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Revisiting Thomas Kuhn's Scientific Revolution Vis-À-Vis Sustainable Development in Nigeria: A Case Study of Covid-19

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Abstract
This work critically analyses Thomas Kuhn's scientific revolution as a panacea for socio-economic development in Nigeria. The paper adopts the method of contextual analysis. The data is generated from both primary and secondary sources. The work observes that heavy reliance on other countries is the bane of sustainable development for Nigeria. This paper recommends that for sustainable socio-economic development in the post-COVID-19 era, Nigeria should embrace a paradigm shift in all aspects of its endeavour. It is the position of this work that the country has the potential and capability to rewrite its history from being an underdeveloped nation to a developed one through a paradigm shift by wholeheartedly embracing indigenous technology.

Keywords: Science, Development, Revolution, Covid-19

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Introduction

Western science and sophisticated technology have undoubtedly made an explosive and tremendous impact on human society. Such explosive impact has some far-reaching consequences for society. Often, we hear the expression Paradox of Western Science and Technology, which means that the many advances in science and technical endeavours have improved the quality of human life and are destroying life as well. However, the COVID-19 pandemic has, in no small measure, vitiated the claims that Western science is the panacea to the global problem. The pandemic not only altered global activities but also brought the world to its lowest ebb in the history of mankind.

The greatest lesson to learn from this scenario is for every country to develop its technology that is in tandem with the needs and aspirations of its citizens. A case study is Nigeria. Despite the numerous unprecedented achievements of science in modern times, Nigeria has yet to experience progress and development, which are said to accompany such technology. A little trip down memory lane will enlighten us further. During the COVID-19 lockdown in Nigeria, most students could not participate in virtual learning because of a lack of basic materials. What about the economic, social, and political lives of the citizens? Consequently, Nigeria immediately went into recession simply because the country is dependent on other countries for virtually everything. Even China, where the virus originated, did not go into recession because the country uses indigenous technology and products.

Due to similar scenarios in the past, Nigeria is enmeshed in a development quagmire. In a dilemma, the best option is to take the bull by the horns. Therefore, given the hopelessness Nigeria found itself during the peak of COVID-19, it is now time to take stock, make a detour and re-strategize for future occurrences. This paper aims to critically analyze Thomas Kuhn's notion of scientific revolution as it relates to the socio-economic development of Nigeria in the post-COVID-19 period. Kuhn's idea of scientific revolution centres on jettisoning a paradigm that seems incapable of providing solutions to problems which it initially sets out to solve. The paper employs the method of contextual analysis. The data is obtained from both primary and secondary sources. It is strongly recommended that, owing to the failure of erstwhile dependence on Western science, Nigeria should adopt a paradigm shift in its future endeavours.

Conceptual Explications

Coronavirus (COVID-19)

Coronavirus disease 2019 is not the first coronavirus in human history. One of the various pandemics in the 21st century was the Severe Acute Respiratory Syndrome (SARS), which belongs to the coronavirus family. Coronavirus disease 2019 (COVID-19) is an illness caused by a novel coronavirus now called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV), which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China (CDC,2019). It was initially reported to the World Health Organization (WHO) on December 31, 2019. Therefore, on January 30, 2020, the WHO declared the Covid-19 outbreak a global health emergency (Gallegos 2020, Ramzy & McNeil, 2020). On March 11, 2020, the WHO declared it a global pandemic, its first such designation since declaring H1N1 influenza a pandemic in 2009 (The New York Times, 11 March). Illness

caused by SARS-CoV-2 was termed COVID-19 by the WHO, the acronym derived from Coronavirus disease 2019. It should be noted that the major challenge and mystery shrouding the virus is the means of transmission. According to the Nigeria Center for Disease Control (NCDC) and WHO, droplets land on objects and surfaces around the person when a person with Coronavirus coughs or exhales. Other people then catch the virus by touching these objects or surfaces, then touching their eyes, nose or mouth (NCDC).

The more worrisome aspect is the evidence of asymptomatic transmission. This means a person could be infected and spread the virus without showing clinical signs. Covid-19 is the most significant global health emergency in the 21st century. From one city to the entire world, the viral infection diffused aggressively with blatant disregard for gender, age, race, social status, national boundaries and level of development (Osayemi, 2020). In a response to 'flatten the curve' (Loeb, 2020) government had to enforce border shutdowns, travel restrictions and quarantine (AL Jazeera News, 20th March; UK GOV, 2020) in countries which constitute the world's largest economies, sparking fears of an impending economic crisis and recession (Buck, et al, 2020). Thus, following the closure of borders, travel restrictions and quarantine, the global economy was seriously affected.

The first Coronavirus case to be reported in Nigeria was confirmed on Thursday, 27th February, 2020. Ehanire (2020) reports that the index case is an Italian citizen who works in Nigeria. He returned from Milan, Italy, to Lagos, Nigeria on 25th February, 2020. Even though at the outset of the outbreak of the pandemic, societies, international organizations, and associations vigorously exchanged ideas and updates, no immediate solution was found. Not until recently did some countries have to fund companies to develop vaccines. However, each country is interested in the well-being of its citizens.

Scientific Revolution

The concept scientific revolution defies any attempt at an appropriate definition. This is due to divergent opinions; more so, it is a fusion of two unlikely words. Thus, the best that can be done here is to offer a simple description. Scientific revolution could be likened to a political revolution. The slight difference is that while political revolution calls for removing existing political movements, scientific revolution involves revising or replacing existing scientific practice or belief (Obi, 2020). The term "revolution" was a phrase so much used in political parlance. The question begging for an answer is how revolution can be used in sciences, that is, why should a paradigm change be called a revolution?

The term scientific revolution gained much prominence in the 21st century through the work of a scientist turned philosopher, Thomas Kuhn. In a bid to account for the possibility of revolution in science, Kuhn makes a comparison with political revolution. According to Kuhn, political revolutions are inaugurated when it is observed that existing institutions have ceased to adequately meet the problems posed by an environment they have partly created. Similarly, scientific revolutions are inaugurated by a growing sense that an existing paradigm has ceased to function adequately in the exploration of an aspect of nature in which that paradigm itself had previously led the way. Thus, Kuhn (1970:92) concludes that in both political and scientific

development, the sense of malfunction that can lead to crisis is a prerequisite to revolution. What does the scientific revolution mean?

According to Kuhn (92) scientific revolutions are those non-cumulative developmental episodes in which an older paradigm is replaced in whole or in part by an incompatible new one. It is pertinent to understand what paradigm is all about. Paradigm is a universally recognized scientific achievement that, for a time, provides model problems and solutions for a community of practitioners (Kuhn, viii). A paradigm simply means an accepted model, a pattern or an exemplar. It is important to expatiate on paradigm because it is germane to understanding Kuhn's notion of scientific revolution. For instance, Kuhn (44) sees paradigm as what the members of a certain scientific community have in common. By this, it means that paradigm is a model for practitioners who are engaged in realization of a particular project and not what all scientists have in common. Therefore, once there is a replacement of a paradigm by another as a result of its inability to solve problem, there is a paradigm shift, which implies a revolution. Some notable scientific revolutions in the 21st century are those of Copernicus, Newton and Einstein.

Development

Development is multi-dimensional. In agreement with the multi-dimensional nature of development, Seers (Cited in Okereke, 2002:11) posits that:

> The questions to ask about a country's development are therefore; what has been happening to poverty? And what has been happening to unemployment? What has been happening to inequality? If all three of these have declined from high levels, then beyond doubt this has been a period of development for the country concerned. If one or two of these central problems have been growing worse, especially if all three have, it would be strange to call result "development" even if per capita income doubled.

Development embraces multifarious economic and social objectives, which are concerned with the distribution of income, the provision of basic needs, and the real and psychological well-being of the people (Thirlwall, 40). At the foundation of development, according to Goulet (cited in Thirlwall, 38), there are three basic components: life-sustenance, self-esteem, and freedom. These represent common goals and aspirations of all individuals and societies. Life-sustenance relates to the provision of basic human needs such as food, clothing, housing and education. Self-esteem is concerned with independence and self-respect. Freedom involves the capability of a people to determine their destiny without undue external interference. No country dependent on another country for industrialization can claim to be developed.

According to Todaro (98), development implies a situation where there has been an improvement in the basic needs, when economic progress has contributed to a greater sense of self-esteem for the country and individuals within it, and when material advancement has expanded the range of choice for individuals. In his assessment of development, Ake (1996:125) sees development as a process by which people create and recreate themselves and their life circumstances to realize higher levels of civilization in accordance with their own choice and values. Thus, development is not a project but a process that must involve the people.

The UNDP (iii) reports that we are rediscovering the essential truth that people must be at the center of all development. Development should be viewed as people inspired, human centered, citizen anchored (Obasanjo and Mabo, 95). In other words, people should be seen as the agents of change and development, and development should directly affect the quality of life and well-being of mankind (Okereke and Ikpe, 12). From the foregoing, it is deduced that development is a process that involves conscious efforts aimed at quantitative and qualitative changes through the use of natural and human resources to bring about improvement in the standard of living of the people concerned.

Scientific Revolution and Development in Nigeria

Going through history, it is observed that revolutions all over the world are not constantly sought, except under extreme circumstances. The situation of Nigeria presently, especially since the outbreak of the COVID-19 pandemic, requires serious and urgent attention; thus, there is need for a radical approach in her scientific enterprise.

Science does not progress via accretion but through discontinuities. Nigeria has in the past exploited and experimented with various methods of tackling its numerous challenges, be it in education, agriculture, health, politics, infrastructure, or other areas. It is obvious that the country has not fared better in all these areas. Therefore, it is not out of place to advocate for a radical change in order to start afresh.

Development is a human enterprise that is culture-specific in content and manifestation. Hence, the best form of development is the endogenous type, which stems from within the people. Therefore, for development to be meaningful, it must aim at the realization of the potential of human personality. According to Isioto et al (2019), one of the indices by which a nation's growth and advancement can be measured is by its technological endowment and not by the level of its endowment in natural and human resources. At this juncture, it is pertinent to glimpse into Nigeria's scientific practice.

The Nature of Scientific Practice in Nigeria

Presently, Nigeria practices science based on Western orientation, be it in education, agriculture, health, politics, infrastructure, etc. Science should be approached based on the socio-cultural needs of a people. Every scientific initiative should be dependent on the peculiarity of the people geared towards meeting their local needs. Nigerians have traditional ways of solving their problems until they came into contact with the colonial masters. Processes such as textile weaving, spinning, dyeing, ginning, and carding were well-established occupations in pre-colonial Nigeria. Though not the thrust of this work, it has to be reported here that several studies have been done on the traditional skills of pre-colonial Nigeria, with evidence regarding the positive contributions 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 500B.C. 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 that area, while there had been ample evidence regarding to 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 the

region among others (Isioto et al). Development must be anchored on an indigenous technology if it has to succeed. According to Ake (cited in Efemini, 42) development occurs in so far as it amounts to the pursuit of objectives set by the people themselves in their interest and pursued by means of their interest and pursued by means of their resources. Several factors have, over the years, affected the practice of science and development in Nigeria. Some of these are highlighted below.

Indigenous Nigerian Scientific Challenges

There are numerous challenges confronting the development of indigenous science in Nigeria, which became more manifest during the peak of covid-19. Some are internal and others are external. However, in this work, these could be reduced to the following factors: Language, Education and Politics. Language is at the root of learning and imparting knowledge, without which education cannot take place, and the standard of education of a given society determines the leadership of that society. Thus, there is a correlation between language, education and politics. The question begging for an answer is: what type of language, education and leadership does Nigeria have?

Language is a social construct through which a particular group of people is identified. It plays a vital role in people's education. It is very easy to identify a person through his/her language. Languages are immensely complicated structures. One realizes how complicated language is when trying to learn it as a second language. All languages are different, and in part, the world is seen differently through the eyes of speakers of different languages. It is obvious that language is much more than the external expression and communication of internal thoughts formulated independently of their verbalization (The New Encyclopedia Britannica, 642-655). One's mother tongue is intimate and includes all sorts of details related to the rest of one's life in a community and to smaller groups within that community. Language is transmitted culturally; that is, it is learned.

Education can be viewed as the transmission of values and accumulated knowledge to a society. In this sense, it is equivalent to socialization or enculturation. Education is one of the ingredients of development. However, the Nigerian educational system in its modern form is a colonial creation. In other words, under colonial rule, education that was externally oriented was foisted on Nigeria. The British primary interest during the colonial era was exploiting resources in Nigeria. Yesufu (53) captures it thus:

> Britain's interest, until and during the Second World War, was how to develop, harness and exploit these resources for the metropolis. Cotton, groundnut, rubber and palm oil, tin and columbite, were of direct interest to British industries, and constitute the main target of the Nigerian colonial government.

Basically, what the British gave to Nigeria in the form of education was a Western-oriented theoretical aspect of knowledge devoid of the practical. Education is at the root of development; however, because of the British's exploitative tendencies, they concealed from the onset the essential aspect of knowledge from Nigerians.

Politics basically has to do with the art of governance. However, political culture and ideology as perceived in Nigeria are short of the real meaning of it. What is regarded as politics in Nigeria is simply a trivialization of participatory democracy. It is an obstacle to development because it offers legitimacy to Nigerian leaders without giving real power to the people. Little wonder the recent agitations and calls for a return to a regional system of government by some well-meaning Nigerians.

Towards a New Scientific Practice in Nigeria

The Western scientific paradigm has inevitably failed to address Nigeria's developmental challenges. According to Kuhn, whenever it is discovered that a particular paradigm is no longer capable of solving a problem, an anomaly sets in, which eventually leads to a crisis. A lot of reasons can be adduced for scientific crises in Nigeria. These include:

I) Negative influence posed by the colonial matters.
II) Abnegation of indigenous knowledge.
III) Improper application of Western education.
IV) Conflict of interest in technology transfer.
V) Faulty industrial policies after independence.
VI) Absence of purposeful leadership.

The above-identified crises can be corrected if Nigeria adopts a new ideological framework-one that encapsulates the country's development objectives. Moreover, such a framework or paradigm must evolve from the socio-cultural needs of the people. Science is an intrinsically social activity.

Recommendations

It is being recommended here that for Nigeria to achieve a paradigm shift in science and enhance its national development, especially going forward, the following should be adhered to:

1) Securing and using Nigerian indigenous languages in teaching and learning.
2) Adopting new information technology using indigenous techniques.
3) Addressing Nigerians' local needs.
4) Building strong institutions geared towards knowledge production and application.
5) Nurturing and harnessing ethnic diversity.
6) The government should invest heavily in research and innovation.

Conclusion

Science and development are essentially human-centred. According to Kuhn (210), scientific knowledge, like language, is intrinsically the common property of a group or else nothing at all. To understand it, we must know the special characteristics of the groups that create and use it. Nigeria, as a country, has peculiar problems that require exceptional methods of solving them since previous approaches have proved abortive. Though it may not be easy at the beginning, what is mainly needed is a radical process devoid of unnecessary external interference. The country has the potential and capability to rewrite its history from being an underdeveloped nation to a developed one through a paradigm shift by wholeheartedly embracing indigenous technology.

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