HISTORICAL DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN NIGERIA SINCE 1898: IMPLICATIONS FOR EDUCATIONAL DEVELOPMENT

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Abstract
This paper examines the historical development of science and technology in Nigeria from 1898 when the first major attempt at entrenching science and technology in educational programme could be said to have started in Nigeria. This was the year when the Moore Plantation, Ibadan was established as a science and technology-oriented research centre in the geographical area now called Nigeria. This earliest effort was followed by the establishment of similar research centres in parts of Nigeria, notably at Samaru and Umudike in Northern and Eastern parts of Nigeria respectively. This was with a view to boosting agricultural production and providing raw materials for industries (in Europe). The study features historical analysis in the examination of the various issues involved in the development of science and technology in Nigeria. This is with a view to considering the level of scientific and technological accomplishments in Nigeria and the implications for educational development in the country. It was found that Nigeria has not recorded an appreciable feat of scientific and technological breakthrough for the sustenance of its teeming populace despite its determination to do so. This has low implications for educational development of the country. However, these are largely due to high scale corruption of successive administrations and public officials in the socio-political and economic milieus. It is recommended that Nigeria addresses more practically, the issues of corruption, financial mismanagement, and policy discontinuity in order to fulfill more realistically its dream of sustainable national development through education.
Keywords: Science, Technology, Educational development, National development.

Introduction

Science is an English word, derived from the Latin 'scientia', which originally had an equally broad meaning. It could refer to almost everything that one has to learn in order to master it: everything from scholarly learning to sewing and horse riding

(Hanasson, 2015). In the seventeenth and eighteenth centuries however, the meaning of science was restricted to systematic knowledge. For instance, it was used with reference to the knowledge an individual needs to make a living in a particular practical trade. In the nineteenth century, its meaning was further restricted to essentially cover what could today be referred to as natural science (Layton, 1976). Today, science is still primarily used to refer to the natural sciences and other fields of research considered to be similar to them (Hanasson, 2015; Salmon, 2003). Science and technology are interrelated. Thus the term 'science' cannot be used in isolation without associating it with technology (Shaibu, 1993)

The word technology on the other hand is of Greek origin based on 'techne' meaning art or skill and 'logy' which means 'knowledge of' or 'discipline of'. The word was introduced into Latin by Cicero as a loanword (Steele, 1900). However, its usage was not very popular until when it was used by Peter Ramus (1515-1572) in the sense of knowledge about the relations among all technai (arts). Thus the word became increasingly used to denote knowledge about the arts (Hanasson, 2015). In English language, the word technology had acquired a distinct meaning. It referred to the tools, machines, and procedures used to produce material things, rather than to science or knowledge about these tools, machines, and procedures. Hanasson (2015) stated that this usage became popular only in the twentieth century. The earliest example in the Oxford English Dictionary is a text from 1898 about the coal-oil industry according to which "a number of patents were granted for improvements in this technology, mainly for improved methods of distillation'' (Peckham, 1898). This remained the dominant usage till today. In English usage, technology normally refers to instrumental practices or their rules and only exceptionally to the scientific description, explication or explanation of these practices (Mertens, 2002).

Science and technology are inter-related and portray a somewhat symbiotic relationship to education. According to Ahmed (1979) the nature or quality of science and technology education can be determined with reference to its enabling capacity to fulfill personal and societal aspirations. Moreover, it is important to note that Nigeria places high premium on the teaching and learning of science and technology as evident in the National Policy on Education (FRN, 2013). This attempt however, is yet to translate to impressive scientific and technological development of the nation's socio-economic milieu (Abubakar,2004; Buhari, 2016). Therefore, this paper examines the historical development of science and technology in Nigeria from 1898 when the earliest attempt at encouraging science and technology began in the country with a view to considering the challenges and prospects of science and technology, and implications for educational development in Nigeria. It examines the evolution and development of science and technology under four different phases thus: 1898-1969; 1970-1975; 1976-1985 and 1986- the present. This becomes imperative because science and technology occupies an important place in the current National Policy on Education with a view to setting Nigeria on a high pedestal in the comity of scientifically and technologically oriented nations of the world.

This study therefore, adopts the historical research method because it is historical in nature. Thus, it made use of primary and secondary sources of data including diaries, log books, minutes of meetings, reports, policy documents and other related materials. These data were subjected to periodic and thematic analyses in order to arrive at historicized conclusions from which recommendations were made.

The First Phase of Development of Science and Technology in Nigeria (1898-1969)

Historical records had it that the first set of scientific and technological institutions otherwise called research centres in Nigeria came into existence with a view to boosting agricultural output and thus, provide raw materials for industries in Europe (Aluko-Olokun, 1999; Barrow, 2002; Abubakar, 2004). It is important to note that the first agricultural research centre to be established in Nigeria was the Moore Plantation, established in Ibadan in the year 1898. This was followed by the establishment of similar research centres in the then Northern region at Samaru, Zaria and Umudike, Umuahia in Eastern Nigeria. The Moore Plantation, Ibadan was later renamed Federal Department of Agricultural Research in 1954 (Barrow, 2002).

West African sub-regional research institutes were established in the early 20th century by the British colonial administration with headquarters in Nigeria. These institutes include:

i. West African Cocoa Research Institute, Ibadan.
ii. West African Institute for Oil Palm Research, Benin.
iii. West African Institute for Trypanosomiasis Research, Kaduna;
iv. West African Council for Medical Research, Yaba, Lagos (Abubakar, 2004).

In addition to the above, the West African Research Office located in the then Gold Coast (now Ghana) had research institutes in Nigeria. These include: the West African Road Research Institute, the West African Timber Research Unit and the West African Rice Research Station. Abubakar (2004) stated that most of the research institutes and centres became full- fledged National Institutes in Nigeria following independence of Ghana in 1957. The Agricultural Research Institute Act was enacted by the Nigerian parliament in 1964 (Aluko-Olokun, 1999).

The Agricultural Research Institute was mandated to co-ordinate research activities in Nigeria as it relates to agriculture. Following the international conference on the Organization of Research and Training in Africa in 1964, the National Council for Scientific and Industrial Research (NCSIR) was established in Nigeria by Decree No.83 of 1966 (Abubakar, 2004). This Council was mandated to act as an advisory body to government and as such, it lacked executive powers (Ameh and Gyuse, 1989; Aluko-Olokun, 1999). The mandate of NCSIR was observed to be narrow and therefore, had structural weaknesses that impeded the efficient discharge of its responsibilities.

The Second Phase of Development of Science and Technology in Nigeria (1970 – 1975)

Renewed consciousness of the development of science and technology in Nigeria could be said to have received a boost in the country after the end of the Nigerian civil war in 1970 (Abubakar, 2004). This is because it was in the 1970s that concerted efforts were made to promote the development of Science and Technology in the country. It was during this period that the Nigerian Council for Science and Technology (NCST) was established by Decree No. 6 of 1970 to replace the NCSIR (FMST, 1990).Furthermore, it was Decree No. 6 of 1970 which stimulated the establishment of the following four sectoral research councils:

(i) the Agricultural Research Council of Nigeria (ARCN) established by Decree No.25 of 1971.
(ii) the Medical Research Council of Nigeria (MRCN) established by Decree No.33 of 1971;
(iii) the National Science Research Council of Nigeria (NSRCN) established by Decree No. 9 of 1973, and
(iv) the Industrial Research Council (IRC) (Abubakar, 2004).

Research and development activities in Nigeria in areas such as Agricultural Science, Engineering and Technology, Medical Science, Experimental Sciences, Environmental and Social Sciences were to be coordinated by the Nigerian Council for Science and Technology (NCST). It is important to note however, that much of the development in the field of Science and Technology during this period was influenced by the activities of the United Nations Educational Scientific and Cultural Organization (UNESCO).

It is pertinent to note that the first regional ministerial conference organized by United Nations Educational Scientific and Cultural Organization (UNESCO) on the development of science and technology in Africa-CASTAFRICA 1 was held in Dakar, Senegal in 1974 (Khalil, 2002) and Nigeria was represented. Among the important resolutions of the conference was the need for each African country to formulate its science and technology policy to guide national development, especially rural and industrial.

The Third Phase of Development of Science and Technology in Nigeria (1976 – 1985)

In pursuance of her commitment to the resolution reached at the UNESCO regional conference in Dakar 1974, Nigerian government in 1976, set up a Science and Technology (S&T) Review Committee. The committee recommended two policy options to guide the nation's development in the area of science and technology thus:

i. establishment of an executive agency to co-ordinate Science and Technology (S&T) policy; or

ii. establishment of Ministry of Science and Technology with all the research institutes under it (Barrow, 2002; Abubakar,2004).

The adoption of the first option led to the establishment of the National Science and Technology Development Agency (NSTDA) by Decree No. 5 of 1977 with all the research institutes under it (Abubakar, 2004). Following the emergence of NSTDA as a new institutional framework, all sectoral research councils and the NCST were dissolved. Animalu (2003) stated that since the National Science and Technology Development Agency (NSTDA) had no minister, it was chaired by Major-General Shehu Musa Yar' Adua, the then Chief of Staff, Supreme Headquarters.

In 1979, more research institutes were established by the National Science and Technology Development Agency (NSTDA). Thus, the total number of research institutes became twenty-two (22): 18 agro-based, 3 industrial-based and 1 medical-based. Aluko-Olokun (1999) noted that in addition to supervising the research institutes, the National Science and Technology Development Agency, also funded university-based researches.

Abubakar (2004) observed that the search for an ideal Science and Technology (S&T) structure continued in 1980 with the emergence of the democratic government, headed by the then President Shehu Shagari. The administration had an apparent realization of the importance of Science and Technology to national development. Consequently, president Shagari dissolved the National Science and Technology Development Agency (NSTDA) and established the Federal Ministry of Science and Technology (FMST) through the Science and Technology Act No.1 of January, 1980. During this period, the Federal Government of Nigeria established specialized universities with emphasis on expanding the frontiers of knowledge in Science and Technology. This is an addition to training high level manpower required for the technological age. This period heralded the establishment of more colleges of technology in parts of the country.

Following the military incursion into Nigerian politics and four years after its establishment, the nascent Federal Ministry of Science and Technology was merged with the Federal Ministry of Education to become Federal Ministry of Education, Science and Technology. The Federal Ministry of Science and Technology regained its status of a full-fledged Ministry in 1986, sequel to the overthrow of the military regime of Major-General Muhammadu Buhari in December, 1985. (Animalu, 2003; Abubakar, 2004).

The Fourth Phase of Development of Science and Technology in Nigeria (1986 – Present)

According to Animalu (2003) it was in 1986 that the first National Policy on Science and Technology was enunciated in Nigeria. During this time, issues for consideration included the establishment of National Science and Technology Fund (NSTF) as a major financial source for implementation of the Science and Technology (S&T) policy in the country. However, the expected funding of S&T through the NSTF

did not materialize (Animalu,2003). The identification of non-existence of an engineering infrastructure in the Federal Ministry of Science and Technology policy framework necessitated the establishment of the National Agency for Science and Engineering Infrastructure (NASENI) by Decree N0.33 of 1992 (Abubakar, 2004). The Federal Ministry of Industry and Technology was established towards the end of 1992 to replace the Federal Ministry of Science and Technology, while the Sheda Science and Technology Complex (SHESTCO) came on board with the promulgation of Decree N0.43 of 1991 (Khalil, 2000; Animalu,2003; Akaninwor, 2008).

The year 1992 witnessed the amendment of Decree N0.39 of 1987 which gave a legal backing to the establishment of the Raw Materials Research and Development Council (RMRDC) for the promotion of raw materials development. It is pertinent to note however, that since 1993 when the Federal Ministry of Science and Technology was re-established, it has been performing its statutory responsibilities without hindrances. Today, there are State Ministries of Science and Technology, working in co-operation with the Federal Ministry of Science and Technology towards ensuring the scientific and technological advancement of the Nigerian nation.

Science and Technology in Nigeria: implications for Educational Development

The science and technology-oriented research centres discussed in this paper are national educational institutions that pursue research oriented studies which lead to the award of National Certificates, National Diplomas, and Higher National Diplomas in Science and Technology-oriented disciplines. Moreover, the centres process and produce a large array of science and technology based agricultural products which could help in large scale development of agriculture in Nigeria.

The ideals of a worthwhile society are expected to be preserved and passed to the next generation through its educational system. In this regard, it requires that adequate attention is paid by the government to funding of research institutions in Nigeria. It is noteworthy that a good number of research institutions are now available in the country. Some of them include Federal Institute of Industrial Research, Oshodi (FIIRO), Product Development Agency (PRODA), Enugu, Nigeria Institute for Oil Palm Research (NIFOR), Benin-City. In a country such as Nigeria where cost sharing is a feature of the nation's educational system, government (at all levels-Federal, State, Local) is expected to partner with the private sector in funding appreciable development of science and technology education.

In Nigeria, most educational institutions including universities, colleges of technology, polytechnics , technical colleges, and research centres that are supposed to be technology-oriented and are established to train and produce scientists, engineers, technologists and technicians can only boast of obsolete, non-functional tools and equipment. This situation no doubt, has devastating effects on the quality of the products of these institutions, thereby hampering their contributions to national development. In the same vein, most of these technological institutions are found to be deviating from their scientific and technological orientation to place undue emphasis on business or

commercial oriented disciplines which they feel are better sought after by candidates, thereby contributing less to the scientific and technological development of the Nigerian nation. This contrasts sharply with what obtains in technologically developed nations of the world.

Conclusion and Recommendations

In conclusion, the earliest effort to encourage science and technology in Nigeria was in the field of agriculture. However, it is ironical that such effort is not being sustained in the 21st century especially with the current amendment of the Tertiary Education Trust Fund (TETFUND) Act, whereby all Colleges of Agriculture in the country are expunged from the list of benefitting institutions from TETFUND. This is rather an absurdity in a nation that aspires to boost agricultural production. In effect, the youth are not adequately encouraged to make agriculture their career due to apparent lack of recognition by the government. Moreover, large scale corruption in successive administrations by some public officials is inimical to the development of science and technology in Nigeria.

The study reveals that Nigeria needs a major policy shift on issues of science and technology in the recognition of TETFUND for Agricultural research centres towards the development of Agriculture for educational, scientific, technological, economic and general national development. Thus, it is recommended that the government intensifies efforts in the recognition and provision of Tertiary Education Trust Fund (TETFUND) for Agricultural research centres including Colleges of Agriculture and similar research institutions.

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