

INTEGRATED SCIENCE FOR SUSTAINABLE DEVELOPMENT IN NIGERIA: THE NATIONAL ECONOMY AND POLITICAL IDEOLGY IMPLICATIONS

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Abstract

This paper analyses the intricate relationship between political ideologies and the implementation of science-based economic policies for sustainable development, with a specific focus on the Nigerian context. It argues that a nation's prevailing political ideologies significantly shape its economic trajectory and its capacity to achieve sustainability. The paper explores various political ideologies: liberalism, conservatism, socialism, fascism, anarchism, nationalism, and environmentalism, and analyzes their potential influence on the adoption and effectiveness of science-driven economic policies. Using the evolution of Nigeria's Integrated Science curriculum as a case study of developmental nationalism's impact on education, the paper further discusses the challenges hindering science-based sustainable development in Nigeria, many of which are rooted in political factors. Ultimately, the paper emphasizes the critical need for alignment between the political ideologies of a nation's leaders and economic policies that prioritize long-term sustainability. It concludes that Nigeria's progress towards sustainable development is contingent upon the active political participation of economic policy experts who possess the will and courage to implement informed science-based strategies.

Keywords: Political ideology, Sustainable development, Science-based economic policies, Nigeria

Introduction

Humans are political in nature, whether partisan or not; the decision they make, how they make it and why they make is based on their political ideologies. Whatever the economy of any nation becomes, whether developed, developing or underdeveloped is equally knitted to the political ideology of her leaders. Sustainable development is the major way for enhancing the growth of any economy and this growth is at the mercy of the political ideology of her citizens. Barker & Marietta (2022) defined political ideology as a set of beliefs and values that shape an individual's or groups' understanding of political issues, governance, and the role of government in society. This provides a framework for interpreting political events and guide individuals in their political behavior and preferences. They emphasized that political ideologies are not just abstract concepts; they are deeply embedded in social contexts and can influence public policy, political discourse, and individual actions. Different ideologies, such as liberalism, conservatism, socialism, and others, offer distinct perspectives on how society should be structured and governed.

National Economy refers to a country's economic system comprising resources, production activities, trade, and services interconnected through various relations to achieve economic development and societal operation (Marchenkova, 2022). This was simply put by

Studysmarter (2024) as the production, distribution and trade, consumption of goods and services by different agents of a nation.

Sustainable development is defined as “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs” (United Nations General Assembly, as cited in Emas, 2015). Sustainable development is an approach to social, economic, and environmental planning that attempts to balance the social and economic needs of present and future human generations with the imperative of preserving, or preventing undue damage to, the natural environment (Kulik, 2024). A development is sustainable if it makes better the lives of the ‘children’ than it did to the lives of the ‘fathers’.

The term “integrated science” is often used as a synonym for interdisciplinary and unified science, which may be applied generally to any curriculum effort in which two or more previously separated science subjects are combined (Showalter 1975).

Types of political ideologies

Political ideology, as articulated by Heywood (2021), provides the foundational beliefs and values that shape a society's understanding of how it should be organized and governed. These ideologies invariably influence the priorities and approaches taken when formulating economic policies, including those that are purportedly "science-based." While scientific inquiry aims for objectivity, the selection of research areas, the interpretation of findings, and the application of scientific knowledge to economic challenges are often filtered through an ideological lens.

1. **Liberalism:** It is an ideology that emphasizes individual rights and freedom with limited government, the rule of law, and free markets. The Liberals believes that the government should stay away from people's lives as much as possible and that the economy will work best when people and businesses can do their own thing without interference.
2. **Conservatism:** It is an ideology generally favours tradition, established institutions, gradual change, and a cautious approach to reform .The Conservatives tend to value tradition, family, and established ways of doing things. They prefer a smaller government role in the economy and believe in personal responsibility. Often times, they are slower to adopt new social ideas.
3. **Socialism:** A broad ideology advocating for social ownership or control of the means of production, distribution, and exchange, with an emphasis on equality and social welfare. The Socialists thinks that things like major industries (like energy or healthcare) should be owned by everyone or controlled by the government to benefit everyone and not just a few rich people
4. **Fascism:** A far-right, authoritarian ultranationalist ideology characterized by dictatorial power, forcible suppression of opposition, and strong regimentation of society and the economy. The Fascists believe that their country is the most important thing and government should be very powerful to make the nation strong. The government suppresses anyone who disagrees with them and can be militaristic.
5. **Anarchism:** An ideology that opposes all forms of coercive hierarchy and domination, including the state. The Anarchists hold agree that people can organize and cooperate among themselves voluntarily without a need to be told what to do. They resist any form of forced authority and accept individual freedom and self-rule.

6. **Nationalism:** An ideology emphasizing the importance of national identity, unity, and loyalty. The Nationalists, oftentimes, want their country to be independent and strong.
7. **Environmentalism:** It is an ideology that places huge emphasizes on the importance of the natural environment and advocates for its protection and sustainability. The Environmentalists crave to protect nature and stand against human actions that harm the environment. They advocate for things like renewable energy, conservation, and life styles that makes nature more sustainable.

Political ideologies in Nigeria

From independence in 1960 to the present day, the country has witnessed diverse political ideologies which are marked by periods of clearer ideological leanings that have gradually become more complex and highly debated.

In the First Republic (1960-1966), there were distinct ideological influences which shaped the major political parties. Joseph (1978) stated that the nationalist ideology was paramount during the struggle for independence, uniting diverse groups against colonial rule. But after independence, regional parties emerged with different ideological orientations:

- The Northern People's Congress (NPC), which represents the interests of the Northern region, leaned towards conservatism, emphasizing traditional structures and gradual change (Joseph, 1978).
- The National Council of Nigerian Citizens (NCNC), which has a strong base in the Eastern region, adopted a form of pragmatic socialism, advocating for greater state intervention in the economy (Joseph, 1978).
- The Action Group (AG), which is based in the Western region, championed democratic socialism, advocating for social welfare programs and a more egalitarian society (Joseph, 1978).

The military rule came after this and suppressed apparent ideological expression and focused on maintaining power and national unity using decrees and not distinct political philosophies.

The Second Republic (1979-1983) birthed new political parties, some, attempted to revive earlier ideological leanings. These, however were also cut short by military intervention.

By the Third Republic (1992-1993), the military introduced a two-party system: the Social Democratic Party (SDP) leaning towards the left (a range of beliefs and principles that campaign for a greater role of government in the economy to achieve social equality, economic fairness, and collective well-being. It focuses the need to address inequalities and provide social safety nets); and the National Republican Convention (NRC) towards the right (a set of beliefs and principles that advocates for a reduced government participation in the economy with a greater emphasis on free markets, private enterprise, and individual economic liberty). This is a purposive attempt to develop a more ideologically structured political landscape, however, this was not sustained (Roelofs, 2024).

The Fourth Republic (1999-present) birthed the wane of clearly defined ideologies within major political parties. Eme & Ibietan (2015) argue that despite manifestos, Nigerian political parties often lack strong ideological dispositions, while factors like identity politics and the pursuit of resources take pre-eminence. Other analysts like Roelofs (2024) and Onoja & Oche (2024) posits that governing parties in the Fourth Republic have largely aligned towards a right-

leaning economic ideology. As politicians keep switching between parties, Adebayo (2018) argues that there is a potential mutability and diminution of deep-seated ideological beliefs among the political class.

The implications of political ideologies on economic policies

Heywood, (2021) and Kenton, (2025) opined that different political ideologies hold distinct perspectives on the role of the state, the organization of markets, and the distribution of resources, all of which directly impact how scientific understanding is utilized in economic policymaking.

Liberalism, with its emphasis on individual rights, limited government, and free markets, would likely favor science-based economic policies that promote innovation and efficiency through market mechanisms.

Conservatism, valuing tradition and gradual change, might approach science-based economic policies with caution. While not inherently anti-science, conservatives may prioritize research that supports existing economic structures and established practices. They might favor studies demonstrating the effectiveness of fiscal conservatism, the potential negative consequences of radical policy shifts, and market-based solutions to economic challenges. Evidence supporting the efficiency of private enterprise and the potential unintended consequences of government intervention would likely be influential.

Socialism, with its focus on social ownership, equality, and welfare, would likely champion science-based economic policies aimed at reducing inequality and ensuring social well-being. The potential for government-led investment in areas like renewable energy and public health to create jobs and improve quality of life would be favored. Scientific findings highlighting social disparities and the need for collective action would likely drive policy recommendations.

Fascism which is characterized by extreme nationalism and state control would likely prioritize science and technology to serve national economic and military power. Economic policies would be centrally directed, potentially utilizing scientific advancements to enhance industrial output and national self-sufficiency. However, scientific inquiry might be subordinate to nationalistic goals, and dissenting scientific views could be suppressed.

Anarchism, opposing state control, presents a unique challenge to the concept of centralized science-based economic policy. In an anarchist framework, economic decisions would likely be decentralized and based on local needs and voluntary cooperation. Scientific knowledge regarding sustainable resource management, ecological balance, and community-led initiatives would be crucial, but its application would be driven by local autonomy rather than national directives.

Nationalism, emphasizing national interests, would likely support science and technology development that enhances a nation's economic competitiveness and security. Policies might favor domestic innovation, protect key industries based on scientific and technological advantages, and potentially restrict the sharing of strategically important scientific knowledge.

Environmentalism, prioritizing ecological sustainability, would advocate for science-based economic policies that mitigate environmental damage and promote long-term ecological health. Research into renewable energy technologies, the economic costs of environmental degradation, and sustainable resource management would be central to policy

recommendations, potentially leading to regulations and incentives for green technologies and practices.

Political ideologies and the implementation of science-based economic policies in Nigeria
The relationship between political ideologies and the implementation of science-based economic policies in Nigeria has been complex, most times indirect and highly influenced by the changing political ideologies from independence to the present day.

In the **First Republic**, the different ideological leanings of the dominant political parties had potential implications for economic policies and those that could have been informed by scientific principles. For instance, the **pragmatic socialism** of the NCNC might have promoted state-led initiatives in industrialization and technological development, potentially guided by scientific expertise. On the other hand, the **conservatism** of the NPC might have prioritized agricultural development based on existing practices, with a more cautious approach to large-scale, science-driven transformations. The **democratic socialism** of the AG could have emphasized social welfare programs that, while not directly science-based in their creation, would require data and analysis for effective implementation (Joseph, 1978). However, the nascent stage of Nigeria's scientific infrastructure and the principal focus on nation-building meant that explicit, large-scale science-based economic policies were not as prominent as the underlying ideological orientations.

During the periods of **military rule**, while ideological discourse was often suppressed, economic policies were typically driven by the priorities of the ruling military regimes, which might occasionally incorporate scientific or technical advice on specific projects without necessarily adhering to a broader, consistent ideological framework.

The transition to the **Second and aborted Third Republics** did not fundamentally alter the landscape in terms of a strong, direct link between evolving ideologies and science-based economic policies. The focus remained largely on political stability and economic management within prevailing global perspectives.

In the **Fourth Republic**, the argument that major political parties have converged towards a **right-leaning economic ideology** (Roelofs, 2024) has implications for science and technology. A predominantly free-market approach might value private sector-led innovation and technological adoption, with the government playing a more facilitative role in funding basic research or creating an enabling environment. Alternatively, if a more interventionist approach, even within a right-leaning framework, were adopted, the government might directly fund specific scientific research areas deemed important for national development.

However, the perceived **weakening of strong ideological divides** and the emphasis on factors like patronage and ethnic considerations (Eme & Ibietan, 2015) can hinder the consistent application of science-based economic policies. When political decisions are driven more by short-term political gains and, or the distribution of resources along non-scientific lines, long-term, evidence-based strategies for economic development that rely on scientific research and innovation may be sidelined. For example, funding allocations for scientific research institutions might be influenced by political connections rather than merit or strategic national needs. Furthermore, the "poverty of ideology" (Eme & Ibietan, 2015) can lead to policy inconsistencies and a lack of a coherent long-term vision for integrating science and technology

into the economy. Without a strong ideological commitment to progress driven by research and innovation, policies might be ad-hoc, poorly funded, or inconsistently implemented, regardless of their scientific merit.

Despite these challenges, there have been instances where science and technology have informed economic policies in Nigeria, such as in the agricultural sector (research into improved crop varieties) and the petroleum industry (technical expertise in extraction and processing). However, these have often been driven by specific needs or external pressures rather than a consistent, ideologically driven commitment to science-based economic transformation across all sectors.

While different ideological orientations in Nigeria's political history could theoretically lead to varying approaches towards science-based economic policies, the practical impact has been mediated by factors such as political instability, the focus on non-ideological considerations, and the perceived weakening of strong ideological frameworks in the Fourth Republic. A more robust and consistently applied integration of science into economic policy requires a political environment where long-term, evidence-based strategies are prioritized and sustained by a clear ideological commitment to innovation and technological advancement (Onoja & Oche, 2024).

-The Integrated Science Curriculum: A science-based policy

The example of Nigeria's Integrated Science curriculum reform in the late 1960s, driven by the Science Teachers Association of Nigeria (STAN) with government support (Brown, 2015; Oludipe, 2005), illustrates how a perceived need for scientific literacy and technological advancement – a form of developmental nationalism – influenced educational policy. The government's rationale, as outlined by Oludipe (2005), aimed to prepare citizens for a scientifically and technologically evolving world. This initiative, while focused on education rather than direct economic policy, highlights how a nation's developmental aspirations, underpinned by a belief in the importance of science, can lead to significant policy changes.

The subsequent development of the Nigerian Integrated Science (NISIP) and the Nigerian Basic Science Project (NBSP) by Nigerian Education Research Development Council (NERDC), based on National Economic Empowerment and Development Strategies (NEEDS) and Millennium Development Goals (MDGs) (Babajide, 2015), further demonstrates the ongoing influence of national priorities and a recognition of the role of science and technology in achieving them. However, the challenges faced by STAN in securing adequate funding underscore that even with a progressive ideological stance towards science education, practical implementation can be hindered by economic and political realities.

Challenges to the implementation of science-based economic policies in Nigeria

Sustainable development is closely knitted to the development of science and technology in any country. Babajide, (2015) listed the following as the major challenges to the development of science and technology in Nigeria.

1. Poor management of funds on the part of the government.
2. Shortage of qualified teachers
3. Poor attitudes of students towards the subject
4. Poor method of instruction

5. Lack of adequate laboratory equipments
6. Insufficient exposure of students to laboratory activities
7. Poor incentives /remuneration on part of science teachers leading to poor attitudes of teachers to work.
8. Poor working condition of teachers and learning environment of students
9. Poor socioeconomic background of students leading to lack of appropriate learning facilities
10. Poor achievement of students in science.

Other challenges of the implementation of science-based economic policies in Nigeria includes: poor policy implementation, political instability, inadequate investment in research, and over reliance on crude oil.

The problems listed above basically take their roots from political ideologies. The bulk of the blame is on the government which is saddled with the responsibility of meeting these basic needs, and then demands that the citizens do their part in order to attain a sustainable development.

The way forward

If the teaching and learning of Integrated Science in Nigeria must produce the results that other developing and developed countries of the world are having, then, reforms should be made to the curriculum to include the following.

1. The pupils and students of Integrated Science should learn early, what governance is, and how it affects the quality of their lives.
2. They should learn early the responsibilities of the government to her citizens.
3. Students should learn early that those in positions of authority (government) will determine their fate as such they should be interested in the processes that take such persons there.
4. The minds of the pupils and students of Integrated Science should be prepared early and made ready to participate in the politics that takes people to the position of power, authority, decision making and implementation.
5. The teaching and learning of subjects like Government and History should be right from the foundational classes and made compulsory for all pupils and students.
6. Pupils and Students should be made to experience what the electioneering process in Nigeria is like by allowing them to vie for positions of authority in the class like the class monitor and school prefects instead of the normal way of selection by the school authority. They should learn to prepare their manifestoes and present themselves for debates with other contestants.
7. When elected, they should be held accountable for their actions. Pupils and students should learn how to hold their leaders at all levels accountable to their duties and responsibilities.
8. Scientists and her various organizations should get more interested in politics, vie for positions and take charge of the implementation of the policies that will better the outcomes of the teaching and learning of Integrated Science at all levels.
9. The teaching and learning of Integrated Science should be done in such a way that the learners can see the future in what they are learning. More real life experiences should be brought into the teaching and learning of Integrated Science. Enough of memorisation of concepts that the

- students and the teachers at times do not know how it can be applied to real life experiences. Concepts should be matched with real life issues especially as it relates to economic empowerment.
- i. The relationship of concepts in separation techniques and economic empowerment can be established by showing:
 - a. How salt (NaCl) is produced from sea water via evaporation. How the process of drying crops for storage for future use or next planting season is via the process of evaporation.
 - b. How the process of preparing awara (soya bean curds) is by boiling, precipitation and filtration.
 - c. How filtration and decantation are the processes used in the preparation of akumu (pap).
 - d. How the process of preparing beans for moimoi is first via osmosis, then application of pressure to separate the seed from its covering (testa or seed coat), floatation, decantation and the sieving before milling the beans.
 - ii. Do more of practical lessons in the laboratory and relate these practical lessons to real life issues. For instance, a teacher can decide to teach oxidation – addition of oxygen/loss of electron by using rusting of metal and its effects, in the laboratory.
 - a. How it can be prevented by covering the metal in oil or any other protective coating that will not expose the metal to oxygen. The protective layer on the metal prevents oxygen from being added to the metal as oxygen does not react with oil under ordinary conditions. The economic importance of this is that for food to be stored in any metallic container which is the case most times, such a metal must be coated with a protective lining to prevent its oxidation and hence keeping the food in its fresh consumable state.
 - b. How lack of oxygen or insufficient oxygen leads to fermentation that is the process used for producing the local spice, okpuye.
 - c. Showing the students in the laboratory how saponification can be used for economic empowerment.
 - iii. Taking students to industries where they can have a real experience of some concepts taught in class.
 - a. Fermentation - visit to garri processing industry to see how cassava is fermented, sieved and fried to birth the product – garri
 - b. Palm oil production - visit to palm oil processing industry to see the effects of boiling (heat) on the structure of palm fruits. How heat has reduced the strength of bond between the mesocarp and endocarp of the fruit making it easier for crushing, in order to increase the surface area of the palm fruits hereby releasing its oil contents to the water where it floats and scooped for further processing.
 - c. Visits to food packaging industries for students to see which concepts is used in packaging food before transportation to other locations or for future use. How expiry dates are determined before placing them on food packs.
 10. The government should pay more attention to what she can produce within the country by making sure that;
 - a. Curriculum is planned and executed to bring about the attainment of set goals.
 - b. Provide enabling environment for the teachers and learners of Integrated Science to achieve set goals.
 - c. Remunerate, motivate and encourage Integrated Science teachers and researchers.
 - d. Discourage the total reliance on foreign foods which boost foreign economy at the expense of local economy.
 - e. There should be increased government and private sector funding for concentration on research.
 - f. There should be strengthening of science-based policies that promotes sustainable agriculture, industry, renewable energy and healthcare.
 - g. There should be adoption of policies that integrates scientific innovations into economic planning.

11. The pupils and students of Integrated Science should be taught entrepreneurship skills early as entrepreneurship is the major factor for economical growth. Entrepreneurship is the easiest way to make the money needed to participate in partisan politics.

Conclusion

No economy can grow without sustainable development. There can be no sustainable development in Nigeria if the political ideologies of her leaders do not align with economic policies that bring about sustainability. Nigeria's journey towards sustainable development will be significantly delayed unless experts in sustainable economic policies have the determination to participate in politics and lead. Without their involvement, leadership often falls to individuals who may not have the right expertise.

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