

Problems and Challenges of Science and Technology Development in Nigeria

¹John T. Kalama & ²Charles I. K. Solomon

^{1&2}Department of Political Science
Federal University Otuoke
Bayelsa State, Nigeria

Article DOI: 10.48028/iiprds/ijdshtmss.v12.i2.09

Abstract

Developing effective and reliable science and development policy remains a major challenge in Africa and third world states hence, this paper examined the problems and challenges of science and technology development in Nigeria. The study relied on the elite theory and derived its data mainly from secondary sources which included official government documents, textbooks, published journals articles, the international news media, newspaper publications, materials from the internet etc. The descriptive research method was also adopted while the data collected were analysed using the qualitative method. Findings in the study revealed that inconsistency in the development of a science and technology development framework is responsible for the lack of indigenous technology in Nigeria and indeed Africa. In order to overcome the challenges observed in this study, there is need to develop and implement indigenous home-grown sustainable science and technology development programmes and frameworks.

Keywords: *Problems, Challenges, Science and technology, Development and Nigeria.*

Corresponding Author: John T. Kalama

Background to the Study

Science and technology are viewed differently by different nations hence, while some nations have realized their deficiencies and have taken necessary steps to bridge the gap other countries including Nigeria and third world countries have continued to remain indifferent. It is on record that while some countries including Malaysia, Finland and South Africa have taken necessary steps to re-direct their science and technology policy objectives by encouraging more research and development programmes others have remained indifferent and nonchalant. It is therefore important to note that science and technology has come to be linked not only to the changing needs of man but also with his improving scientific knowledge and reasoning hence, technology is regarded as essential to a country's security and prosperity. The growth of science, the efficiency of industry, and the policy of the state are, therefore, joined together uniquely by the research and development process. The current situation in the third world clearly revealed that Nigeria and indeed the rest of black Africa is caught up in a dilemma which shows the availability of natural resources and internally generated revenue with very poor science and technology programme. It is in the light of this background that this study attempts to unravel the issues and factors responsible for the lack of indigenous technology framework in Nigeria.

Theoretical and Conceptual Issues

Various factors are responsible for the level of under development and poor state of science technology infrastructure in Africa. While some scholars attribute the problem to leadership others blame the poor state of science and technology infrastructure to external interference in the internal affairs of African states. Achebe (1984) identified leadership ineptitude as the major problem facing Nigeria and African states. According to him, the trouble with Nigeria is simply and squarely a failure of leadership. Mytelka (1989), also attributed Africa's under development to leadership failure and noted that excessive reliance on external sources of revenue/income by African leaders accounts for the huge debt crises facing the African continent. In his words:

Policies and development plans in the immediate post-independence period were drawn up with the assistance of foreign experts... the first Nigerian national development plan (1962-1968) assumed that foreign sources would provide 50 percent of the capital expenditure required to service the development plan.

According to Mytelka cited in Fadahunsi (1979), regretted that in Tangayika (now Mali), both the three years development plan (1961-1964) and the first five year development plan (1964-1969) left the industrial sector to private entrepreneurs (largely foreign) hence, he stated categorically that the over dependence on external sources of finance and the diversion of such funds by political elites in Africa accounted for the poor state of science and technology infrastructure in the continent. Also commenting on the poor state of science and technology infrastructure and development in general, Bayart (2009), observed that the euphoria and anxiety over the independence of several sub-Saharan African states suddenly disappeared as African leaders became semi-gods and lords over their subjects. This point was made clearer when he stated thus: policies are been formulated for selfish gains, selfish interests leading to intermitted conflicts which have to a near failed state situation. In his review, of the Decade of

African independence, he added that at independence, access to the state through the political process serves as a means to accumulate wealth and resources of the state. Thus, he described sub-Saharan African states as the arena of what he called “the politics of the belly” (meaning a system where self-interest prevailed and not the collective interest and survival of the state). In the same vein, Zartman (1971), in his theory of the collapsed state described post-independence African states as collapsed and fragile states for failing to perform their basic constitutional obligations and responsibilities. In his work titled “Collapsed states in Africa” he reiterated that states collapsed or fails when they no longer perform the functions required by law. These basic functions the state must perform include:

- (a) The state as the sovereign authority,
- (b) The state as the institution, and
- (c) The state as the security guarantor.

It is therefore imperative to state unequivocally that the factors responsible for the underdevelopment of Africa has remained a source of debate among scholars especially among scholars in the field of development administration hence, Ake (1981), rightly observed that the problem of development generally can only be overcome when African leaders and elites accord development and education (indigenous education) top priority on their agenda in terms of planning and budgetary allocation. In his words: Development must be domesticated and democratized... It must incorporate popular participation, wishes and aspirations of the people; as well as the cultural practices and values of the people for which it is designed (Ake, 1981, 41).

Theoretical Framework

The elite theory was used in this study based on its interdisciplinary character which offers a penetrating insight into the phenomenon under investigation. As a framework for analysing political systems and structures, the elite theory is derived from the works of Italian sociologists, Vilfredo Pareto and Gaetano Mosca. In the words of Nkrumah (1980), elitism is an ideology of the bourgeoisies (the ruling class). Scholars in this school of thought views public policies and decision as representing the interests of the governing elites hence, the general public are not allowed to be involved in the decision making process even when the issues affect them. Because the people are excluded from the affairs of the state by the elites, public policies and decision are always directed to favour the ruling class. The elite political theory therefore contends that society is divided into classes, the ruled and those who control the machinery of the state. Thus, in elitist states where this theory is practiced, the minority always exercise effective political power. This is true because democratic principles allows for the election of few persons into leadership positions to harness, control, and put public resources together for public interest and good. Pareto cited in Obah-Akpogohaha (2013), believes that elites in different occupations and strata generally come from the same class: those who are wealthy are also intelligent: they have an aptitude for mathematics and moral character. To him, society consists of two classes namely:

- (a) **A higher stratum:** the elites which are divided into governing elite and non-governing elite.
- (b) **A lower stratum:** the non-elites Pareto's focus of inquiry was the governing elites which he argues rules by a mixture of force and deceit (Varma 2006).

In relating this theory to the Nigerian situation, it is obvious to observe that most Nigerian politicians, especially the band of retired military Generals and top government officials have remained in the political arena for decades without making any meaningful impact on the people and the economy. These elites have reached the peak of their professions/careers yet they still cling very tight to the governance of Nigeria using their political parties as well as the title of a General to intimidate others hence, displaying what Roberto Michels described as “Iron Law of Oligarchy”. According to Roberto Michels cited in Varma (2006), every organization is eventually reduced to oligarchy that is the rule of the chosen few. He maintained that majority of human beings are apathetic, indolent, slavish, and permanently incapable of self-government. In his words:

These manipulative devices of the masses by the political elites tend to manipulate ethnoreligious sentiments as tools for the acquisition of political support... Also, members of this dominant elite group are powerful, well organized and politically skilful to such an extent that they are capable of exploiting their positions so as to preserve the elite's domination over other members of the society.

This explains why the People's Democratic Party dominated the political space of Nigeria for a long time. The elite theory as applied in this paper is relevant in this context because science and technology policies and development policies generally in Nigeria have not yielded the desired results because such programmes and policies are formulated and implemented to satisfy the selfish desires of a few ruling class and not the nation in general hence, the high rate of conflict, insecurity and underdevelopment in Nigeria and Africa.

Nigeria's Science and Technology Policy Document

The formulation and implementation of science and technology policy framework is no doubt a product of public policy which varies from country to country. The problems facing the science and technology policy process across the world prompted ten (10) research times from Africa, Asia, Latin America, and Southern Europe to embark on a joint research captioned “The Science and Technology Policy Instruments (STPI) with a view to gather, analyse, evaluate, and generate information that may help policy makers and planners in under developed countries. In spite of these efforts, the task of presenting a strong science and technology policy framework remains a major challenge in Nigeria and Africa. In the case of Nigeria, the science and technology policy framework has the Federal Executive Council (FEC) at the apex. Directly below the FEC is the chief scientific adviser to the president. This is followed by the Honourable Minister for science and technology, followed by an elaborate technical structure comprising of research institutes, academia, departments and agencies of other ministries, the organized private sector, the informal sector and the foreign science desk under which is the Nigeria Diaspora. Available records show that Nigeria has reviewed its science and technology policy guidelines about three times namely in 1986, 1998 and 2003 respectively. In this paper emphasis was placed on the 2003 science and technology policy document which contains the following:

Annex I:	Policy on Biotechnology
Annex II:	Policy on linkage of the federal ministry of science and technology, universities, national and international research institutes
Annex III:	Policy on human capacity building of Nigerians and transfer of technology by multinational companies
Annex IV:	Policy on energy research and development
Annex V:	Policy on cooperation of federal government ministries and federal ministry of science and technology on the implementation and funding of science and technology based capital projects at federal, state and local government levels.
Annex VI:	Policy on space programmes
Annex VII:	Policy on appropriate technologies for empowering small and medium scale enterprises (SMEs).
Annex VIII:	Policy on engineering material research and development.
Annex IX:	Policy on science and technology data bank.
Annex X:	Policy on information technology
Annex XI:	Policy on intellectual property rights
Annex XII:	Policy on traditional medicine development
Annex XIII:	National Energy Policy

In order to effectively drive the above policy guidelines, the federal government also created an institutional framework to anchor the development of science, technology and innovation (ST&I). This development led to the establishment of the Nigeria Council for Science and Technology (NCST) via Decree No. 6 and Decree No. 83 of 1966 which mandates the council to perform the following functions:

1. Determine priorities for scientific activities in the federation in relation to the economic and social policies of the country and its international commitments.
2. Advise the federal government on a national science policy, including general planning and assessment of the requisite financial resources.
3. Ensure the application of the results of scientific activities and enquires to the development of agriculture, industry and social welfare in the federation.
4. Ensure cooperation and coordination between the various agencies involved in the machinery for making the national science policy, and promote public confidence in scientific expenditure and an atmosphere conducive to scientific activities.

Other functions of the NCST include considering and advising generally on all scientific activities including:

1. The application of the results of research,
2. The transfer of technology into agriculture and industry
3. Scientific and technical manpower (actual and potential),
4. Scientific research (oriented and non-oriented) and technology
5. Science education, not only at the advance level in respect of quality and quantity of potential manpower training but also at lower levels in respect of general science education for the public,
6. Scientific documentation, statistics surveys, and general information.

As part of the policy implementation process, the federal government also established the following research councils and institutes:

- (a) Agricultural Research Council of Nigeria (ARCN) via Decree No. 25 of 1973
- (b) Industrial Research Council of Nigeria (IRCN) by Decree No. 33 of 1971
- (c) Medical Research Council of Nigeria (MRCN) by Decree No. 1 of 1972
- (d) Natural Science Research Council of Nigeria (NSRCN) by Decree No. 9 of 1973
- (e) Agricultural Research Institutes of Nigeria (ARIN) by Decree No. 35 of 1973

Further steps taken by the federal government to promote the development of science and technology in Nigeria include the establishment of the following research institutes:

1. National Institute for Pharmaceutical Research and Development (NIPRD), Abuja
2. Federal Institute of Industrial Research (FIIRO), Oshodi, Lagos
3. National Institute for Medical Research (NIMR), Yaba Lagos
4. Projects Development Institute (PRODA), Enugu
5. Nigeria Stored Products Research Institute (NSPRI), Lagos
6. Nigeria Building and Road Research Institute (NBRRI), Otta, Ogun state, and
7. National Technology Development centre via National Science and Technology Act.

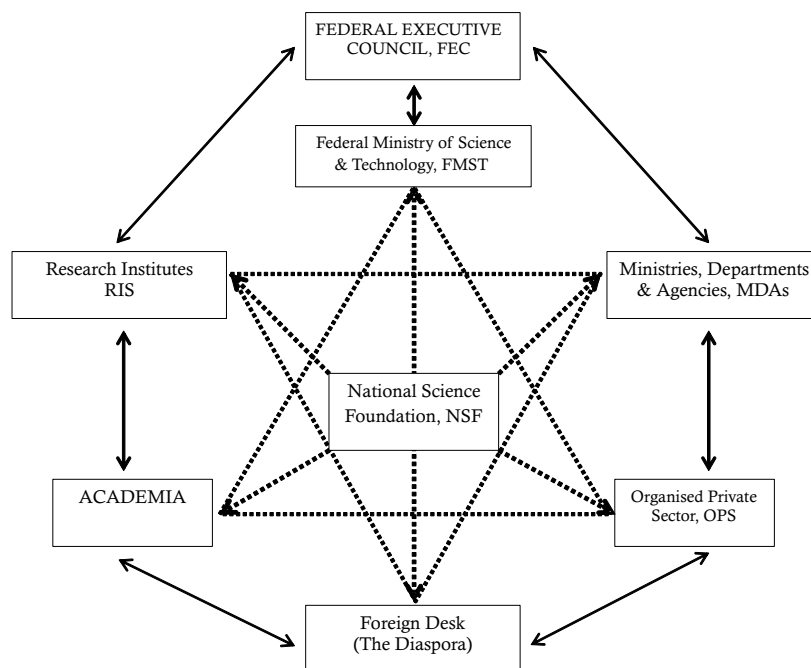
Science and Technology Policy Development Problems and Challenges in Nigeria

Science and technology development at any level is a product of the policy formulation and implementation process which entails input and output analysis hence, a nation can only experience rapid development in the science and technology sector when priority is given to research and education. In the case of Nigeria and most African countries, excessive dependence on foreign sources of finance has been a major challenge facing the development of science and technology in Nigeria. Mytelka made this point clear when he stated thus: The over dependence on external sources of finance and the diversion of public funds by political elites in Africa account for the poor state of science and technology infrastructure in Africa. Bayart (2009), identified corruption and policy inconsistency as major problems hindering the development of science and technology in Africa when he said policies are been formulated for selfish gains, selfish interests leading to intermitted conflicts which have led to a near failed state situation. Zartman (1971), corroborated Bayart's position and added that at independence, access to political power is the means to accumulate wealth. Thus, he described sub-Saharan African states as being the arena of the politics of the belly (where self-interest thrives above the general and collective good of all). Ake (1996), identified poor funding and lack of investment in the education sub sector. According to him, the problem of science and technology including economic development can only be overcome when African leaders accord development and education as top priority on their agenda. In his words:

Development must be domesticated and democratized. It must incorporate popular participation, wishes and aspirations of the people; as well as the cultural practices and values of the people for which it is designed (Ake, 1981, 41).

It therefore implies that policy decisions and actions are taken for the benefit and interest of a few ruling elites hence, the frequent change of policies at the slightest opportunity. The study further shows that the national science and technology policy framework in Nigeria has been reviewed several times by successive governments. This development has in turn led to series of inconsistencies which has made the policy framework to lack the necessary instrument capable of facilitating communication between arms of government. Lack of continuity in governance structure and policy have also hindered the development and advancement in science and technology in Nigeria hence, political leaders in the country have not demonstrated the much needed political will to sincerely drive the process of science and technology through research and development efforts. It is also on record that most public office holders and political leaders conduct government business as a personal private enterprise hence, making themselves territorial controllers or lords of public estates. Military incursion into public administration in Nigeria no doubt aggravated the situation which has also made public corruption a culture in Nigeria. The above challenges have compelled the nation to rely on external sources for its science and technology needs thereby making Nigeria and other dependent states rentier states dumping ground for all types of goods and services. Scholars are also of the opinion that the current national science and technology policy framework/structure is too complex with so much power and control in the presidency and the Hon. Minister for science and technology. Thus, funding and other forms of support hardly get to the real research institutes which require autonomy to function effectively. Below is the organogram of the national science and technology policy framework.

Figure 1: Nigeria Science and Technology Policy Framework/structure (page 6)



Source: Adapted from 2007 Federal Ministry of Science and Technology Policy Review document, Abuja

Conclusion

The paper examined problems and challenges facing science and technology development in Nigeria. While emphasising on the descriptive research method and secondary data, the study adopted the elite theory in order to explain the problems of policy failure and inconsistency in the science and technology sector and the political system in general in Nigeria. Analysis was based on the qualitative method (content analysis). For easy comprehension the study was divided into eight sections namely: The abstract, introduction, theoretical and conceptual issues, Nigeria's science and technology policy document, science and technology policy development problems and challenges in Nigeria, conclusion, recommendations and references. Findings revealed that lack of commitment and consistency on the part of the political class and elites have hindered progress and development in the science and technology sector in Nigeria. Over dependence on external sources of finance and technology also constitutes a major challenge confronting all sectors of the economy in Nigeria. Lynn Krieger Mytelka made this point clear when he stated thus: Over dependence on external sources of finance and the diversion of such funds by political elites in Africa accounts for the poor state of science and technology infrastructure in the continent (Africa). It is obvious to conclude that advancement and progress in science and technology does not fall from the sky but are developed or acquired through conscious efforts put in place by states through the policy formulation and implantation process. Therefore, it is pertinent to state unequivocally that public policies in general may remain as mere rhetorical statements if conscious efforts and the necessary legal and administrative frameworks are not provided to drive the implementation of such policies. In the case of Nigeria, the study observed that there is still a wide gap between the national science and technology policy document and the actual implementation by government institutions and agencies.

Recommendations

The following recommendations will no doubt help to promote the development and advancement of science and technology in Nigeria and Africa in general:

1. Science and technology development policies and actions should be guided by national interest and not the interest of a few (elites). Thus, such actions should focus on the entire nation and not a segment, region or geo-political zone as it is the case in Nigeria and other African countries.
2. Public policies should be projected and formulated to satisfy the general good of society and not the selfish interest of a few wealthy ruling classes as it was observed in the study.
3. Local entrepreneurs and industrialists should be assisted with facilities to enable them compete favourably with their foreign counterparts in the international markets. This is imperative because Africa's growth and development agenda must be championed by Africans and not foreigners.
4. Nigeria and African countries should accord more priority to science and technology infrastructure by increasing their budgetary allocation to education and research projects and programmes.
5. The national science and technology policy framework in Nigeria should be reviewed to accommodate young scientists and gifted children who should be identified and nurtured through, scholarships and other incentives.

6. The judiciary and anti-corruption agencies in Nigeria should also be strengthened and empowered to investigate and prosecute corrupt public officials to serve as a deterrent to those who mismanage or divert public funds especially funds meant for science and technology development in the country.
7. African countries should also ensure that they carryout electoral reforms to ensure that only credible and responsible citizens are allowed to participate in the electoral process. This will greatly reduce corruption and mediocrity in the system.
8. To ensure sustainable national development, African states and its leaders should develop an indigenous development framework and methods. In doing this, they must reject external development incentives (loans, financial aids and grants) that are inimical and counterproductive to Africa's economic interest.
9. There is need for Nigeria and African states to review its relations with her foreign partners in order to moderate and control the level of technology transfer and other forms of external interference in the development and policy formulation process in Africa.

References

- Adelman, I. & Morris, C. T. (1973). *Economic growth and social equity in developing countries*. London: Stanford University Press.
- Ake, C. (1981). *A political economy of Africa*, New York: Longman Press.
- Ake, C. (1985). *Political economy of Nigeria*, New York: Longman Inc.
- Bayart, J. F. (2009). *The state in Africa: The politics of the belly*, London: Longman.
- Clarke, I. (1999). *Globalization and international relations theory*, Oxford: Oxford University Press.
- Dickson, D. (1974). *Alternative technology and the politics of technical change*, USA: Fontana Press.
- Furtado, C. (1994). *Development and underdevelopment*, USA: University of California Press.
- Jose-de C. (1974). *Technology transfer and the developing nations*, New York: Council of the Americas Press.
- Mukoro, A. (2019). *Public administration: Practice and theory in Nigeria*, Ibadan: Ababa press Ltd.
- Mukoro, A. (2020). *Administration of the public service*, Ibadan: Ababa Press Ltd.
- Mytelka, L. K. (1989). *The unfulfilled promise of African industrialization in The African Studies Review*, 32, (3) 77-137.

- Mytelka, L. K. (1989). *The unfulfilled promise of African industrialization” in the African Studies Review* 32, (3), 77 -137.
- Mytelka, L. K. (1989). *The unfulfilled promised of African industrialization in the African Studies Reviews* 32(3) 77 – 137.
- Obah-Akpowoghaha, N. G. (2013). Assessment of the impact of political recruitment on democratic consolidation in Nigeria, 1999-2007 being an M. Sc thesis presented to the department of political science, Obafemi Awolowo University Ile-Ife, Osun state.
- Obande, O. P. (2007). *Overview of Nigeria's national science and technology policy*, Abuja: Federal ministry of science and technology publication.
- Okereke, O. D. (2008). *Public policy analysis and decision making*, Ebonyi State: Willyrose & Appleseed Publishers.
- Pareto, V. (1935). *The mind and society*, New York: Harcourt-Brace
- Varma, S. P. (2006). *Modern political theory*, New Delhi: Vikas Publishing House PVT Ltd.
- Zartman, W. I. (1971). *The politics of trade negotiations between Africa and the European economic community: The weak confronts the strong*, New Jersey: Princeton University Press.