Public Policy and Administration Research
ISSN 2224-5731(Paper) ISSN 2225-0972(Online)
Vol.3, No.7, 2013

Formulating Coherent Science and Technology Policies in Nigeria: is There any Political Will ?

Massoud Omar,
Dept. of Local Govt. Studies, Institute of Administration, Ahmadu Bello University, Zaria.
Email: drmassoudomar@yahoo.com
massoudomar55@gmail.co

Abstract
This paper argues that there is no coherent national policy in Nigeria for scientific and technological development. Policies are at best ad-hoc and fragmented or non-existent, and this has been the case since the attainment of independence in 1960. Both civilian and military regimes which have ruled the country at different points in its history, are to blame for this trend. The first attempt at formulating a coherent national policy on science and technology research in Nigeria began in 1966 with the establishment of the National Council on Scientific and Industrial Research to advise government on science and technology policy. This Council did not even function because of the civil war from 1967 to 1970. The National Council on Scientific and Industrial Research was replaced by the Nigerian Council for Science and Technology (NCST) in 1969. This Council existed for six years, i.e. 1970-1976. Again a new agency, the National Science and Technology Development Agency (NSTDA) was established in 1977. This agency took over the functions and activities of the NCST. However, this agency hardly had enough time to function before it was abolished in 1979. The functions of the NSTDA were taken over by the newly created Federal Ministry of Science and Technology in 1979. The ministry existed for four years i.e. 1979-1984 before it was merged with the Federal Ministry of Education to become the Federal Ministry of Education, Science and Technology in January 1984. It however re-emerged in 1985, retaining its former name of Ministry of Science and Technology. All these developments point to the ad-hoc nature and lack of a well-sustained policy thrust in the realm of the scientific research and development. The absence of a well-coordinated policy on science and technology according to this paper, is due to the lack of political will and underfunding. Unless the political leadership show a commitment towards the development of scientific research which will lead to technological advancement, Nigeria cannot make the quantum leap needed to bridge the gap between it and the technologically advanced nations of the world.

1. Introduction

A coherent national policy that provides for research into the development of science and technology in Nigeria had been at best, ad-hoc, fragmented, and almost non-existent. Past and present governments, both military and civilian, are responsible for this trend. Yet, technology is central to the development process of any country. During the first Republic (from 1960-1966), there was no national policy for the development of research in Science And Technology (S&T), even though the Nigeria did participate in the 1963 United Nations conference on "The Application of Science And Technology for the Benefit of Developing Countries", as well as the 1964 UNESCO international Conference on Research And Training in Africa. The lack of a comprehensive national policy to advance the frontiers of knowledge ins science and technology during this epoch is incomprehensible, because this was the era of independence in Africa, when African leaders were filled with nationalistic zeal to make their nation-states less reliant on the former colonizing powers, and be at least, self sufficient in terms of basic needs and necessities of society. The thinking of many African leaders then was that of the State playing a prominent role in the process of socio-economic development of their newly emergent nation-states. The catchphrase in the economic policies of most African countries then was that the "State should control the "commanding heights" of the economy". Prominence was given to State intervention in the areas of manufacturing, education and agriculture, with industrialisation as the main thrust of development policies. Clearly, any emergent nation that is serious about its development should have an overall State sponsored, coherent national policy whose main thrust would be to provide the human, financial and material resources for research towards the development of science and technology in the society.

The first attempt at formulating a coherent national policy on science and technology research in Nigeria began in 1966, (six long years after independence!) with the establishment of the National Council on Scientific and Industrial Research (by Decree 83 of 1966), to advise government on science and technology policy. This Council did not even function because of the civil war from 1967 to 1970. The National Council on Scientific And Industrial Research was replaced by the Nigerian Council for Science and Technology (NCST) in 1969. This Council existed for six years, i.e. 1970-1976 and established a framework for an integrated science and technology policy in Nigeria. The main function of the Nigerian Council for Science and Technology was to define policies and priorities for scientific research in Nigeria. It had a three-tier system;

i) The NCST Board for Policy Formulation
ii) Sectional Research Council for Policy Coordination
iii) Research Council Institutes for Execution of Research.

There were also four sectional councils established purposely for management and coordination. These were:

i) The Agricultural Research Council of Nigeria (established by Decree No. *25* of 1971)
ii) The Industrial Research Council (established by Decree No. 33 of 1971
iii) The Medical Research Council (established by Decree No. I of 1972)
iv) Natural Sciences Research Council (established by Decree No. 9 of 1973)'

The NCST was abolished in 1977 along with the four sectoral councils. Again a new agency, the National Science and Technology Development Agency (NSTDA) was established (by Decree no *5* of 1977). This agency took over the functions and activities of the NCST. It operated through five Departments namely:

i) Planning
ii) Agricultural Sciences
iii) Industrial Sciences
iv) Physical Science and Technology
v) Medical Research and Biological Sciences

However, this new agency hardly had enough time to function before it was abolished in 1979, having been in existence for only two years. The functions of the NSTDA were taken over by the newly created Federal Ministry of Science and Technology in 1979, thus effectively putting to an end the existence of the NSTDA. As at then, the Ministry of Science and Technology had six Departments namely:

i) Administration and Finance
ii) Science and Technology Planning, Programming and Evaluation
iii) Agricultural Sciences
iv) Industrial Sciences and Energy
v) Medical and Natural Sciences
vi) Technology Transfer and Education

This ministry existed for four years i.e. 1979-1984 before it was merged with the Federal Ministry of Education to become the Federal Ministry of Education, Science and Technology in January 1984. It however re-emerged in 1985, retaining its former name of Ministry of Science and Technology. All these developments point to the ad-hoc nature and lack of a well-sustained policy thrust in the realm of the scientific research and development. Clearly, there was no direction and focus in this regard.

2. INSTITUTIONAL MECHANISMS FOR PROMOTING THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY

One of the main distinguishing features of the industrialization process is the application of S&T to the productive activities of a country. This requires the educational system producing a community of scientists and engineers, backed by an institutional framework to encourage maximum efficiency in scientific research. Starting from 1979 a new approach towards the development of science and technology was initiated in the country, with the introduction of the National Policy on Science and Technology. This approach basically focuses on the improvement of institutional mechanisms for adapting imported technology and promoting research and development to meet industrial and other needs of the country in order to achieve self-sustainable development. The National Policy on Science and Technology as it currently exists is meant to addresses the following issues:

i) Scientific and Technical Manpower Development. This aims at emphasizing Science at all levels of the nation's educational system. It also offers special incentives to individuals engaged in science and technology endeavours. The objective here is to encourage the development of new technologies and to adopt existing ones for the well being of society.
ii) Localisation of capital goods development and manufacture: This is to enable a solid and stable technological base for a self-sustaining industrialisation process and channel capital into the engineering industry for its local growth. In order to achieve this, the policy requires;
a) The production of industrial machinery and equipment to be largely locally based and
b) Financial incentives must be created to encourage the growth of machine tools and heavy engineering equipment industry.
iii) Materials for Industrialisation: The policy in this area is for the exploitation, processing and utilization of the nation's material resources to be programmed in such a manner as to promote self-reliance. Successful implementation of this policy will guarantee steady and assured sources of raw materials for local industry.

iv) Energy Exploration, Exploitation and Utilization: Energy is recognised as the all- pervasive factor in the overall economic and social life of the nation. In this regard, the policy seeks to ensure that the nation's energy resources are protected and optimally utilized in the overall interest of the nation at all times.

v) Technology-Generation, Transfer, Development and Control: The policy identified technology as the key and the basis of true development. Its cultivation was recognised as the assurance and guarantee for any nation to attain any reasonable level of self-reliance and national security. The policies in the area of technology included:

(a) The maximal utilization of technology in all aspects of day-to-day activities of the nation;

(b) The acquisition of foreign technology in an 'unpackaged' form for major Government projects involving these;

(c) Insulating strategic capital goods industry from foreign control;

(d) Offering incentives for organisations that maintain locally based research and development activities; and

(e) Ensuring that important national development projects are not based on unproven foreign exchange technologies. The policy also identified areas of technology development where priority attention should be paid henceforth. These included agriculture and food production, health and health-care delivery, and industry.

vii) Other Areas: The other specific areas addressed by the policy include the development of military science, control and enhancement of the environment, strengthening of international cooperation in science and technology, and active promotion and dispersal of results of research.

It must be noted however that the implementation of the National Policy on Science and Technology is not a special preserve of the Ministry of Science and Technology. The policy also touches on the mandates of other governmental agencies and also on the operations of private sector establishments. The main focus of science and technology activities however is the Ministry and it is looked up to for policy guidelines and direction for the rest of the country. However, there are two major issues which mitigate, or serve as bottlenecks, thereby preventing the smooth implementation of a well coordinated policy on scientific research in the country. These are;

i) The absence of political will

ii) Under funding

2.1 ABSENCE OF LACK OF POLITICAL WILL

The lack of political will to achieve stated national objectives constitutes one major problem preventing the development of effective research in science and technology. This problem translates into chronic under-funding for research activities. Research and Development (R&D) is not adequately funded as outlined in the National Policy. Frequent changes in the political leadership of the country means that each government comes out with its own blueprint or plans for development, shelving the programmes of its predecessors. This, in effect, means that there is lack of continuity in policy implementation, which, in turn, seriously affects research in science and technology. Changes in government means changes in the structure, leadership as well as the location of the parastatals established to handle science and technology policies. Consequently, various frameworks were created for science and technology activities with lack of a clear focus. No effective science and technology policy guideline evolved to give these policies a sense of direction, which in the long run would help achieve set goals and national objectives. Concomitantly, research activities in science and technology did not become a vehicle for the economic emancipation of the country as happened in other countries like Japan and South Korea.

The lack of political will, further compounded by the lack of continuity in policy making has in turn affected the educational sector- especially the tertiary institutionswhich should play a major role in the development of science and technology. A case in point is that of university education. There has been a considerable expansion of the university system from independence to date without the corresponding financial wherewithal to fully equip these universities, especially the research centres. . Three major periods of university expansion and development in Nigeria have been identified. The first period was during the immediate post independence era up to early 1970s, when the first generation universities were established. The second phase of expansion was during the late 70s, when seven more universities were created and the third phase was during the early 1980s when seven federal universities of technology and nine state universities were established. The Federal Government in 1979 established seven Federal Universities of Technology in the States, which hitherto had no Federal Universities. This act was more political in nature than based on actual need to enhance and advance the frontiers of knowledge in science and technology, as evidenced by the fact that funding for R &D in these institutions as well as other institutes and research centres located in other universities has been abysmally low. As Awe M., and AF Oluwole (1989:7) aptly remarked:

"It is doubtful whether government really gave serious thought to the aims and

> *objectives of these institutions as well as their course offerings. There was certainly inadequate planning to obtain the right calibre and number of human resources as well as the physical facilities to run the universities. The result is that these universities of technology are still to make an impact on the training of high level technological manpower in the country* ".

At present, there are twenty-one federal, and one military university in the country. The states of Kano, Kaduna, Gombe, Niger, Abia, Imo, Delta, and Edo have established their own universities. It is therefore not surprising that against this background, the ratio of science and technology graduates to the total number of graduates in Nigeria has not changed since 1985. In addition to establishing these institutions, the Federal Government has also made "efforts" to establish science and technology based research units mainly in the universities and polytechnics. Even though there are highly qualified personnel to man these units, output has not corresponded with available skilled manpower. The reasons for this gloomy picture are not far to fetch. Laboratories are not well equipped; funds for research are not enough while researchers are not well supported. As our interviews with some researchers in some of the institutions reveal, what keeps most of them in the research institutions is the devotion and dedication to their chosen professions. Referring to the working conditions in the institutions, Prof. Iyahsen of the National Mathematical Centre, Abuja,, had this to say:

> *"It is very difficult to retain graduates with first class honours degree in mathematics or a second class upper in mathematics and physical sciences, because they are taken over by the oil companies and the banks. They do not even think of the university because what these companies pay them is eventually more than what their lecturers earn. In the mathematical centre here, the conditions are not good enough but some of us are too old to leave*[1] *"*

Two young researchers at the Centre For Energy Research and Training, Ahmadu Bello University, Zaria expressed the same opinion. According to these two researchers, even though the Centre, in terms of funding, is under the Energy Commision of Nigeria. their working conditions and salaries are tied up with the university structure which is hardly enough to make ends meet. In terms of what they receive as salary, it is not much when compared with what colleagues in other countries receive. They however get the opportunity to frequently attend seminars overseas which makes them keep abreast with current developments in their chosen professions. It is only their devotion and love for their chosen field, which makes them, remain with the Centre for Energy Research and Training. Added to the lack of incentives and material well-being is the apparent lack of maintenance culture to keep the equipments, which have either been purchased or donated, in good condition. Despite these setbacks, one should not however underestimate the impressive achievements of Nigerian universities as centres for advancing the frontiers learning and research. The universities have produced a large number of graduates over a short period, provided essential community services and contributed significantly to research outputs. About *85%* of the total research output measured in number of mainstream publications are from Nigerian universities.

2.2 UNDERFUNDING RESEARCH IN SCIENCE AND TECHNOLOGY

In terms of financing science and technology research in the country, The National Policy on Science and Technology specified a three-tier funding system involving the Federal Government and its parastatals, the State Governments and its private sector establishments. In stipulates that the Federal Government should fund science and technology development programmes up to a level of *5* per cent of its annual budget while the States are to contribute by way of sponsored research projects. The establishment of a National Science and Technology Development Fund, to which major enterprises, both public and private, operating in Nigeria should contribute, is at least on paper, a step in the right direction.. Despite these policy measures, fiscal allocations by governments of the federation for research in science and technology is abysmally low. A cursory glance at the budgetary allocation of the Ministry for Science and Technology from 1979-1985 shows the lack of necessary commitment and seriousness of the federal Government towards funding research into science and technology. Between 1980-1985, i.e. the period of the 4 National Development Plan, only 0.85% of the budget for the plan was allocated to the Ministry. This was just enough to cater for administrative overheads. Also throughout the five-year period, the ministry gave no research grant to any of the Federal Universities of Technology, not to talk of the Research Centres in the various universities throughout the country. Over a four year period, i.e between 1982-1985, there was a continuous whittling down of the fiscal allocations to the ministry of science and technology in the federal budget. In 1982, N98m was granted to the Ministry, representing less than 1% of the Federal Budget. This was reduced to N68m in 1983 and N18m in 1984. In 1985, it was further reduced to N7.5m.

[1] Interview conducted with Prof. lyahsen, National Mathematical Centre, Abuja, April 2007.

(Awe M., AF Oluwole 1989). An examination of the year 2000 budget shows that the following allocations were made to the key ministries which deal directly with the research institutes and universities.

	Budgetary Allocation		
	Recurrent	**Capital**	**Total**
i) Agriculture And Rural Development	4,834,666,655	5,803,716,440	10,633,383,095
ii) Education	29,030,912,906	11,333,370,264 40	10,364,283,170
iii) Health	10,337,129,731	6,814,735,252	16,669,865,003
iv) Science And Technology	1,096,038,487	1,199,028,168	2,295,066,655

A breakdown of these figures show that out of a total budget of 667.5 billion for the year, the four ministries got N69.9 billion which represents an insignificant percentage of the budget for that year. The fiscal allocation for the Ministry of Science And Technology against the overall total of the year 2000 amounts to only ***%.*** Another example of the serious under-funding of research in science and technology becomes apparent when one looks at the 1999 budget of the National Mathematical Centre. The Centre proposed a budget of N188, 025, 072.00. Yet it received only N67, 037, 370.00[1].

Applied research, aimed at industrial use, is mainly conducted in research institutes owned by the federal government. There are carried out in twenty two federal research institutes which in the mid 1 980s, had about 15,000 scientists and support staff in their employ. Researches conducted in these Federal Research Institutes are mainly oriented towards the use of natural resources found in Nigeria. There is considerable size variation among the institutions, with some employing between 100-300 workers, and others employing around 2000. The biggest broad category is that of plant scientists who comprise 62% of the total manpower. Within this category, agronomists made up 42% (or 26% of the total) while plant pathologists and soil scientists made up another 40% in roughly equal proportions. Within the social sciences economists are not integrated directly into the formulation of research projects but are usually involved either in extension work of in specific social studies along with the sociologists. Overall, the skill level of the research scientists in the federal research institutes has been identified as lower compared with that of the universities. (Yvon Chatelin et al 1997:15).

Despite these setbacks however, the various research centres and institutes notably in agriculture and veterinary medicine have recorded achievements. It must be noted however, that even the capabilities and technologies, which have been developed by these research institutions, have had little impact on the country because there has not been a conducive atmosphere for their diffusion on a large scale. Moreover, the achievements are not in the hard-core areas of technology as the list of some of these inventions provided in tables II and I below shows.

[1] Scientific Activities of the National Mathematical Centre. Abuja. Submission made to the House of Representatives Committee on Education, I 0th February 2000.

TABLE 1

S/N	Technology	Uses and applications of the technology	Institute
1	Arable and Hort. Crops Multipurpose Dryer	Prototype of this dryer can be popularized to dry fruits, tubers and vegetables slices and chips during the commodity glut for down-stream food processing	NSPRI FIIRO, IAR
2	Plastic crate	Solar tray dryers developed fro drying tomatoes, pepper e.t.c. to be distributed for demonstration in major production areas.	NSPRI
3	Vegetable basket	Vegetable baskets for transportation and storage of vegetables to be promoted among women vegetable traders and vegetable farmers.	NSPRI
4	Multipurpose crop thresher	Capable of threshing wheat (80kg/hr), Millet (50kg/hr)and sorghum (60kg/hr)	IAR
5	Oil Extractor	Simple machine capable of extracting oil form groundnut and sunflower with less energy than traditional system as in the write-up	IAR
6	Soyabean thresher	These threshers jointly designed and produced by IAR&T IAR, NCRI and UAM removes drudgery of manual threshing of soyabean prototypes requires popularization which will lead to improving the design of new prototype.	IAR & T NCRI

TABLE II
VACCINES PRODUCED BY THE
NATIONAL VETERINARY RESEARCH INSTITUTE, VOM

a) Viral Diseases vaccine	b) Bacterial Vaccines
Newcastle Disease (Intraocular)	Anthrax
Newcastle Disease (Lasota)	Blackquarter
Newcastle Disease (Kamorov)	Brucella (S 19)
Fowl Pox	Bovine Pleuropneumonia (wet)
Gumboro	Bovine Pleuropneumonia (Inactivated)
Rinderpest	Hemorrhagic Septicaemia
Rabies (Dog)	Fowl Typhoid (Wet)
Rabies (Cat)	Fowl Typhoid (Lyophilized)
	Fowl Cholera

The National Veterinary Research Institute is currently engaged in research to develop and produce the following vaccines:

i) Lumpy Skin Disease
ii) Plueuropneumonia Combined Rinderpest and Bovine
iii) PPR(Kata)
iv) Sheep Pox
v) Foot and Mouth Disease
vi) Pelleted Newcastle Disease
vii) Mareks Disease
viii) Combined Newcastle Gumboro Fowl Pox

Source: National Veterinary Research Institute, Vom, Plateau State

3. CONCLUSION

The political leadership of the country has not shown a strong willingness or firm commitment to commit substantial resources to research activities in science and technology. Strengthening of the universities in terms of funding, remuneration and adequate equipping of the laboratories in order to raise the amount and level of research done by university scientists has not been of utmost priority for past and present governments. Laboratories are not well equipped, funds for research are not enough and researchers in the various institutes and centres are not well supported materially and financially. The creation of a Ministry of Science and Technology in 1979 and the way the Ministry has functioned since then shows either official disdain or lack of a

firm conviction in the all embracing role that science and technological development can play moving this country forward. This has resulted in the absence of a tradition of rational and systematic *application of* science and technology results for national development. This, on the other hand, means that there is no recognition of the role that science and technology research can play as a vehicle for the economic emancipation of the country. Consequently, Nigeria will remain underdeveloped until clear, well-articulated policies with the appropriate institutional structures are put in place to enable the country make the quantum leap needed to bridge the gap between it and the technologically advanced nations of the world.

REFERENCES

Awe O. Science and Technology Development, University Lecture On Behalf of Faculty of Science, University of Ibadan, June 1982

Awe, M., and A.F. Oluwole, Nigeria Since Independence:the First Twenty Five Years, Vol.ix, Panel on Nigeria Since Independence Project, Heneimann, Lagos, 1989

National Policy On Science And Technology, Federal Ministry of Science and Technology, Lagos, 1986

Igbeka J.C. "Technology and Industrial Policies as They Affect the Agricultural Machinery Manufacturing Industry In Nigeria", Research Report No.3, Development Policy Centre, Ibadan, 1998

Maduemezia, A., S.N.C. Okonkwo and Ephraim Okon, Science Today In Nigeria, The Nigerian Academy of Science, Lagos, 1995

Technology Policy In Nigeria, Institute of Social and Economic Research, Ibadan, 1990

Yvon,. C. et a!., The Nigerian Scientific Community: The Colossus With Feet of Clay" In J. Gaillard et.al. Scientific Communities In the Developing World, Sage Publications, 1997, New Delhi.

National Agricultural Research Project-Implementation Completion Report. Institute For Agricultural Research, Ahmadu Bello University, Zaria 1999