

NIGERIA'S ENGINEERING AND TECHNOLOGICAL LEAP: CATCHING UP WITH THE TIME

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ABSTRACT

Nigeria is experiencing a marked transformation in its engineering and technological landscape, underpinned by growing investments in infrastructure, innovation ecosystems, and STEM education. This study assesses the country's adoption of emerging technologies, focusing on renewable energy, the digital economy, and advanced manufacturing. It examines the attendant challenges and opportunities and evaluates their implications for economic growth, industrial advancement, and global competitiveness. The analysis highlights Nigeria's capacity to strategically leverage technological innovation to promote sustainable development and align more closely with global technological trajectories.

KEYWORD

Innovation, research, experience sharing, problem-solving, solution development, stem education

INTRODUCTION

Nigeria is undergoing notable transformation in its engineering and technological landscape through investments in infrastructure, innovation hubs, and STEM education to diversify its oil-dependent economy (Akinyoade & Udoh, 2018; Oyelaran-Oyeyinka, 2017; Adelegan, 2019). Government initiatives and a growing startup ecosystem have stimulated innovation in areas such as renewable energy and the digital economy, particularly in major cities (Akinwale, 2018; Nwankwo, 2019; Ohia & Nwakoby, 2020). Noticeably, there is significant transformations, driven by investments in infrastructure, innovation hubs, and STEM education while there are challenges to be addressed. Despite the challenges such as infrastructure deficits, limited funding, and skills shortages (Adenikinju, 2008), Nigeria possesses strong potential to drive sustainable economic growth through engineering and technological advancement (World Bank, 2018; Kuznets, 1966). This study explores the current state of engineering and technological advancement in Nigeria, highlighting the opportunities and challenges facing the country.

MATERIAL AND METHODOLOGY

This study on "Nigeria's Engineering and Technological Leap: Catching Up with the Times" employed a comprehensive research design, combining both qualitative and quantitative research methods to achieve a thorough understanding of the topic.

MATERIALS

Primary data was collected from:

Surveys and questionnaires were administered to a sample of engineers, technologists, and industry experts in Nigeria, using a structured questionnaire to gather information on their experiences, perceptions, and opinions on Nigeria's engineering and technological advancement. In-depth interviews with key stakeholders in the engineering and technology sectors, including industry leaders, policymakers, and academics, were conducted to gather more nuanced and detailed insights into the topic.

Secondary data was obtained from:

A comprehensive review of existing literature on Nigeria's engineering and technological development, including academic articles, research reports, policy documents, and industry publications. Analysis of reports, policies, and documents from government agencies, research institutions, and industry associations to gather information on the current state of engineering and technology in Nigeria according to Adeyemi (2020) and Afolabi (2020).

METHODOLOGY

This study employed a mixed-methods approach, combining qualitative and quantitative data collection and analysis methods.

Data Collection:

Surveys: 384 engineering and technology professionals, academics, and industry experts were surveyed to gather data on the current state of engineering and technology in Nigeria.

Interviews: 20 key stakeholders, including policymakers and industry leaders, were interviewed to gain deeper insights into the challenges and opportunities in Nigeria's engineering and technology sector.

Case Studies: Successful engineering and technology projects in Nigeria were analyzed to identify best practices and lessons learned.

Literature Review: Existing studies and reports on Nigeria's engineering and technology sector were reviewed to provide context and background information.

Data Analysis: Data was analyzed using:

Descriptive statistics (charts) to summarize survey responses and provide an overview of the experiences and perceptions of engineers, technologists, and industry experts.

Thematic analysis to identify patterns and themes in interview data and provide more nuanced insights into the topic.

RESULT AND DISCUSSION

Figure 1 shows the statistical information of the current state of Engineering and Technology Development in Nigeria. It shows that majority of the engineering and technology professionals strongly agreed or agreed that factors such as brain drain, lack of adequate infrastructure, limited access to quality education resulted into unsatisfactory state of engineering and technology in Nigeria.

Figure 2 shows the statistical information of opportunities and challenges for leapfrogging. It is observed that majority of the engineering and technology professionals strongly agreed or agreed that dependent on foreign technology and cybersecurity threats hinder Nigeria technological progress. And majority also agreed that collaboration with international partners (instead of total dependent on their technology) and investment in digital infrastructure can help Nigeria catch up with time in engineering and technology.

Figure 3 shows the statistical information of policy and Implementation in Nigeria technological systems. Majority of the engineering and technology professionals strongly agreed or agreed that factors such as monitoring and evaluation, public-private partnerships, clear policies and guidelines and provision of funding for research by the government help in facilitating the development of engineering and technology in Nigeria.

Figure 4 shows the information for prospects of Engineering and Technology Development in Nigeria. Majority of engineering and technology professionals strongly agreed that sectors such as biotechnology, cybersecurity, artificial intelligence and other renewable energy sources can enhance Nigeria technological growth and future advancement.

The survey findings highlight the need for stakeholders to build on the momentum generated by the respondents' positive outlook. By prioritizing investment in digital infrastructure, providing funding for research and development, and creating policies that support innovation and entrepreneurship, the government and industry stakeholders can work together to drive

technological advancement and economic growth in Nigeria. This can help to unlock the country's potential and ensure that it catches up with the rest of the world in terms of technological development.

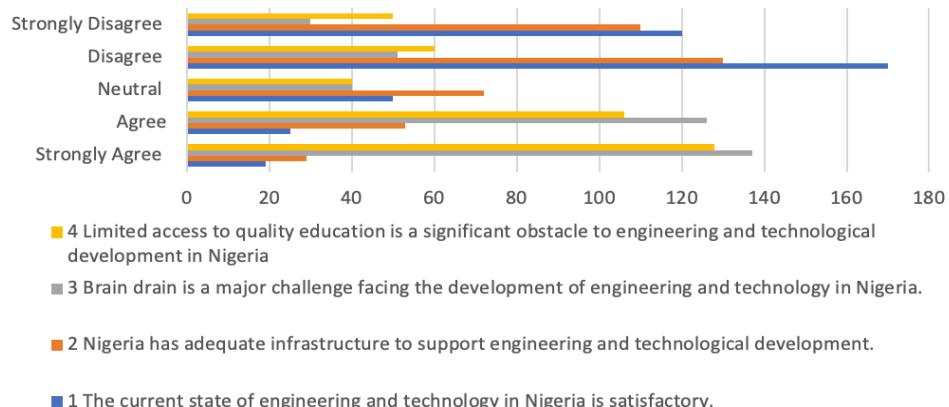


Figure 1: Current State of engineering and technology in Nigeria.

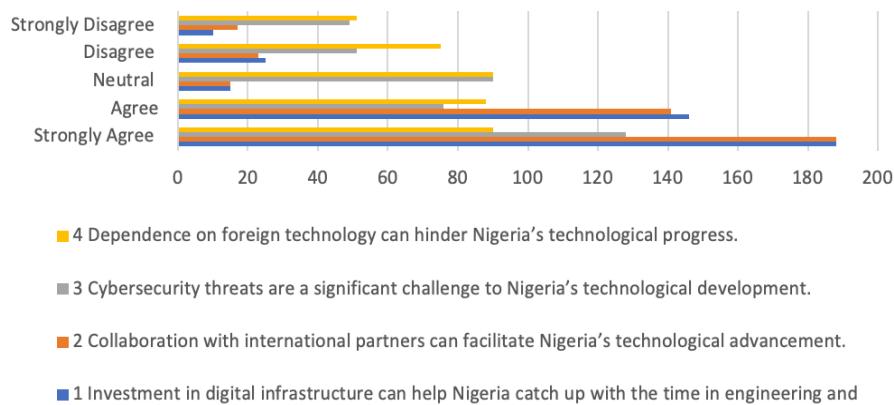


Figure 2: Opportunities and challenges for leapfrogging.

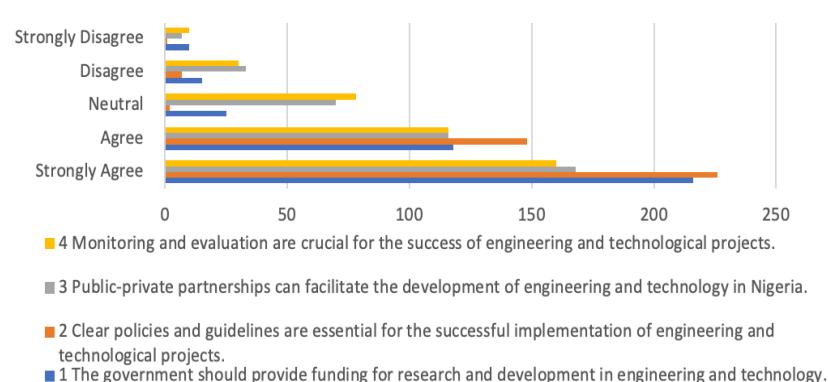


Figure 3: Policy and implementation in Nigeria technological systems.

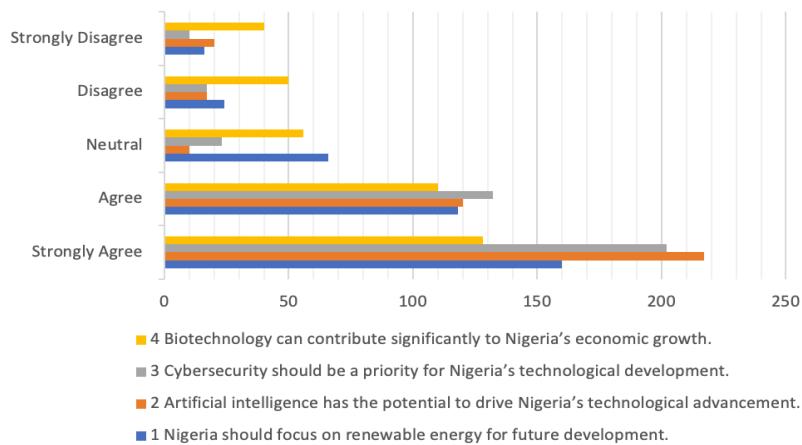


Figure 4: Prospects of engineering and technology development in Nigeria.

CONCLUSION

The findings of the survey provide valuable insights into the perceptions of stakeholders on Nigeria's engineering and technological leap. The overwhelming majority of respondents strongly agreed or agreed on the importance of various factors such as investment in digital infrastructure, collaboration with international partners, and government funding for research and development in driving technological progress. The survey also highlights the potential of sectors such as renewable energy, artificial intelligence, and biotechnology in contributing to Nigeria's economic growth and development. Overall, the findings suggest that Nigeria has the potential to leverage technology and innovation to drive economic growth and development, and that stakeholders are optimistic about the country's prospects for technological advancement.

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