SCIENCE EDUCATION AND ECONOMIC DEVELOPMENT OF NIGERIA

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Abstract
This paper highlights the contribution of science and technology to the economic development of Nigeria. The nature of the Nigerian economy has also been discussed extensively. Probable factors militating against science and technology in the economic development of Nigeria such as; limited technology capabilities, poor economic structures, lack of education, funding, civil wars, corruption, inadequate transportation means and poor electricity supply have also been identified. Recommendations which, if implemented, will bring about rapid economic development in the country have also been made.

The economic attainment and development of any nation depends on the quality of science and technology education of that nation. Real development involves the creative capacity of people to transform effectively natural resources of the environment into goods and services through imaginative and practical application of
their creative talents and productive labour force. As documented by Lewanika (2005), advances in science and technology contribute to the social and economic development of nations that result in improved standard of living manifested through good health, food security, adequate housing and sustainable use of natural resources, environmental protection and economic growth. This is partially noticed in Nigeria which is experiencing serious economic stagnation.

In the country, there is an increase in disease burden, inadequate housing, and poor management of natural resources. Nigeria lacks number of qualified scientists and engineers for her to take full advantage of scientific and technological advances. Nigeria also lags behind in investing in human resource development. As Lewanika (2005) correctly observed, there is urgent need for Nigeria to invest in education as well as in science and technology for broad-based economic growth and for the country to be competitive in global economy. This is relatively difficult in Nigeria as Chukwumerije (2011) in his lecture, also correctly observed that the base of a critical mass of skilled manpower is the foundation of economic strength and social stability of any nation. He pointed out that Nigeria lacks this foundation. This is because the future of Nigeria is founded on unproductive and unemployable manpower and on import-based economy. Much of the Nigerian economy is dependent on the export of natural resources such as cocoa and petroleum, with no value addition (Chukwumerije, 2011). Nigeria is still suffering from the legacies of colonialism and unsound economic policies.

According to Ezeagwu (2013), even the present developed nations like America, Britain, Germany, Japan, and France among others, were more or less underdeveloped at a certain stage in their history as the developing nations of today, they are now transformed from rural, peasant communities into highly urbanized, industrialized countries through the development of their science and technology. He further added that these developed nations have become rich and politically powerful today.

Ezeagwu (2013) further noted that for Nigeria to develop like other advanced nations, she must develop scientifically and technologically. Though, Nigeria as a developing nation is also aware that science and technology are the vehicles for socio-economic development, she lacks the foundation necessary to develop science and technology which are potentials in real terms. Nigeria lacks this foundation because of the increased quest for material wealth by her populace. This behaviour does not favour the spirit of productivity and utilization of scarce resources which leads to inhibition of scientific and economic development of a nation.
Nigeria’s problem of underdevelopment also lies in the issue of inadequate research in science education. In the same vein, Ezeagwu (2013) suggested that science and technology have to be taught and studied systematically and purposefully at all levels of education including at least the first years of tertiary education for the Social Sciences, Arts and Humanities. Economic development generally refers to the sustained, concerted actions of policy makers and communities that promote the standard of living and economic health of a specific area (Sen, 1983). Such actions can involve multiple areas including development of human capital, critical infrastructure regional competitiveness, environmental sustainability, social inclusion, health, safety, literacy and other initiatives. Economic development implies the process and policies by which a nation improves the economic, political and social well-being of its people (Sheffrin, 2003).

President Henry Truman of the United States of America in his inaugural speech identified that more than half the people of the world are living in conditions approaching misery (Schumpeter & Backhaus, 2003). He added that their food is inadequate and they are victims of diseases. The above description by President Truman is true about Nigeria in the sense that the economic life of the people in many parts of the country is primitive and stagnant. Many people are living in abject poverty and are victims of various diseases. Although Nigeria is not a poor country but her money is in the hands of a few individuals that have climbed to the top.

This paper therefore gives an overview of the following questions;

i. What is the contribution of science and technology to the economic development of Nigeria?

ii. What is the nature of the Nigerian Economy?

iii. What are the factors militating against science education and economic development of Nigeria?

Contribution of Science and Technology to the Economic Development of Nigeria

The development of science education in Nigeria as opined by Itua (2011) is a welcome idea because this critical sector holds the key to the rapid transformation of the country, Nigeria. Science education and technology are the driving forces of the economy of any nation especially Nigeria. Itua (2011) has therefore, attributed the low level of Nigeria’s economic development to her refusal to embrace science and technology and the resultant poor funding of the sector, stressing that science had a lot to do with the per capita income of any nation.

Science education deals with sharing of science content and process with individuals who are not considered traditionally to be members of the scientific community; the individuals could be students, farmers, market women or a whole community. It has contributed in no small measure in the economic development of...
Nigeria to the extent that a graduate of physics education can be self employed. This is because many of the physics education graduates possess some knowledge of electronics that is sufficient for them to be able to have a period of training and then stand alone as electronic technicians (Oladejo, Olasunde, Ojebisi & Isola, 2011). The knowledge of semi-conductors in physics is very important in a growing economy like Nigeria. This is because it is useful in the ceramic industry and a well trained physics education graduate can be well established in a ceramic industry.

Science education contributes in the areas of engineering, architecture, medicine, and agriculture among others. All these disciplines cannot be studied if there are no science and technology teachers to teach the students the core science subjects leading to the study of these courses (Kola, 2013). Biology education is very important to the growing economy of Nigeria. Kola (2013) ascertains that many biology students can be self employed since they can set up laboratories where different types of causative agents of diseases could be diagnosed. Also many of them can be involved in fishery business. In chemistry education, Kola has further pointed out that many of the chemistry graduates can establish their own dye and chalk industries respectively. With the knowledge of chemicals and polymers, many chemistry graduates can establish industries where foams can be produced for the comfort of the Nigerian populace without importing them from other countries.

Technology is the cornerstone of development of any nation. Developed countries such as China, United States of America and Singapore among others, are economically developed in this last generation because they acquired advanced technologies (Awase, 2013). According to Uza (2013) for many years, Africa and Nigeria in particular, are perceived as having been left behind, purely because of backwardness in technology. This can be seen in the bad roads, which leads to difficulties in transportation, education and infrastructure, among others that are poorly developed as compared to those of other developed and developing countries.

The benefits of technology in the development of Nigeria can be seen in the benefits that telecommunication has brought to Nigeria, especially through wireless technologies. This has transformed businesses into mobile and global enterprises (Awase, 2013). With telecommunication, traders have opportunity to place their products and services in a more competitive global market comparing with similar companies around the world. This means that the role of technology can be seen in developing local markets to modern markets. The role of technology can also be seen in mobile learning. Vänskä, (2013), has pointed out that mobile learning plays a central role in Nigeria’s educational and economic development, providing equal access to quality learning regardless of place (distance), gender and age. He further added that mobile learning helps people to overcome urban/rural education gap by allowing
teaching materials, resources and students’ communication to travel long distances, creating an environment of interactive learning. If this continues, mobile learning may help Nigeria to move forward educationally.

**The Nature of the Nigerian Economy**

There is no doubt that Nigeria is endowed with enormous human and natural resources. As rightly observed by Matthew-Danial (2013), human and natural resources endowment are not enough for wealth creation and economic development of any nation, but the knowledge of how these raw materials can be transformed into valuable goods and services for economic development and improved quality of life. Modern science education holds the key to the rapid transformation of Nigeria. The Nigerian economy is one of the most developed economies in Africa (Economy Watch content (EWC), 2010). It has been observed that Nigeria is a middle income nation with developed financial and communication among others and that Nigeria has the second largest stock exchange market in the African continent (EWC, 2010).

Petroleum is considered as the major sector in the Nigerian economy. According to Economy Watch Content (2010), Nigeria is the 12th largest producer of petroleum products in the world, and that, the industry accounts for almost 80% of the Gross Domestic Product (GDP) share and above 90% of the total exports. According to Marinos and Ehul (2006) petroleum accounts for most of the foreign exchange earnings, and more than half of government revenue. EWC (2010) further observed that outside the petroleum sector, the Nigerian economy is highly amorphous and lacks basic infrastructure. They also added that as Nigeria’s economic structure is largely oil-based, the economy has stumbled for years due to political unrest, corruption and poor fiscal policies and prolonged military rule which lead to economic and social stagnation and decline. EWC (2013) reported that the Nigerian economy slowed down from 7.4% growth in 2011 to 6.6% in 2012. The oil and gas sector continue to drive the economy with average growth of about 8.0% compared to – 0.35% for the non-oil sector. Agriculture and the oil sectors continue to dominate economic activities in Nigeria. It also asserts that the outlook for economic growth remains positive.

Agriculture has not kept up with rapid population growth, and Nigeria, once a large net exporter, now imports food. Agriculture has suffered a relative decline because of the dominance of oil in the economy but it still accounts for about a third of GDP and provides employment for a large majority of the population. Agriculture is mainly dominated by traditional small house holders raising subsistence crops. In Nigeria, recently, poultry farming and fish farming are rapidly increasing (Marinos & Ehul, 2006).
The Nigerian economy is facing some crisis such as security challenges arising from religious conflict in some states; cost associated with flooding, among others (EWC, 2013). The economic development in Nigeria has not translated into job creation or poverty alleviation. Unemployment increased from 21% in 2010 to 24% in 2011 (AEO, 2013). This is because the sectors driving the economic growth are not high job-creating sectors (African economic Outlook, 2013). The Nigerian economy lacks diversification and Nigerian agriculture lacks modernization (AEO, 2013).

Factors Militating against Science Education and Economic Development in Nigeria

Science education has been considered as an important input into the scientific and technological capability of any country all over the world. In Nigeria today, there are a number of factors that militate against science and economic development of the nation. This is because Nigeria faces many challenges of good governance, economic growth, erratic power generation and supply, non-functional public health and educational system from primary school to university level. This can be observed as being true of Nigeria in the seven point agenda of President Yar’Adua; thus “power and energy”. The electricity situation in the country has gone from bad to worse with many parts of the country being thrown into total or near-total blackout (Akpihi & Idoko, 2009). They stressed that this has been identified as a major constraint to industrialization in Nigeria. Nigeria is currently generating below 3000 MW. Other factors as mentioned by US envoy, McCulley (2013) include “get-rich quick syndrome”, religious intolerance and youth restiveness. Yet, other factors include:

1. **Limited technology capabilities**
   It is apparent that to become successful in this modern world, technology must be incorporated into the improvement process. It has been observed that Nigeria lacks a critical number of qualified technologists, scientists and engineers who will take full advantage of scientific and technological advances (Daniel, 2013).

2. **Poor economic structures**
   According to Daniel (2013), due to the reluctance of adopting technology in Nigeria, there is a slow change in her economic structure since independence. He further observed that most African nations, including Nigeria, rely heavily on exporting various raw materials like gold, bauxite, diamond, cocoa, timber, petroleum, among others, all in raw forms without any degree of processing the raw materials in order to add value to them before exportation so as to earn more money on the global market. Abdullahi (2008) in Akpihi and Idoko (2009) has observed that Nigeria is yet to develop industrially because of over reliance on oil which is a non-renewable resource. Daniel (2013) also pointed out correctly that if African nations especially Nigeria, import matches, computers, toys, tooth picks
3. **Lack of education**
In Nigeria, the education sector has been under threat, due to incessant strike actions being embarked upon by the academic and non-academic staff of all the levels of our educational institutions (Akpihi & Idoko, 2009). These strikes have almost paralyzed the educational system, causing science and economic set back in Nigeria. Daniel (2013) ascertained that education is a vital developmental tool as it promotes entrepreneurship and also creates a highly skilled workforce. He emphasized that only quality education can give the African (Nigerian) populace the correct skills and knowledge to create and manufacture things. He has also observed that the current education offered in Nigeria has not enabled our students to produce anything of worth.

4. **Civil war**
Insecurity in the country can cause serious hindrance to science education and economic development in Nigeria. According to Daniel (2013) civil war is a major deterrent to development. Some African countries that have been impoverished as a result of civil war include the following; Somalia, Sudan, and the Democratic Republic of Congo (DCR) among others. Akpihi and Idoko (2009) also observed that insecurity in the nation has scared away many foreign investors, particularly in the oil and gas industries and lead to loss of billions of dollars by Nigeria over the years. In the same vein, Daniel (2013) has observed that when there is civil war, investors cannot dare to invest in such a country and thus it inhibits the creation of employment opportunities. He also added that infrastructure also suffers since the country will be more inclined to spend its limited resources on buying fighting equipment rather than enhancing infrastructure.

5. **Transportation**
Transportation is the key point in economic development of any nation. Akpihi and Idoko (2009) have emphasized that the place of efficient means of transportation in development is found in the fact that it enhances the movement of goods and skills from areas of surplus to areas of deficit. They added that in spite of the above, the condition of most, if not all, Nigerian roads is terrible or in a mess; the railway system is almost collapsing; the water ways are under threat from water weeds such as hyacinth; while, air transport is beyond the reach of ordinary Nigerians. The bad condition of the Nigerian transport system hinders both efficient movement of people and goods within the country and foreign investment.
6. Corruption

Transparency International (2005) has rated Nigeria as the sixth most corrupt country in the world. The problem of corruption in Nigeria has affected the development of the nation adversely. Corruption comes in many forms and ranges from trivial to monumental issues. Corruption includes bribery, nepotism, misappropriation, and indiscipline (Sorkaa, 2003). Sorkaa (2003) in his Benue State University Inaugural Lecture, clearly stated that the effects of corruption cause even the Federal Government of Nigeria to find it difficult to regularly pay salaries and allowances not to think of more serious problems facing the States and Local Governments in that regard. He further stressed that the diversion of public funds to private pockets through corrupt practices changes completely the values of hard work and industry to unproductive behaviour. This brings a lot of setback to science education and economic development of the country.

7. Funding

Science education and technology is the engine room for the development of any economy (Itua, 2011). Itua (2009) documented that most countries commit as high as two per cent of their gross domestic product (GDP) to science and technology research, development and innovation, but what Nigeria commits is about 0.1 per cent which is too small to write home about. This means the low level of economic development of Nigeria can be attributed to the poor funding of science and technology. Itua (2011) complained that even the Ministry of Science and Technology in Nigeria cannot boast of any technology that has been developed locally under its auspices with the federal allocation they get annually. Itua further lamented that the engineers from Nigerian schools are worse than roadside mechanics.

8. Poor supply of electricity

The poor supply of electricity has been the major factor militating against industrialization in Nigeria. Based on this, Abdullahi (2008) in Akpihi and Idoko (2009) has observed that due to poor power supply, entrepreneurs resort to the use of plants for production while those who cannot afford it simply fold up. This has lead to high cost of production and capacity underutilization of most industries in Nigeria.

Conclusion

The contribution of science and technology to the economic development of any nation cannot be overemphasized. For Nigeria to move forward economically, she must consciously agree to invest in science and technology. The oil sector has done a lot for the Nigerian economy but need to diversify into other areas such as agriculture, medicine among others.
Recommendations

In order to properly harness the contributions that science and technology can contribute to the economic development of Nigeria, the following recommendations have been made:

1. There is need to diversify the Nigerian economy into a non-oil sector. For instance, the agricultural sector and medicine. According to Abraham (2012) the neem tree is impacting the economy of India; yet Nigeria is endowed with a lot of neem trees with great potential yet to be tapped.

2. Agriculture should be improved to supplement petroleum which is a non-renewable resource. Farmers should be encouraged by providing them with farm inputs such as fertilizers, herbicides and pesticides on time and at affordable rates. Mechanized farming should be highly encouraged by providing tractors.

3. Nigeria needs to properly fund her Ministry of Science and Technology, Research institutes, special science primary schools, Special Science Secondary Schools and Faculties of science in Tertiary institutions in order to establish a sound scientific base for technological development. Without proper funding, no meaningful economic development can be achieved.

4. Science and technology teachers should be encouraged by organizing workshops for them to update their knowledge and by giving them good incentives such as science teachers’ allowance and other rewards, to enable them produce good results.

5. The power sector must be improved upon if industries and scientific research must flourish and produce good results. Scientific research and scientific industries depend on adequate, cheap and constant power supply to produce goods and services.

6. Good roads should be built and properly maintained in order to facilitate efficient transfer of goods and services to sustain economic growth.

7. Entrepreneurial courses should be introduced at secondary and tertiary levels in order to encourage graduates to be self-reliant and productive. This will promote economic growth and enhance economic development.

8. Greater emphasis should be placed on science education because every country that wants to be developed must cultivate the science culture in her populace so as to have the proper and requisite foundation on which to develop our science and technology which will in turn develop the Nigerian economy.
References


