberate and concerted efforts in investing in R and D so as to generate new ideas across a broader spectrum of the economy.

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