



Impact of the “New Economy” on Nigeria’s Technological and Economic Development, and The Way Forward.

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Abstract

This study was carried out in order to determine the impact or implications of the ‘new economy’ on Nigeria’s technological and economic development and the way forward. The research was aimed at determining four distinct objectives; These were; to examine the technological and manufacturing capabilities / situation in Nigeria; the production regime of Nigeria and its contradiction in the current global economy; the threats of techno-nationalism, and its implications for Nigeria’s technological development; as well as the implications of the “new economy” and its overbearing weight on Nigeria’s technological, growth and economic development. Finally, strategies were proffered on the way forward for Nigeria. Qualitative research method was used for the study. The research revealed that; weak/poor manufacturing technology situation in Nigeria is responsible for its very poor performance in global trade; that the production regime in Nigeria is a contradiction to the current trends in the global economy; that the threats of techno-nationalism and protectionism is putting more pressure, as well as slowing down Nigeria’s technological and economic development; the findings also reveal that “new economy” framework has very serious implications for Nigeria’s economic and technological development; and based on the foregoing findings, the study recommended among others, increased expenditure and substantial funding of R & D Institutes, Universities, Polytechnics and Laboratories, etc.

Keywords: Automation, “new economy”, technology, techno-nationalism, digitalization, globalization, economic development, technological development industrialization, technological capabilities etc.

Introduction

The “New Economy” is the superior economic structure which arose as a result of the globalization of economic activities (business) on the one hand, and by the revolution in the information and communications technology (ICT) on the other hand. The revolutions in information and communications technology (ICT) have been a productive element in the globalization process. It has its own logic that drives the economics of globalization, that is, efficiency in production, leading to what is now called the “New Economy” (Gillian 2000). The “New Economy” is a theoretical concept that points to certain macro effects of a global economy in which real – time transactions are becoming paramount. Central to the argument of the rise of a “New Economy” is the notion that knowledge has become the most creative, value-adding factor in production. Whereas, in the old economy, land, labour and capital were the only “generic” factors of production, in the “New Economy” the critical assets are know-how, creativity, “intelligence” or “information”. Intelligence embedded in software and technology across a wide range of products has become more important than capital, materials, or labour. Whilst knowledge or information were always present in production, what

characterized the “New Economy” is that the production of knowledge or information has itself become the leading branch of economic activity (UNIDO, 2000).

In view of the above, it is safe to say there that the “New Economy” is characterised by rapid innovation, knowledge – based services, and high speed communication. It shifts from traditional physical manufacturing to intangible tech-driven value creation. Key features of the “New Economy” include globalization, capitalization and increased flexibility. Globalization has thus brought about inequalities, global digital and geographical divide.

In view of the above and contrary to the changing structure of world trade and economy in favour of the manufacture of a wide range of products, Nigeria still maintain the colonial pattern of trade. They are still major exporters of primary commodities and importers of industrial products. This is because, Nigeria is backward in productive technology. It virtually produces nothing in industrial terms, and have nothing to offer, much less compete in a global economy. A preponderant proportion of existing technologies is imported, and the rationale for such importation is that the dominant mechanism of acquiring technology is by purchase of machinery equipment and other artifacts of production. There are very few establishments that are committed to local research and development. In consequence, the technologies generated locally are very few and even the efforts of research and development establishments, are hampered by the low rate of commercialization of their findings and innovations. This discourages the process of learning by doing which is a sine-qua non for advanced technological development.

The above developments have therefore constituted a serious challenge to re-thinking the role of government in the promotion and stimulation of technological and industrial development. The situation has become very urgent, and critical because the benefits of globalization and the New Economy have been heavily concentrated in the developed countries, and the gap keeps widening because of the role of technology particularly in the ICT and manufacturing sectors. At the moment, the situation of Nigeria is comparable to that of a toddler participating in a 100 metre dash with world class athletes.

In view of the above, this research is therefore an inquiry into the features of production regimes in the Nigerian political economy, nature and thrust of Nigeria’s external trade relations, the state of technology infrastructure and industrialization in Nigeria.

The Problem

The “new economy” particularly as it relates or concerns recent technological changes, along with the new organizational forms of production, and new bases of competition, have important implications for Nigeria’s production regime or structure, industrial and technological development and competitiveness in the global economy.

A country’s ability to enter and remain competitive in export markets depends ultimately on domestic industries ability to match and then exceed international benchmarks of productive efficiency, which rise with every innovation. Knowledge and the ability to exploit it for economic ends is now recognised as a critical factor of production, giving rise to what has been called the “symbolic economy” in which power rests with those who control information (Toffler, 1990; cited in Irfan Ul Haque, 1995).

Notwithstanding the above developments, it's clear that Nigeria is not even ready to compete even in the "new economy" after over 60 years of political independence compared with some countries in South East Asia that got their political independence almost at the same time with Nigeria. For example, in the area of manufacturing, Nigeria is very weak and fragile. As noted by Aja-Akpuru (2001), in Nigeria, there is actually no productive technology for the manufacturing of standardised goods of international recognition. The economy is basically mono-cultural. So what obtains in Nigeria is the buying and selling of foreign goods. This is why some people / scholars are of the view that the situation in Nigeria is comparable to that of a toddler participating in a hundred metre dash with world class athletes. This is because, contrary to the current structure of the world economy in favour of manufactured products, Nigeria is still maintaining the colonial pattern of trade. They are still major exporters of primary products, and importers of industrial products. The primary sector and particularly, the oil and gas sector still dominate the gross domestic product (GDP) of Nigeria, accounting for over 95 percent of export earnings and about 85 percent of government revenue (Chete, Adeoti, Adeyinka, & Ogundele; 2015).

Another impact of problem of the new economy on the state of technological infrastructure in Nigeria is that Nigeria, and Africa in general seems to be suffering from two significant technology gaps. The first is in large and in many cases widening gap between technological capabilities employed by African firms, and those employed by firms in other parts of the world. This is in part, due to a large variance in domestic capabilities which exists among firms within manufacturing industries. Nigeria and Africa in general exhibits much more inter firm technological heterogeneity than other developing regions. The second is in the learning environment. In Nigeria, compared to other developing regions like South East Asian countries, the infrastructure for technical learning is too weak, such that key learning mechanisms, which provide the basis for technological upgrading in other developing countries are absent. The implication of these gaps, is that Nigeria, and Africa in general as a consequence has been under pressure and she is not only having problems catching up with the rest of the world, but has begun to fall further behind. The increasing gaps has been on two fronts –plant and machinery, as well as management and labour force skills to master new technologies (Tyler, Manju & Pradeep, 1995).

Beside the problem noted above, developing countries like Nigeria also face the twin threats of excessive protectionism, and the rise of "techno nationalism" (that is, national protection of technology transfer in industrial countries). This development has no doubt put more pressure on them, as well as restricted their ability to acquire advanced technological capabilities.

Prior to the 1980s, suppliers of technology were more willing than they are now to transfer technology at relatively low prices. Then, markets were less global or international, and therefore the sale of foreign technology tended to be seen more as an additional source of income, than as a contribution to a potential competitor. In their initial stages of development, countries like Korea, Taiwan, China and so on, were able to obtain much of their technology either through importation of capital goods, sub-contracting with foreign buyers, or arranging for foreign and technical assistance contracts (Westphal, Kim and Dahlman, 1985 cited in Irfan Ul Haque, 1995). Therefore, a direct consequence of increasing globalization is that, as

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technology becomes a key element of international competitiveness, more efforts are being made to restrict its movement and transfer to developing countries like Nigeria, whom the industrially advanced countries consider as potential competitors (Irfan Ul Haque, 1995).

Finally, it is also important to note here that recent revolutions and advancements in technology has a direct impact on many developing countries like Nigeria that solely depend on the production and exportation of some natural / agricultural products. For example, technological advances that have led to better integration between design and production, and new optimization techniques have brought about material savings. Synthetics are replacing many traditional materials such as natural rubber fibres (notably cotton and jute) while composites such as plastics and ceramics are being substituted for steel and aluminium, and optical fibre is replacing copper. Currently, solar energy and gas is gradually replacing petroleum energy and the like. These displacements, no doubt will have very dire impact or consequences on developing countries like Nigeria that depend on some of these primary products for survival. At the same time, the increase in automation and robotics technology made possible by new electronics software based technologies has resulted in a decline in the direct labour share of production costs, though in the industrially advanced nations for now, but it is most likely to be the trend in Nigeria and Africa in general, in the nearest future. Increased automation means that cheap labour may no longer be a sufficient basis for competitiveness in some industries, and in some developing countries like Nigeria, in the nearest future.

The above developments have therefore constituted a serious challenge to re-thinking Nigeria's techno-industrial strategic framework, and trade policies against globalisation and its "new economic" logic.

Research Questions

This study will revolve around the following research questions:

1. To what extent is it true that weak / poor manufacturing technology is responsible for poor performance of Nigeria in the global economy?
2. What is the production regime of Nigerian political economy, and why is it contrary to the dictates of the current global economy?
3. What is techno-nationalism, and how does it impact technological development and industrilization in Nigeria?
4. What are the implications of the "new economy" on the political economy and technological growth of Nigeria in the nearest future?

Research Hypotheses

The hypotheses of this study are:

1. Weak technological and manufacturing capabilities is one of major reasons why Nigeria is occupying a peripheral position in the current global economy.
2. The production regime in Nigeria is anachronistic, and contrary to the dictates of the current global economy.
3. The threats of techno-nationalism and protectionism puts more pressure on developing countries, like Nigeria, who before this era, was struggling to integrate themselves into the global economy and to create internationally competitive productive structures.

4. The “new economy” has serious implications for Nigeria’s technological and economic development in terms of unemployment, foreign exchange earnings, and so on.

Objectives of the Study

The main objective of this study is to x-ray the impact of the “new economy” on Nigeria technological and economic development, and the way forward.

However, the specific objectives of this study are:

1. To examine the nature of the Nigerian production regime and its political economy and why its operational features contradicts the current global economic logic;
2. To analyse the concept of techno-nationalism and its impact on Nigeria’s technological and economic development.
3. To x-ray the state of technology infrastructure and industrialization in Nigeria;
4. To examine the impact of the “new economy” and recent technological advances on the Nigerian political economy;
5. To suggest possible ways forward for Nigeria.

Literature Review

The Concept of Technology

Technology or know-how means specialized knowledge to achieving a practical purpose. In the economic context, technology is considered the means for transforming inputs into outputs. Inputs for any transformation activity may be naturally available resources and / or intermediate goods (outputs from other transformation activities). The outputs may be consumer goods (requiring no further transformation) or intermediate goods to be used as tools for resource transformation) (Rizwanul, 1992).

Although technology is commonly perceived to be the physical tool used for any resource transformation; it is infact a combination of four basic components, all of which dynamically interact, and together accomplish any transformation operation. The components are; facilities (technoware); abilities (humanware); fact (infoware); and frameworks (orgaware) (Rizwanul 1992).

Technoware or object embodied form of technology includes all physical facilities such as instruments, equipment, machinery, devices, structures and factories; humanware, or person embodied form of technology includes all acquired abilities such as expertise, proficiency, dexterity, perseverance, diligence and ingenuity; infowarer, or document embodied form of technology includes all facts and figures such as designs, accounts, specifications, observations, relations, equations, charts and theories; orgaware, or the institution embodied form of technology includes the frameworks such as groupings, allocations, systematization, organisations, networks, management and marketing.

Technoware is also known as hardware technology, while the other three components together are known as software technology. The presence of the above four components of technology at a certain minimum level is pre-requisite for any resource transformation.

Technoware is developed, installed and operated by humanware, which in turn is guided by infoware which however is generated and also utilized by humanware for decision making

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and operation of technoware. Orgaware acquires and controls infoware, humanware and technoware to effect the transformation operation. Each of the four basic components of technology has several degrees of sophistication, increasing stepwise. Physical facilities (technoware) develop by the following stage: manual facilities, powered facilities, general purpose facilities, special purpose facilities, automatic facilities, computerized facilities and integrated facilities.

In case of human abilities (humanware), the following stages of development may be observed; operating facilities, setting-up abilities, repairing abilities, reproducing abilities, adopting abilities, improving abilities, and innovating abilities. For the other technology components as well, similar stages of development can be perceived (Rizwunul, 1992).

The Concept of Technology Transfer, Technology Diffusion, Technology Assimilation, and Technology Adaptation

Technology sources and technology users may be located within the same country, or in different countries. Transfer of technology usually connotes transfer across the national boundaries, while transfer of technology within the country is referred to as diffusion of technology. Transfer of technology, defined as transfer across boundaries occur essentially to bridge existing technological gaps between countries.

Technology transfer may be static, or dynamic. When a technology developed in one country, is transplanted into another in the form of setting up of a project with necessary supplies of technoware and technical services, and along with it, transfer of skills and know-how required for day-to-day operation and maintenance of the project, we may call such technology transfer, static.

Dynamic transfer of technology on the other hand, takes place with the development of skills, knowledge and experience of the recipient so that they can acquire an autonomous capacity to implement technical changes and build new facilities or in other words, they succeed in assimilation, adoption and generation of new technologies.

Technology assimilation connotes that a recipient absorbs a new technology, digests it and achieves a target by utilizing it in the way the imported technology originally served. In other words, it is to understand and use the imported technology in the right manner.

Technology adaptation means the modification of imported technology to suit local conditions. It broadens and strengthens the scope of the applicability of imported technology. Once a firm possess capabilities in parts and process design, as well as manufacturing, maintenance and production control, the process of technology adaptation is complete.

When the recipient of technology attains capabilities to generate a new technology based upon the imported one, the final stage of dynamic technology transfer, and technology generation is attained (Rizwanul, 1992). However, the ease or difficulty of technological assimilation and adaptation is dependent or assessed as high if the technology is highly sophisticated and usually requiring internal technical staff of more than 10(ten) specialists; intermediate, if the technology requires the participation of fewer than 10(ten) technicians or persons with the requisite technical knowledge; and elementary, if the technology can

compensate for lack of technical staff by careful management (Ogbonna & Emenike, 1995). The five most important ways to acquire technology according to Ogbonna and Emenike (1995) are; (i) purchasing; (ii) integration; (iii) adaptation; (iv) development (v) contractual development. When selecting and negotiating a technology package, the buyer must ascertain whether capacity to assimilate the technology exists.

Technological Development and Industrialization

Technological development according to Unanka (2001) is the aggregate of a society's capability necessary to design and produce internally (not by importation), in a generally efficient way by international criteria, a given percentage of the total national capital, such as production equipment, plants and processes (including human capital). In this sense, technological development is related to industrialization, but not necessarily the same thing as industrialization.

Industrialization, on the other hand "is a process – the course of transition, from the preceding agricultural or commercial society toward the industrialized society". Specifically, Unanka notes that "industrialization process entails the accumulation (through internal capabilities or importation) of machine technology, factory methods and artifacts, machine engineers, furnaces, mines, computers, vocational education systems and other similar tangible objects (Unanka, 2001).

An industrialized society may not necessarily be a technologically developed society, but every technologically developed society is an industrialized society. Thus, while technological development is a sure guarantee to true industrialization, industrialization per se, does not necessarily guarantee technological development. According to Unanka, industrialization that occur with technological development, means industrial development. In this sense, technological development means industrial development. This is the experience of the developed countries. But when industrialization occur without technological development, it means industrialization without development. This is the experience of many developing countries like Nigeria.

Industrialization can also be measured quantitatively through; (a) energy-related measure; and (b) manufacturing – related measure. In simple terms, when industrialization is measured by the amount of energy consumed; it means total amount of electricity consumption by millions of kilowatt hours, by total amount of commercial energy use (oil equivalent) – by 1000 metric tons, or per capita (kg). Using this energy –related measure parameter, we must be cautious since it may lead to the re-assignment of countries traditionally classified as non-industrialized into the industrialized group (Unanka, 2001).

Beside, the energy-related measure, industrialization can also be measured by the percentage of manufactured goods relative to exports. By this measure, a country that operates in the global economic system by depending on the export of agricultural raw materials (including crude oil) cannot claim any level of industrialization. Industrialized nations are those with significantly higher share of manufactured goods in its total export (Unanka, 20021).

In view of the foregoing, it is clear that whether we measure the level of industrialization in Nigeria from the point of energy or manufacturing, she is not an industrialized state, neither is she technologically developed.

The Technological and Industrial (Manufacturing) Situation in Nigeria

The atmosphere of technological uncertainty that pervades Nigeria today can be traced to Nigeria's historical past, especially the Western incursion through imperialism, colonialism, and neo-colonialism. Many years after political independence, Nigeria is still heavily dependent on the West, and South –East Asian economies (most of whom gained independence at the same time with Nigeria) on matters relating to capital intensive techniques of production. The consumption pattern of Nigeria is foreign oriented because the bulk of goods produced in the metropolitan centres of Europe, America and Asia (China) are taken uncritically.

This no doubt, adversely affected the structures of local industries since these industries are oriented towards import-substitution. These local industries are based on foreign machinery with very few based on local raw-materials. Apart from the general lack of effective planning and coordination of scientific and technological activities such as the failure to set a specific scientific and technological goal, there is nothing like visible practical science, as people acquire science and technology education or skills through pages of text books without the accompanying breakthrough. This makes technology transfer and assimilation difficult, if not impossible (Osi, 1995).

It is in view of the foregoing that Tyler Biggs (1995) in their study found out that Africa and Nigeria in particular is suffering from two significant technology gaps: the first is a large, and in many cases widening gap between technological capabilities employed by firms in Nigeria and those employed by firms in other parts of the world. Part of this gap in average, appears to be due to a large variance in domestic capabilities which exists among firms within manufacturing industries. Africa and Nigeria in particular exhibits much more inter-firm technological heterogeneity than other developing regions. The second gap according to Tyler Biggs et al (1995) is in the “learning environment” in Nigeria and other parts of Africa. Compared with other developing regions like the South East Asian economies, it was discovered that their infrastructure for technical learning appear weak, in that many key learning mechanisms which provide the basis for technological upgrading in other developing countries are absent. The implications of the foregoing according to Tyler Biggs et al (1995) is that Nigeria, and Africa in general has not only had problems catching up with the rest of the world, but actually has begun to fall further behind.

Consequently, the industrial or manufacturing sector of Nigeria faces a number of structural problems which is the result of technological backwardness. These problems according to Nwosu (1985) are : (i) the dominance of “turnkey” (i.e transplanted) high industries using low technology. For example: food, beverages and tobacco industries; (ii) the virtual absence of the engineering industry. Factories for such things as metal furniture and fixture, structural metal products and fabricated metals dominate this sub-sector. The real engineering sub-sector , manufacturing of agricultural and special industry machinery, machinery and equipment, household electrical apparatus, and transport equipment, accounts for only a negligible percent of value-added in manufacturing. In Nigeria, assembling of

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imported components of such items as cars, buses, trucks, television sets, computer / laptops, etc. passes for manufacturing; (iii) the third feature is the weakness of the intermediate and capital goods sector in both high and low technology areas. For instance, basic industrial chemicals, fertilizers and pesticides account for only a very small percentage in Nigeria, and the whole of sub-Saharan Africa.

As a result of the foregoing, Nigeria and the continent in general, still contents itself with importing related finished products or consumer goods at very exorbitant prices from the industrially and technologically advanced countries. The expenditure incurred as a result of this situation not only tends to cancel out the country's foreign exchange earnings from exports, but also has adverse effects on such areas as employment, inflation and the question of economic self-reliance based on self generating growth.

The “New Economy” and Nigeria’s Production Regime and /or Political Economy

The “new economy” as we have earlier noted in the introductory section of this paper refers to the post – industrial economic structure that emerged from the 1990s, driven by information, knowledge, and digital technologies rather than traditional factors of production like land, labour and physical capital. It's also called the knowledge economy, information economy, or digital economy. Put in other words, in the “new economy”, knowledge and information, became the “fifth resource” or factor of production alongside land, labour, capital and entrepreneurship. In this economy, value comes from intellectual capabilities more than physical inputs or natural resources. Information is now both an output and a crucial input in virtually all sectors.

However, contrary to the changed structure of global trade in favour of manufactured products, Nigeria has remained highly uncompetitive in world trade because her major export bundle largely constitute agricultural and mineral products whose prices are highly volatile or unstable. She is a dumping ground for most cheap and many a time, sub-standard foreign products. Till today, she still maintains the colonial pattern of trade where they were skewed to be major exporters of primary products/ commodities mainly to the industrially developed countries, and importers of industrial products, mainly from the developed North (Khor, 2001).

After almost 66 years of political independence, the primary sector, and particularly the oil and gas sector still dominate the gross domestic product (GDP) of Nigeria accounting for over 95 percent of export earnings and about 85 percent of government revenue (Chete, et al, 2015). This statement is very true because the economic recession which Nigeria experienced in 2016 was mainly attributed to the collapse in crude oil production and prices, while the boost in economic activities which she experienced in 2017 was mainly attributed to the recovery in crude oil production and prices (CBN Annual Report, 2017). According to the report, while agriculture contributed 0.5 percent to growth in 2016, industry had a negative contribution of - 0.21 percent in 2017 (CBN Annual Report, 2017). In summary, this shows that till date, the contribution of manufacturing to GDP is still very insignificant and at best, sluggish and epileptic.

The present structure of underdevelopment in Nigeria basically stems from her incorporation into the expanding capitalist system over a period of about four centuries. Under

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colonialism, the basic features of the present political economy of trade in Nigeria took form. Colonialism of underdevelopment took place. It was during this period that the dynamic sectors (trade particularly) of the colonies were aligned with the interests of the metropolitan countries (Britain, USA and Europe in general). This phenomenon created within each colony, the political, economic and social conditions necessary to sustain and reproduce the asymmetric trade relationship established under colonial system. This process was so successfully maintained and nourished that after almost 66 years of political independence, has not led to a radical shift in trade relationship between former colonies, and metropolitan interests, at least, not at an economic level. Almost all the African states today show a continuity in the presence of the metropole in most sectors, particularly in trade (Bade Onimode, 1983; Ihonvbere, 1992).

One grave consequence arising from this neo-colonial system which is inimical to development processes in Nigeria, and Africa in general is that the structure of Nigeria's/Africa's external trade in this day and age of modern globalization still bear a very close resemblance to what prevailed in the colonial period. Nigeria / Africa remains a major producer of raw-materials for world markets in respect of commodities needed for the manufacturing industries of the developed economies, contrary to the current demands of the "new economy" principles.

Impact of Technonationalism on Nigeria's Technological Development

The interplay of science, technology, and foreign relations is a primary issue of our times. The ways in which countries attempt to support, protect and use new scientific knowledge and technical expertise profoundly influence international relations. This is because of the rising threats of "protectionism" and technonationalism which we earlier defined or explained in the problem statement of this paper.

With particular focus on the United States of America (USA), Keatley (1985) notes that the traditional accessibility to foreigners of the US -educational and research system is thus, more and more frequently questioned and/or restricted. Major research institutions / universities many a time, deny foreign students access to most advanced projects, for example, in areas such as artificial intelligence. Scientific societies are now limiting some meetings to US citizens only. Questions of balance and reciprocity are now being raised about foreign access to frontier biotechnology research in Federal laboratories. According to Keatly, these events were the beginning of an "intellectual isolationism" stemming from a desire to ensure US technological leadership.

In addition to the above, the World Trade Organisation (WTO) Agreement on Trade Related Intellectual Properties (TRIPs) is also a major fall-out of the rising trend of technonationalism in global technology flows and trade. According to Khor (2001), Southern countries (developing countries) were also obliged in the TRIPs agreement to introduce intellectual Property Rights (IPRs) legislation with standards of protection that are similar to those in Northern countries (developed countries). This (IPRs) according to Khor, will hinder firms from developing countries from absorbing some modern technologies over which other corporations from the developed countries have intellectual property rights. This would curb

the adoption of modern technology by domestic firms in developing countries like Nigeria, and this is already happening.

The foregoing could be one of the reasons Tyler Biggs (1995) noted that Africa as a consequence, has not only had problems catching up with the rest of the world, but actually has begun to fall further behind.

No hard data on technology transfers are available but there is some evidence that transfers to developing countries have slowed down. For example, technology payments from developing countries increased from about one billion (US) dollars a year in the early 1970s to \$2.5 billion a year in 1981 – 1983. However, between 1985 and 1987, they remained below \$2 billion annually (Irfan Ul Haque, 1995). However, he (Irfan Ul Haque) notes that while the global economic recession may be one of the reasons for slow down in technology acquisition, greater hesitancy on the part of technology producers to supply technology to potential competitors is certainly the major reason.

Implications of Recent Technological Advances or progress on Nigeria's Technology and Economic Development

The last decades has witnessed an unexpected and dramatic acceleration in the pace of innovation that has been called the “third industrial revolution” bringing with it an explosive growth in information and technical knowledge unprecedented in human history (Irfan Ul Haque, 1995).

Much of the recent technical progress consists of developments in micro-electronics, biotechnology, new materials and aerospace (Irfan Ul Haque, 1995, Keatley, 1985). Modern telecommunications technologies, no doubt are transforming societies, even in Nigeria. Much progress has been made in the Nigerian banking sector, and several other sectors. ICT in recent years is one of the major boosts of Nigeria's gross domestic product (GDP). For developing countries such as Nigeria, modern telecommunications will continue to improve service delivery such as in healthcare and educational services, however, a significant point of concern or conflict exist, if not now, but in the nearest future, because of the use of equatorial geosynchronous orbits for communications satellites. Because there are only a limited number of slots available in that orbit, developing countries are concerned that by the time they possess the requisite technology for exploiting the medium, the industrialized nations will have already appropriated all of the available slots. Some developing equatorial states have already made claims on the “sovereignty” of the geosynchronous orbit area 22,300 miles above their territories (Keatley, 1985). There is no doubt that this situation have the capacity to hinder the developing countries from developing technological capacities in communications satellite technologies as well as fully appropriating the maximum economic or financial benefits or gains that come with such capacity, because already, the advanced industrial nations may have already appropriated all the available slots before they will be ready. This calls for concern, and a wake-up call.

Moreso, developments in new materials sciences has led to a general reduction in the use of traditional industrial products, of which Nigeria and other African countries are the major suppliers. Increased process control has led to increased energy efficiency in energy –

intensive process industries such as steel and cement. Better integration between design and production, and new optimization techniques have brought about materials savings. Synthetics are replacing many traditional raw materials such as natural rubber, fibre (notably cotton and jute), while composites such as plastics and ceramics are being substituted for steel and aluminium, and optical fibre is replacing copper. This displacement, no doubt has a direct economic impact on Nigeria, and other African countries who rely on some of these raw-materials mentioned above for part of their foreign exchange earnings (Keatley 1985, Irfan Ul Haque, 1995).

Theoretical Framework

The theoretical framework applied in this study is the world system theory. This theory is closely associated with Immanuel Wallerstein. This is evident in his works entitled: *The Modern World System, 1 and II* (1974 & 1979). The world system theory essentially employ dependency framework of analysis. They locate the dynamics of world economic structure at the global level, as chiefly defined and influenced by the dominant world capitalist system. For them to understand why the developing countries like Nigeria are in persistent crisis of poverty and underdevelopment, one needs to understand the nature of exchange relations at the international level which is structurally in favour of the major capitalist societies. The world system theorists are also known as globalists. To them, the world is taken as a single social unit of analysis. On the other hand, the materialists also employ the dependency approach but they differ in the sense that they locate the dynamics of the world economic structure at the production level of analysis. They locate the unit of analysis at the domestic structure or substructure, and not the world unit level of analysis. However, whatever the differences in the level of analyses of the globalists, and the materialists the persistence of underdevelopment in the third world cannot be understood in a comprehensive and holistic manner unless we recognize the interplay of exchange relations, as well as production relations. Both unit levels of analysis explain neo-colonialism as a form of contemporary imperialism (Aja-Akpuru, 1993, Mimeo, 1998).

According to the World system theory, the capitalist world economy is a global system divided into a hierarchy of three major types of nations; core, semi-peripheral and peripheral, in which upward or downward mobility is conditioned by the resources and obstacles that characterize the international system (Kendal; 2002, Calhoun, 1998).

The core nations are the dominant capitalist centres characterized by high levels of industrialization, technology development, and urbanization. Core nations as Canada, USA, Japan, Germany and Britain possess most of the world's capital and technology. They exert massive control over world trade and economic agreements across national boundaries. Some cities in core nations are referred to as global cities because they serve as international centres for political, economic and cultural concerns. New York, Tokyo and London are the largest global cities, and they are often referred to as the "command posts" for the world economy. Many of the World's wealthiest individuals and families reside in the core nations (Kendall, 2002).

The semi-peripheral nations are more developed than the peripheral nations but less developed than the core nations. Nations in this category typically provide labour and raw-

materials to core nations within the world system. These nations constitute a midpoint between the core and the peripheral nations but promotes the stability and legitimacy of the three tiered world economy. The semi-peripheral nations are actively involved in the world system, but are limited in their ability to influence it. The newly industrializing economies (NIEs) of Asia developed out of this group. Turkey, Mexico and Malaysia, all of which have improved their global position in recent years are all part of the semi-peripheral nations (Kendall, 2002).

The third world countries contain the vast majority of the world's peripheral nations. These countries are on the edges of the world system not because they are in a transitional stage, but because they are sellers of low-priced raw-materials. Most are predominantly agricultural, and depend to some degree on foreign aid, and participate in the world system, only on terms set by the core nations. Many are not able enter large scale international trade at all, having nothing valuable to sell to the world markets (Kendall, 2002; Calhoun et al., 1998).

The world systems theory has been criticized for its narrow focus on the global market structure however, despite its short comings, the authors here are of a strong view that this theory is very relevant to this study and has the strongest capacity to helping us push through our views here. This position is supported by Unanka (2001) who analyzed the concept of globalization from a Marxist / dependency and world system perspective through his discussion of the concepts of dual globalization, de-globalization and self reliance. According to Unanka, dual globalization is a manifestation of the paradox of the post – industrial technological development, in which some nations remain parts of the globalization euphoria, but separated from the benefits of the post –industrial information and communications technology (ICT) revolution that gave birth to it. From a world system / centre-periphery perspective, globalization is occurring at two fronts, among the centre nations and among the periphery nations on the other hand (centre – globalization, and periphery globalization). According to Unanka, centre globalization is orthodox globalization – the shrinking and integration of the world into a global village to serve the economic interests of the centre-nations. Periphery – globalization, on the other hand is the shrinking and integration of the less developed countries (third world) linked through the centre of the periphery to serve the economic interests of the centre-nations. It means the electronic organization of the third world nations into an easy target for economic and political domination from the industrialized nations.

The awareness of dual globalization above, has led to calls for de-globalization of the domestic economies of African states like Nigeria. Applying the world system theory, and self reliance development perspective, Unanka notes that industrialization or technological development of the third world countries requires a radical shift and review of the challenges of globalization vis-à-vis the reality of dual globalization. According, this revolutionary path raises awareness on the relationship between the centre – globalized nations, and the periphery-globalized nations. The de-globalization theory therefore suggests that for third world countries to develop they need to be cautious about the timing and speed with which they liberalize their economics. It also calls for good governance to ensure that globalization and technological development and work human development for the people, and not for profits in the centre nations. Among other things, Unanka, also notes that de-globalizing African domestic economics requires awareness of the right, kind of foreign investment, and above all, the

realization that growth must be financed from domestic savings and investments. Very importantly, de-globalization leads to a dismantling of the technology dependency, and technology transfer syndrome which has ravaged the psyche and political will of African people in general, and their political leaders is particularly

Research Method

This study explored the use of qualitative approaches. The researcher did an ex-post assessment or analysis of the impact of the “new economy” on Nigeria’s technological and economic development, and the way forward. The study used explanatory research design, documentary and/or content analysis, as well as ex-post factor research method to examine; the production regime of Nigerian political economy and its contradictions in the current “new economy” era; the concept of techno-nationalism and its impact on Nigeria’s technological and industrial development and the future impact of the “new economy” on the economic and technological development of Nigeria.

Conclusion

This study mainly applied qualitative research design in order assess or analyse the impact of the “new economy” on Nigeria’s technological and economic development, and the way forward. The findings of this study clearly show that weak / poor manufacturing technology is mainly responsible for the poor / peripheral performance of Nigeria in the global economy; that the production regime of Nigeria is a contradiction to what is currently obtainable in the global economic and exchange relations; that the threats of techno-nationalism and protectionism puts more pressure on Nigeria’s technological and industrial capabilities which before now has been struggling to catch up or integrate themselves into the global economy; and finally, the findings also show that the “new economy” framework has serious implications for Nigeria’s technological and economic development in terms of unemployment and social unrests (due to increasing automation and control in the production process), foreign exchange earnings, and so on.

In views of the fore going, this paper therefore concludes that the challenges of the “new economy” puts Nigeria under more pressure, and in a disadvantageous position to maximally benefits from the globalization process and put the nation on a pedestal for sustainable economic and technological and industrial development. This therefore demands a radical rethinking of Nigeria’s economic, technological and industrial polices.

Recommendations

In view of the above findings, this study hereby makes the following recommendations as the way forward Nigeria:

1. Nigeria, no doubt is very weak in technological and manufacturing capabilities. Her participation in global trade is comparable to that of a toddler participating in a hundred metre race with world class athletes. Therefore, to reduce the widening gap, government (both at the federal and state levels) must urgently put in place the relevant policies that will fasten Nigeria’s technological and industrial development so that the much needed technological and industrial capabilities to locally produce certain machineries and industrial goods is acquired.

2. The production regime or structure of Nigeria is in contradiction to the current structure of the global economy. Effort must be made by governments at all levels to encourage speedy diversification of the economy not only in the area of manufacturing, but also in domestic service industries which offer ready made possibilities for experimentation, imitation, adaptation and learning process.
3. With respect to the rising trend of techno-nationalism and protectionism, Nigerian people and their leaders must begin to dismantle this idea or notion of technology transfer syndrome which has not worked or helped them, and begin to seek ways of developing their technological needs indigenously. This can be done or achieved through, first, the strengthening of the capacity of institutions for Research and Development (R & D) such as the universities, polytechnics, Research Institutes and laboratories; second, by substantially raising their expenditures on R & D and effectively monitoring the application of these expenditures, and results generated from them. third; by governments at all levels, finding a way to make researchers, scientists technologist, universities and polytechnics to work in partnership with manufacturers and entrepreneurs. This can be realized through an Act of the National and State Assemblies. In summary, education at all levels, including technical education must be properly funded by government, at all levels. Nigeria cannot run away from this if she must develop technologically and economically.
4. The implications of the “new economy” on Nigeria, particularly as it concerns the increasing spate of automation, development of synthetics and substitutes to our traditional raw materials, as well as the increasing pressure for environmental friendly technologies, in the nearest future, and even now, are quite enormous and threatening. Therefore, its clear now that the notion of “given factor endowments” (natural resources and cheap labour) has become less relevant with the increasing importance of what is called “created endowments” (human and physical capital, and managerial skills). Nigeria therefore, must henceforth invest massively in creating her own endowments so as to be able to mitigate the overbearing weight and consequences of industrial countries scientific and technological progress.

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