

Technology Development in Nigeria: The Nigerian Machine Tools Industry Experience

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KEYWORDS Technology. Industrialization. Development. Machine. Tools

ABSTRACT This study examines the challenges of Industrialization in Nigeria, with emphasis on the projects earmarked to support technological development and trail blaze industrialization in the fourth and fifth national development plan schedule. The study relied on primary and secondary sources of information: oral interviews and government documents constitute the primary sources, while, the secondary sources include newspapers, journal articles, conference papers and personal observations. The study reveals that colonialism truncated and hindered improvement in the indigenous skills and techniques of the pre-colonial economy. While the progress made by the fourth and the fifth national development plans; particularly with the establishment of a Nigerian machine tool industry at Osogbo among others, was short-lived by the withdrawal of the foreign technical partners. This is, however, seen as the problem of institutional support from the Nigerian government and secondly, of technology transfer, a struggle of opposing classes in which the developed nations tried to perpetuate a decadent status quo. However, the development of indigenous skills and techniques of pre-colonial Nigeria is a pre-requisite to sound technological growth, rather than depending on foreign inputs, which must be properly monitored and developed to set the pace for Nigeria's industrialization.

INTRODUCTION

Technology development is generally regarded as a catalyst for national development, because it offers among other things, the necessary support for change in all the major sectors of the economy, most especially in agricultural and industrial sectors. Therefore, it is unarguably the prime source of change, that is, of innovations and adaptations required for improving production methods needed to propel growth and development.

Technology has a wide range of definitions; nevertheless, it is a term traceable to "*techné*" 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.

According to Titanyi (1985), 'science and technology represent power instruments of change which can assist in the economic, social, and cultural development of people' such that the superiority of the rich countries in terms of their living standards, better health services and educational facilities is generally attributed to the breathtaking advances in science and technology which has taken place in the industrialized countries during the last two hundred years. 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.

Development, on the other hand, is the gradual growth of a skill to become more advanced or the process of producing a more advanced product (Hornby 2002). Consequently, technology development is the transformation of ideas to practical skills, which are concerned with the production and transformation of raw materials into finished goods. Onipede (2003) opined that technology development pertains to development witnessed through industrial activities; he went further to state that these activities involved the processing of manufacturing goods on a large scale using extensive plant and equipment which were all products of technology.

With the above definitions in mind, therefore, technology development might be interpreted to mean the various transitional processes in the art and craft techniques and traditions, of blacksmithing, iron and wood carving, canoe building among several other indigenous ways by which people of different cultures have explored to control and maximize the use of their environment.

Therefore, the traditional skills and techniques used in the production of arts and crafts, blacksmithing, and iron smelting, carding and weaving, brewery among others can be summed up as indigenous technology in Nigeria.

INDIGENOUS TECHNOLOGY IN PRE-COLONIAL NIGERIA

Technology development entails a process of mobilizing resources, socio-cultural and harmo-

nious integration of modern and traditional technologies organized and fitted into feasible projects designed for specific purpose.

Hence, the process of textile weaving, spinning and dyeing, ginning carding had been a well-established occupation in pre-colonial Nigeria (Onimode 1982).

Several studies have been done on the traditional skills of the pre-colonial Nigerian, with evidence regarding the positive contribution of indigenous skills and techniques, particularly to the development and growth of various Nigerian communities before colonialism. For example, the Iron technology of the Nok culture around Jos, Bauchi, Daima, Kano and Zaria is dated to about 500 B.C (Olaoye 1992). Archeologists have excavated iron spears and axes at Nok, and iron smelting furnaces had been discovered in Taruga, and it is 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 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).

In Oyo, specialized iron mining villages were recorded in 1904 to have contained 100 to 120 people engaged in iron mining, smelting and smiting. Stride and Ifeka (1975) wrote of these industrial skills 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 ore locally meant early possessions of efficient tools and weapon ...their craftsmanship in weaving and dyeing in carving and decorative arts'.

Nevertheless, these developments in iron works and craft were stultified with the advent of colonial government and the introduction of a capitalist economy which led to the monetization of the Nigeria economy arising from changes in the normal and traditional way of life of the people and the introduction of foreign products like cocoa, rubber among others, replacing the subsistence and communal system of production second to slave trade that had initially dispossessed Nigeria of her able bodied men, who would have formed the major work force as agents of industrial transformation.

These developments, however, hindered the modernization of the indigenous technology in

iron and crafts in the sub-region as a whole and Nigeria in particular, because rather than improve on the local skills of production, they were sanctimoniously replaced by foreign trade in articles like palm oil, ivory, guns and pepper, cocoa, coffee, groundnut and rubber, while the supposed work force had been carted away to Europe as slaves.

More importantly, the introduction of colonial rule and by extension 'imperialism' laid the foundation for Nigeria's industrial underdevelopment. Because by nature imperialism is fortuitous, transferring to the metropolitan states the wealth of the underdeveloped nations, thereby undermining them through capital and human exploitation, colonialism and contemporary neo-colonialism.

Indeed, the historical and current technology underdevelopment of the country could not be explained without reference to imperialism and European economic domination. The imperialist domination of Nigeria and its underdevelopment is a total process involving all facets of national life.

Onimode (1982) argues, 'both processes have historically co-existed the transformation from communalist to a predominantly capitalist mode of production in Nigeria occurred under the struggle for national developments since independence has been taking place under neo-colonialism'.

The implication is that various regions of Nigeria had at one time developed technologies that are suitable for their industrial development before colonialism, a development that was brought to an abrupt end as a result of her contact with the Europeans and the introduction of slave trade and at a later date, lucrative trade in African goods. This actually led to colonization, necessitated by the industrial revolution in Europe and the need for raw materials of which Africa is home, because of its richness in palm oil, cotton, indigo and other materials needed for the new industries in Europe. In fact, this has continued till date in Nigeria, through her reliance on foreign experts and partners in the handling of her economy.

Meanwhile, colonialism lasted between 1900 and 1960 without adequate and proper planning for technological development of Nigeria. In fact, the colonial welfare plan introduced by the British colonial government in 1946 to 1955 never deemed it fit to address the technology

and manufacturing sector of the Nigerian economy and not until Nigeria gained independence in 1960, that efforts were made to tackle major technological challenges of the country through the establishment of the Federal Ministry of Planning, saddled with planning for the development of all the sectors of the economy.

NATIONAL DEVELOPMENT PLANNING IN NIGERIA

National Development Planning started in Nigeria shortly after independence in 1962, with the aim of changing the process of economic, political and social development across the country and between 1962 and 1985, Nigeria launched four development plans, (1962-1968, 1970-1974, 1975-1980, 1981-85) in her attempt to redirect and reposition the socio-economic life of Nigeria (Onipede 2004).

Rather than have the 5th plan in 1986, the problems of the past plan necessitated a change whereby a new policy was introduced called the Structural Adjustment Programme (SAP) designed to cover 1986-1989, primarily to provide framework for successive plan that is the 5th development plan and the first rolling plan in Nigeria.

Although, the first three National Development plans, (1963-1980) had common objectives which included, achievement of dynamic and self-sustaining growth of the economy, improvement of the living standards, enhancing per capital income, diversification of the economy and indigenization of economic activities. While agriculture, industry, transportation, manpower development takes the first priority with defense and security constituting a self-generic.

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.

The Liquefied Natural Gas Plant, the Petrol-

Chemical phase two, Oso Condensate, the Ajaokuta and Aladja Steel Plant, the Rolling Mills at Osogbo, Aluminum Smelter Plant and the Nigerian Machine Tools were all established as priority projects during the plan period (N.D.P. Schedule 1990).

However, the establishment of the Nigeria Machine Tool industry is the concern of this study, considering its relevance to industrial growth of Nigeria and more importantly to the completing of some important industrial projects in the plan as mentioned above which could not be completed within the fourth plan period and was subsequently drafted into the 5th National Development Plan.

To achieve this, a total sum of 54 million naira was released for the provision and construction of the machine industry. One important thing to note here is that the Machine tool industry came into being as 85:15% equity ventures between the federal government of Nigeria and the Indian government owned Hindustan Machine Tools International Limited respectively. The agreement was signed in mid- 1979 and the company located on a 1023-hectare parcel of land at kilometer 8 Ikirun road, Osogbo the present capital town of Osun State, Nigeria.

The industry commenced operation in January 1983, with machinery and equipment assembly but began full and effective manufacturing in September 1987 with a total work force of about 310, comprising some crop of Nigerian engineers trained in India by Hindustan Tools Limited and some expatriates, with the hope that it will assist the nation through its policy and plans of self reliance and the promotion of small scale industries, especially in the production of technological tools, equipments and machineries and thus free herself from technological bottlenecks.

Secondly, that a new social order is the objective of a development process which involves the structural transformation of the old social system, that is, its economic social and political institutions are challenged with the application of new patterns of thought and work, more productive technology and new inputs which the Nigeria Machine Tools is expected to bring about.

Nevertheless, the Nigeria machine tools industry has within the opportunities of available resources designed and fabricated an impressive range of products to meet its objectives. For

example, the foundry plant installed initially at a capacity of 3000 tones in the full range of casting products like grey iron, steel, bronze and aluminum per annum was doubled within the first five years of its operation (Akinrinade 2004). This had enabled the industry to provide support services for the Nigerian railway corporation, through the provision of spare parts like crusher balls, crushers jaws, brake blocks, while other products like manhole cover and frames, channels gratings, general machine component part, brake drums and brake disc were provided for both small and medium scale industries in agriculture and other related sectors of the economy, for example, lathes power, hacksaw, stamp duty and embossing machine, oil extractor were specifically made for the agricultural mechanization.

Within this period, the industry was able to also establish its mark as a major engine for the industrial take-off of Nigeria, by producing over twenty different machines tools and accessories, in an attempt to fulfill its role in boosting confidence in local engineering technological capabilities, as well as manpower development through the assistance of the foreign partners, by providing a wide range of consultancy and allied services to customers nationwide, while investing in research and development.

Although, the Nigeria Machine Tools Industry recorded a lot of achievement, yet it has remained in the implementation stage since 1981, when it was first launched, due to the withdrawal of the technical partners in 1983, who were saddled with the responsibility of building up manpower, the knowledge base of the industry, and this had led to the moribund situation of the company, coupled with stagnation and underdevelopment in the industrial and technology sector of the Nigeria economy.

Of importance is the over-reliance of Nigeria machine tools on foreign experts and partners; the Hindustan company of India whose withdrawal could not be really understood, had almost cost the total closure of the machine tools industry. This is because installations of equipment were half done, manpower development and training stopped while assistance in the form of donations or aid from the multinationals like the World Bank, IMF which had always been channeled through Hindustan company, were all stopped.

This may be understood from the fact that

technology remains an essential commodity which has placed the developed nations above the underdeveloped and any attempt by any nation to divulge its principles amount to losing their pride, hence the withdrawal of India is an attempt to protect her technological strength and probably the reason for rendering half-hearted assistance to Nigeria and by extension, the developing nations.

In fact, scholars have argued that the technical aid and donations given to the developed nations are for the primary purpose to monitor secretly developments in the underdeveloped countries, that any attempt at technology development by the underdeveloped is seen as inimical to the economic health of the developed nations. Hence they make sure such attempts never work either through sabotage or any other means, thus faulting the idea of technology transfer.

Morrison and Okita (1980) have argued that acquisition of education and scientific expertise were from the outset of crucial importance to technology development. 'In importing such skills, the Japanese government carefully surveyed each amity, made assessment as to which country was most outstanding in each field and in each field absorbed knowledge from that country which had the most to offer'.

This means that Japan imported from the west into their educational system those things that were necessary for the technological take-off which were fused together to produce a cultural uniqueness in Japan rather than the Nigerian government importing personnel from India.

In fact, technological development entails a process of mobilizing resources and harmonious integration of modern and traditional technologies organized and fitted into feasible projects designed for specific purpose, but this study assumed that national planners in Nigeria represented by the elites were more interested in chasing shadows while working without adequate data and project analysis. Paradoxically, the elites are well-represented in the industrial sector, the prime sector and mover of industrialization, the correlation of which might mean their working as compradors to the metropolitan organizations.

The identity of the African industrialists, represented by the elites in government, who are agents of the imperialist also come to fore, which actually translate into the consciousness and the

level of government commitment to formulating policies that will resolve the problem of technology. This has remained one of the many challenges of policy planning and implementation in Nigeria and by extension the major challenges of technological development in Nigeria.

The problem of funding is closely related to the above. It is generally known that Nigerian government measures progress and achievements in terms of funds allotment, which of course is important, but the problem of normal financing for maintenance and expansion of operations had adversely affected the Nigerian machine tools.

For example, the industry has faced the problem of unsettled debt running to billions of naira, from unserviceable loans since it has not received any subvention from the government for more than three decades of its establishment. Because of these challenges and the capital structure of the industry, it could not go to the capital market to raise fund. While request for a working capital from the government was not granted, all these had adversely hindered any meaningful development within the industry and explain the reason for the low level of technological development in Nigeria.

In the light of the above, can one explain the 25 industrial projects of the 5th development plan which include two other similar projects sited in Anambra state, which is the Nigerian metal-lurgy and machine tools at Ozubulu, which received 30.05 million naira during the plan period but today has nothing to show for the fund it received.

The second is the development of indigenous technology research and fabrication center at Awka, established to undertake design development of new products and system enumeration of existing products and machineries, expected to be done in five phases of metals, chemicals, plastics, rubber and electrical with a capital investment of 64.87 million naira.

By and large, these failures could partly be adduced to the problem of technology transfer, because, all these projects depend largely on foreign ideas and technology, coupled with shortage of competent indigenous engineering manpower, with the experience and analytical skills to undertake engineering designs for the various industries which can easily take over from where the foreign partners might have

stopped, are lacking. In fact, one would have expected the graduation of local and indigenous artisans as part of Nigeria technological transitional process, through a process of training and re-education, rather prerogatives were accorded to expatriates, withdrawal of whom has spelled doom for the infant industry.

The shortage in manpower has remained a major setback to Nigeria's technological breakthrough. This shortage is linked with the imperial educational system that gave little or no consideration to the technological needs of a rapidly changing industrial economy, that Nigeria today has to rely heavily on foreign assistance and expertise at the expense of local industrial research and developmental institutions. The cumulative effect is the graduation of half-baked graduate engineers and technicians that know little or nothing as regards the practical application of knowledge (Afolabi 2009).

Hence, the problem is not lack of resources, but the lack of productive investment, ability and clear imaginative orientation which has hindered the gap between reality and aspiration.

This study therefore, maintains that it takes more than mere declaration to make any plan work, but the steadiness, drive and moral discipline that will not compromise principle which require certain strength of will, because a plan is just an empty and inactive collection of ideas, hopes and aspirations, without adequate will and discipline needed for implementation.

Ultimately, it would be more rewarding if Nigerian policy makers realize the need to look inward, recognize the technological need of the nation, and use same to develop a high competitive manufacturing and industrial sector toward a higher productivity so as to relieve Nigeria the burden of underdevelopment.

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