LOW TECHNOLOGICAL DEVELOPMENT: HOW NIGERIA WILL GET TECHNOLOGICAL DEVELOPMENT RIGHT

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Abstract
In today's globalized world, nations with strong technological development command respect in its bi-lateral and multi-lateral international relations more than nations with weak or low technological development. Using the Nigerian experience as a case study, this article predicated on Marxist theory of post-colonial state, shows how class interest and power relations factors by the dominant class undermine socio-economic development including technology in Nigeria. We argue that why Nigeria has remained a primary exporter of raw materials since 54 years of her existence, at the expense of technological development, is because it favours the dominant class. We suggest a duality of Nigeria government genuine commitment on technology development and overhauling of all her policies including university curriculum to be problem-solving and technologically-driven.

Keywords: Governance and Public Policy, Technological Development, Education, Marxist theory of post-colonial state, Nigeria.

Introduction

Technology development, unarguably, is regarded as a catalyst for socio-economic development that should be properly nurtured and adopted to facilitate development of key sectors of any notion. This explains why Offiong and Chikwem (2011:14) argue that the levels of a country's technology determine the levels of its socio-economic development. High technology generates larger and better economic and social results, while low technology is followed not only by low socio-economic development but also low life expectancy at birth. In the same vein, Ukah (2009:1) contends that "science and technology have become and will continue to be a measure of any nation's development and success; nation and its citizens' command in the committee of nations". In other words, the level of technological development determines the amount of income, level of awareness or civilization, skill, general standard of living, etc, in a nation or economy (Adiele, 2009:5).

Unfortunately, Nigeria universities because of years of government neglect have been a home of theoretical knowledge devoid of application. In fact, Nigeria universities are busy pursuing technological development without the corresponding application. This makes nonsense of technological education whose essence lies on application. This explains why:

> No indigenous company could participate in the several licensing bid rounds on many petroleum prospective blocks offered by the federal government of Nigeria. Participation here includes capability of mobilizing to any block won immediately, without the assistance of foreign technical partners. Interestingly, companies from Asia and South-America notably from Indonesia, Malaysia, Brazil, which, started petroleum production, later than Nigeria or have no petroleum deposits, have bided for Nigeria's petroleum blocks. Some of these companies like Indonesia Petroleum Company are wholly owned by their governments (Adiele, 2009:12).

In fact, Nigeria has continued to watch and wonder helplessly from the sideline, and in most cases, found itself crawling and slipping away while other nations solidify their footings and race on the fast lane towards technological development and advancement. Due to our inability to look inwards, challenge ourselves, act rightly and proactively, we have found ourselves at the mercy of other nations, and have now been forced to rely heavily on them to provide for us even those basic necessities of life which we ought to provide for ourselves, neglecting both the long term economic and national security implications. It is quite difficult to overstate the need for a reversal of this ugly situation if we are serious in creating the required technological and manufacturing base needed to jump-start our economy and put our idle, able-bodied and willing to work citizens to work (Ukah, 2009:2).

In the light of this, this paper seeks to contribute to the literature on low technology development in six sections. The first is the introduction followed by second and the third sections examining the central concepts and related theoretical issues as well as the nature of technological development. The fourth and fifth sections, respectively, explore the methodology and causes of low technological development in Nigeria. The final section concludes.

Conceptualizing Low Technological Development

For effective definition of low technology, let us first examine what is technology. Technology has a wide range of definitions; nevertheless, it is a term traceable to "*techne*" which means activities by which man seeks to (Olaoye 1990) adapt to his environment. It is defined by Hornby (2002) as a scientific knowledge, used in practical ways, especially in the designing of new machines, machineries and equipment. Olaoye (2008) interprets technology to mean the transformation of a theoretical idea to a practical skill in order to produce the objects of one's need.

On the other hand, low technology is when a country:

i. cannot produce capital goods such as tractors, lathe machines, drilling machines, cars, trains, and other earth moving equipments.
ii. is unable to exploit her natural resources except with the help of foreigners who will normally provide the technology and expertise to undertake the exploitation of her natural resources.

iii. is unable to mechanize her agriculture i.e. crude implements are still used for agricultural production activities by a large percentage of those who are involved in agricultural production.
iv. depends on other countries for the supply of its spare parts for industrial machinery
v. exports raw materials to other countries as against finished products
vi. is unable to produce her own military hardware with which to defend herself if the need arises (Uwaifo and Uddin, 2009:107).

Development, as well, is the gradual growth of a skill to become more advanced or the process of producing a more advanced product (Hornby 2002). Consequently, low technology development is the inability to transform ideas to practical skills, or the inability to transform raw materials into finished goods. With the above definition as the working tool, we can then proceed to the framework of analysis.

Theoretical Discourse

What account for low technological development in Nigeria? What theory can suitably interpret low technological development in Nigeria? One is immediately tempted to anchor the analytical proposition on the theory of transnationalist. Opponents of transnationalist theory see the multinational companies (MNCs) as a predator taking advantage of host countries. They claim MNCs mine irreplaceable national resources, siphon capital out of the host state, bring in technology unsuited for the host's development plans, hire skilled people away from local business, and cause host governments to restrict human rights (Henderson, 1985:78). Hence, they blame underdevelopment, most especially low technological development on them. While appreciating the high explanatory currency of the theory, especially its historical sensitivity and logical validity, we stand to argue that the theory lacks in depth tools to unravel the fundamental historical cause which persist, in all its ramifications, till date.

To fill the above gap and minimize the shortcomings noted above, we shall predicate our analysis on Marxist theory of post-colonial state. The theory came up as a reaction to Weberian theory of the state as a centralized organizational structure; impartial and independent force; a sovereign whose decisions are binding; a neutral umpire that caters for the main interest of every member of the society; an instrument of coercion and domination; an engine of growth and development; and hence rises above class interests.

This Weberian view of the state does not take into account most of the states, especially, in Africa that have been historically and inextricably trapped, which the Marxist post-colonial concept has come to take care. For Marxist-oriented scholars, the state is rather an instrument of class domination; the centrality of the state and its apparatuses as the main instruments of primitive accumulation especially by the dominant class and their collaborators (Alavi,1973:74). In line with the above view, Mamdani rightly noted that the colonial state in Africa was bifurcated, having been

characterized by centralized and decentralized forms of despotism. This duality coupled with its racialist ideology and practice resulted in the externalization of the colonial state by the subjects (Mamdani, 2002:6-12). However, the neo-colonial state unique attributes can be traced to the colonial government who discouraged the emergence of a strong indigenous capitalist class to secure their economic interest. Worse still, the new indigenous bourgeoisie that inherited control over the neo-colonial state apparatuses had a weak economic base, and hence relied on this control for its own capital accumulation and self reproduction. Consequently, the state and its apparatuses and institutions have become the main instruments for perpetuation of class interest and for willful alienation, appropriation and self-reproduction of the dominant class. Corroborating the above view, Miliband (1977) remarked that "the state in the peripheral social-formations have remained largely "the source of economic powers as well as an instrument of it; the state is a major means of production" (Onah, 2008:256). In fact, this is what is reflective of most African countries.

When applied to Nigeria, a Marxist post-colonial framework enables us to unravel why the Nigerian state cannot be the power house of economic development and growth; why the ruling elites concentrate in looting the state treasury with impunity; why there is over-concentration in petrodollar; why technological development and application is not given serious attention, etc. These negative perceptions continue to structure and condition the attitude of Nigerians toward the government and the state (Iffih, 2001:42-53). This explains why, unlike in the west, the state in Nigeria is not perceived or seen in the Weberian sense of an impartial and impersonal entity. Due to its colonial historical trajectory, the state is conceptualized as alien's institution whose powers are used to further the interests of those who wield them. As a result of the interplay between formal and informal spheres, political reciprocity between patrons and clients influences the operation of political institutions and makes them susceptible to private capture and personalization (Watts, 2007:637-660). Little wonder, public resources were appropriated for personal and sectional gains. The capture of state resources was done through the use of ethnically based patron-client networks and the sharing of the national cake was decentralized (Oarhe and Aghedo, 2010:131).

All these explain why the ruling Nigerian elites pay less attention to policies that would transform Nigeria's low-technological development and application, and rather concentrate in plundering the economy which they see as a major source for the pursuit and realization of their personal and parochial interests. In fact, this Marxist theory of post-colonial state offers a holistic, coherent and in-depth explanation of the problems plaguing a given polity, especially Nigeria, which reflects in low technological development and application. It has unravelled why most Nigerian leaders pay less attention on economic development strategy, rather they concentrated, as Schatz argues, on oil boom which has brought about a pirate capitalism in which the state is the major source of wealth and fortune for the ruling elite (Schatz, 1984:45-57). Schatz contends, furthermore, that this sort of manipulation of the economy started in the pre-independence era when the colonial

administration accorded primacy to British interest. Contemporary Nigerian elite, nonetheless, inherited this frame of mind. This explains why the contemporary Nigerian ruling elites cannot drive socio-economic development.

The Nature of Technological Development in Nigeria

Prior to the advent of colonial government in Nigeria, most of the regions in Nigeria had established traditional technological skills which they used to the development and growth of various Nigerian communities. For instance, in Oyo State which is the present day South West Region of Nigeria, there were concrete evidence of iron mining villages recorded in 1904 with about 100 to 120 people engaged in iron mining, smelting and smiting. The above fact was confirmed by stride and Ifeka (1975) who documented that the above industrial skills were important in the growth of old Oyo Empire. They argue that the growth of Oyo's prosperity and power were the industrial skills of its people. Their early knowledge of iron working and the existence of iron or locally meant early possessions of efficient tools and weapon… their craftsmanship in weaving and dyeing in carving and decorative arts.

In the Northern region also, precisely, Bauchi, Jos, Daima, Kano and Zaira, there were evidences of iron technology dated about 500 B.C. The above fact was confirmed by Olaoye (1992) who documented that archeologist have excavated iron spears and axes at nok, and iron smelting furnaces had been discovered in Taruga, believed to have contributed to the development of agriculture in the region, while there had been ample evidence regarding the use of iron around the kanji Dam in the present Day Niger State of Nigeria, around 2nd Century B.C. which had contributed to the building of canoe and other agricultural implements around that region (Obayemi, 1980).

With the Nigerian independence in 1960, Nigeria started thinking towards resuscitating her technological skills for socio-economic development through the national development planning. Between 1962 and 1985, Nigeria launched four development plans: 1962-1968; 1970-1974; 1975-1980 and 1981-1985.

The fourth plan set out not only to diversify the economy, but also to review the entire economy. It listed among its objectives the development of science and technology which was a break and departure from the old tradition, thereby shifting prime attention to the manufacturing sectors with greater efforts geared toward establishing manufacturing industries so as to reduce the level of the country's reliance on foreign goods, and enhancing the foreign exchange capacity of the country by laying the foundation for long term development of the industrial sector (Onipede, 2010:87).

The 5th developmental plan was the structural adjustment programme (SAP) designed to cover 1986-1989. All these gave room to the citing of some industries in Nigeria. But the necessary economic policies to protect these indigenous industries from foreign modern mechanized industries in Nigeria are lacking. Hence, the collapse of these industries in Nigeria. Today, Nigeria's dependence cut-across all sectors of the economy.

Methodology of the study

The study raises the following fundamental research questions: What are the causes of low technological development in Nigeria? What should Nigeria do to get it right? The questions will adopt the following propositions: That Nigerian government lack interest in technological development. That Nigerian government should overhaul all her policies to be technologically-driven.

The data for the study were derived from secondary and primary sources. Secondary sources include journals, newspapers, magazines and internet, while the primary data were collected from survey questionnaires on a dichotomous scale. The data collected through the questionnaire were subjected to computations in the form of table which made the calculations and analysis easy.

All the survey questionnaires were administered to Ministries of Education, National Planning, Communication Technology, Science and Technology Trade and Investment, academics, industrialist and politicians in one state each of the four geo-political zones of Nigeria, namely Abuja, Federal capital territory; Lagos in Lagos State, Enugu in Enugu State and Port-Harcourt in River State. These states are strategic administrative and industrial zones in Nigeria.

A random sampling technique was adopted. This is to guarantee high accuracy of the respondents answers. Thus, the sample size was 80 respondents, 20 each state. The data collected through questionnaires were based on frequency and presented in tables along the formulated propositions. As far as the education was concerned, all the respondents were post-graduates with some computer related qualifications

Table 1: Causes of low technological development in Nigeria

Low technological development are caused in Nigeria by	**Per cent of Yes**
Poor funding of education	84
Poor funding of Research and Development (R&D)	78
Lack of proper protectionism	72
Lack of professional encouragement	82
Lack of preference for made in Nigeria goods	42

The survey results indicate that low technological developments are mainly caused by poor funding of Nigeria educational sector. This explains why there exists no equipped and modern laboratory in Nigeria universities, and as such, no serious researches go on in them. This implies that Nigeria graduates; most especially engineering graduates are theoretically trained devoid of application of knowledge. As documented by Omuta (2010), the following allocations, in billions of Nigeria, went to the educational sector: 1999(N23.0476-11.2%), 2000 (N44.25b -8.3%); 2001(39.885b-7.0%); 2002 (N100.2b – 5.09%); 2003 (N64.7b – 11.83%); 2004 (N72.22-7.8%); 2005 (93.59b -3%; 2006(N166.6b-8.7%); 2007 (137.48b -6.07%) (Omuta, 2010:11). In 2008, the sector got N168.64 billion, and in 2010, the sum of

N249.09 billion. The 2011 budget of N356.5 billion from a total budget of N4.226 trillion, has drawn criticisms from operators in the sector (*Vanguard*, 26 January 2011). Analysis of the above allocations showed that educational sector has continued to be relegated to the background with less than the required UNESCO approved 26% of the federal government budget for the sector.

Similarly, the survey results indicate that there is poor funding of R&D in Nigeria. This continues to militate against effective research undertaking. For instance, India invested over three billion dollars in 1985 in some 1,300 research institutes working on electronics, aeronautics and space atomic energy. In the same year 1985, India spent 1.5% of her GNP on research and development compared with about 2.5% spent by the US. Nigeria's highest allocation figure was 0.43% in 1983, which went down to 0.5% in 1992 and 0.23% in 2003 (*The Nigerian Engineers*, 35, December 2003). This R&D figure should be increased by Nigeria government, to at least, up to the required UNESCO approved 1% of the Federal Government Gross Domestics Product (GDP).

Furthermore, survey respondents revealed a strong expression of anger over lack of proper protectionism on Nigeria's growing industry. In fact, no country survives economically and technologically without some form of measures of import substitution strategy for a substantial period of time in the history of industrialization. No wonder, Offiong and Chikwem (2011:22) observed that:

> Nigeria government swallowed hook, line and sinker, this western capitalist foisted development without appropriate internal economic reform to cushion the negative effects of this on her domestic technology. The effects, today, on Nigeria's growing domestic technology is devastating, hence, the total collapse of Nigeria indigenous technology.

The above view was succinctly attested to by Joseph Stiglitz, Noble prize winner in economics, who among other things, observed that:

> At their November, 2008 summit, the G-20 leaders strongly condemned protectionism and committee themselves not to engage in it. Unfortunately, a World Bank study notes that 17 of the 20 countries have actually undertaken new protectionist measure, most notably the US with the "buy American" provision included in its stimulus package (Stiglitz, 2009:7).

Also, most of the survey respondents claimed that lack of professional encouragement in Nigeria universities are responsible for the daily increase in brain drain from Nigeria. This is true when one takes into account the poor working conditions of these professionals in Nigeria institutions of higher learning. To encourage these professionals and stop the excessive brain-drain, professionalism should be accorded due recognition and given commensurate incentive, short of this,

Nigeria technological development and application would remain a dream (Offiiong and Chikwem, 2011:22).

The respondents were sharply divided on the preference for foreign goods. While some respondents argue that they prefer foreign made goods, others objected, insisting that they prefer made in Nigeria goods. However, a good number of the respondents agree that most of those in the lower class prefer made in Nigeria goods, while most of those in the higher class go for foreign made goods. Finally, almost all the respondents agree that with proper economic policies like protectionism put in place, foreign goods will be too costly and majority of the people will have no choice than settling for made in Nigeria goods.

Table 2: What Nigeria should do to get technological development right

To get technological development right, Nigeria should	**Percentage %**
Declare a state of emergency on technological development and application	78
Coordinate a sound science and technology policies with genuine commitment	70
Change Nigeria Universities curriculum to be problem-solving and development-oriented.	62
Provision of a functional Nigeria National Science foundation/ Functional and well-equipped national laboratory	74
End to bad leadership	80

The survey results indicate that Nigeria should make technological development a priority by declaring a state of emergency on mostly technological application, as contended by most of the respondents, since most of the Nigerian students have been over-fed by theoretical knowledge. This is because technological education/application is to be considered as the key agent of technology development, either as a way of developing human capacity, increasing the shield workforce for modernization, industrialization and environmental development or as a matter of personnel freedom, developing capability and empowerment (Osalor, 2015:22).

On the issue of sound science and technological policies, the respondents are divided. While some argue on building upon the national development plan of 1962-1968, 1970-1974, 1975-1980, 1981-1985 with the 5th and finals national development plan being structural adjustment programme (SAP) designed to cover from 1986-1989, others respondent, insisted on overhauling all the policies to be technologically-driven. However, most of the respondents acknowledge the fact that policy is not our problem but genuine commitment by Nigerian government. For instance, the fourth plan set out not only to diversify the economy, but also to review the entire economy. It listed among its objective the development of science and technology which was a break and departure from the old tradition, thereby shifting prime attention to the manufacturing sectors with greater efforts geared toward establishing manufacturing industries so as to reduce the level of the country's

reliance on foreign goods, and enhancing the foreign exchange capacity of the country by laying the foundation for long term development of the industrial sector (Onipede, 2010:87).

Almost all the respondents strongly agree that the provision of a functional and well-equipped Nigeria national laboratory that will serve as a brainstorming and research hub for scientists and engineers as well as a training center for up-coming scientists will put Nigeria on the road to technological development. This center, will among other things, serves as an invaluable partner to the universities since it would encourage research collaborations and also afford university teachers and students possible access to more modern and sophisticated equipment that may be unavailable in the University laboratories. Such a center automatically helps in bridging the gap between industry and science graduates by affording them the opportunity of carrying out real-life researches that use the center, in the course of their undergraduate and graduate studies. More importantly, it would in no small means help in lending credibility to our educational system because of its ability to spur serious researches and research publications by our researchers/university teachers and students in world-class peer reviewed journal (Ukah, 2009:4). With this center in place, Nigeria can carry-out industrial espionage.

All the respondents agreed that for all the above technological strategy to work, a dedicated, patriotic and nationalistic leader must be on power. A leader who will prioritize technological development and push all the government agencies toward the achievement of the set goals or target(s). No wonder, Koontz *et al* (2002) noted that "the importance of good leadership is nowhere better dramatized than in the case of many underdeveloped countries where provision of capital or technology does not ensure development. The limiting factor in almost every case has been the lack of quality and vigor on the part of managers".

Understanding Low Technological Development within the context of Marxist Theory of Post Colonial State

Several explanations can be constructed for technological development in Nigeria. Specific reasons abound, but they are all imbedded on class interest and power relations factors by the Nigerian dominant class. Nigeria was the creation of the (British) colonial state. Through its coercive apparatus, colonial state defined Nigeria territorially and forcefully integrated the various political forms and pre-capitalist modes at different stages of development into the global capitalist system. In this way, "the Nigeria colonial state served the interest of global accumulation at the periphery through the local extraction and transfer of resources to the metropolis (Obi, 2003:263). As a result of this colonial experience, the privatization of the state for primitive accumulation became a defining character of the Nigerian state. In Nigeria, politics is largely seen as a means of accumulating wealth; and because the state is the object of political competition and medium for the allocation of resources, it has been effectively used to achieve the goal of primitive accumulation. The result is the privatization of the state by custodians of power at all levels of governance (federal, state and local) and its consequent utilization for the pursuits of individual,

sectional and ethno-regional interests; as against the pursuit of common interests or the public good (Ibaba, 2008; Ake, 2001; Ekekwe 1986; Oyovbaire, 1980). This explains why different successive administrations in Nigeria concentrate on primitive accumulation at the expense of technological development.

Following closely the above reason is the discovery of oil in larger quantities in Nigeria. In fact, the ruling class abandoned all other sectors and concentrate on petro-dollar. As such, oil displaced agriculture and other technological development as the productive base of Nigeria economy. As observed by Offiong and Chikwem (2011:28), "Nigeria prior to the discovery of oil and gas was doing fine in science and technology, but the discovery of this natural resources made the ruling elites to completely abandon all other sectors of the economy and concentrate on petro-dollar which has reduced Nigeria's economy to a monocultural economy".

Furthermore, due to lack of proper fund for Nigerian educational system, Nigerian universities have ended up training her students, to be theoretically based devoid of application of knowledge. This explains why most of the engineering students remain unemployed. Hence, Nigeria depending heavily on foreign countries for almost all her needs; this is dangerous for a growing economy like Nigeria for her economic and security reasons.

Finally, the Petroleum Technology Development Fund (PTDF) which is a fund dedicated to develop science and technology especially in the Petroleum oil sector has ended up being an avenue of compensating political appointees. In other words, it is an avenue of compensating politicians or a means of seeking for political support. As a result of this, its intended objective of promoting technological development have been neglected, and rather used as a means of acquiring knowledge instead of assisting Nigerians to apply knowledge in the petroleum industry of Nigeria (Adiele, 2009:24). This explains why so many years of the establishment of PTDF, nothing tangible has been achieved in technological development.

Conclusion

This paper explored low technological development and how Nigeria will get it right within the context of Marxist Post-colonial state. It unravels the negative impacts of most of the post colonial African state especially Nigeria, that was handed over to an indigenous bourgeoisie who have been using the state as instrument of primitive accumulation at the expense of socio-economic development. This is true, for instance, when one examines the loot associated with successive heads of different administrations in Nigeria since 1960- military and civilians alike. That explains why technological development which would have boosted other sectors of the economy is neglected.

However, measures that will make Nigeria to get it right have been explicitly stated by the respondents in table 2 above. Therefore, if Nigeria government follows these remedial measures stated in the above table 2, Nigeria will excel like the Asian countries and technological development will blossom and Nigeria will be export-oriented instead of import-oriented.

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