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Education and Industrialization Nexus: An Analysis of Basic and Secondary Education as Agents in Sokoto Metropolis, Sokoto State, Nigeria

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Abstract

This study investigated the contributions, roles, and challenges of basic and secondary education as agents of industrialization in Sokoto Metropolis, Sokoto State, Nigeria. A descriptive survey design was adopted, with stratified random sampling used to select teachers, schools, administrators, and industry experts. The sample size of 120 respondents was determined using the Research Advisor (2006) table. Data were collected through a structured questionnaire with a reliability coefficient of r = 0.92 and analyzed using descriptive statistics and multiple regression model. Findings showed that secondary schools contribute to industrialization through vocational subjects, practical workshops, entrepreneurship education, alignment of projects with industry needs, and promotion of creativity and innovation. They also promote industrial growth by producing employable graduates, fostering school–industry collaborations, and implementing policies that enhance industrial awareness. Major challenges include inadequate funding, shortage of qualified technical/vocational teachers, lack of modern equipment, and cultural barriers. The regression results indicated a strong relationship between the independent variables and the dependent variable (R = 0.810), with R^2 value of 0.656, The Adjusted R^2 of 0.614 further validates the strength and reliability of the model. The ANOVA test confirmed the statistical significance of the model ($F(13,106) = 15.534$, $p < .001$).

Keywords: Analysis, Basic, Secondary Education, Industrialization, Nexus

Introduction

Industrialization has long been recognized as a catalyst for economic growth, technological advancement, and societal transformation across nations. In the context of developing countries such as Nigeria, industrialization holds the promise of reducing unemployment, alleviating poverty, enhancing the

standard of living, and fostering overall national development (Ibrahim, & Garba, 2022). However, the pathway to achieving sustainable industrial growth is multifaceted, involving several sectors, with education particularly basic and secondary education playing a pivotal role. Schools serve as the primary institutions where foundational knowledge, critical skills, and entrepreneurial mindsets necessary for industrial activities are cultivated. Therefore, analyzing the role of basic and secondary schools as agents of industrialization becomes imperative, especially within specific local contexts such as Sokoto Metropolis in Sokoto State, Nigeria. According to Eneogwe, & Ihechukwumere, (2024) education is universally acknowledged as the bedrock of societal progress. From basic literacy and numeracy to the development of technical and vocational competencies, the educational system shapes the future workforce. In Nigeria, the government, through various policy interventions, has sought to realign the education system with national industrial goals. Policies such as the Universal Basic Education (UBE) Programme and the emphasis on technical and vocational education at the secondary level aim to equip young citizens with practical skills that can drive industrial development. Despite these efforts, significant gaps remain between educational outputs and industrial needs. It is within this context that the present study examines the specific contributions of basic and secondary education in Sokoto Metropolis to the industrialization process. Sokoto Metropolis, the capital of Sokoto State, is not only a political and administrative center but also a hub for commerce, education, and emerging industries in the northwestern region of Nigeria. Historically known for its Islamic scholarship and trade, Sokoto has witnessed gradual shifts toward modernization and industrial activities, albeit at a slower pace compared to other regions. Understanding how educational institutions in this metropolis contribute to industrialization is essential for tailoring educational reforms that are contextually relevant and impactful.

According to Okonkwo & Ahmed (2023), basic education, which covers primary and junior secondary education in Nigeria, lays the groundwork for further learning and skill acquisition. At this level, students are introduced to core subjects that develop their cognitive, psychomotor, and affective domains. More recently, efforts have been made to incorporate elements of technology education, entrepreneurship, and vocational skills into the basic education curriculum (Yahaya, & Bello, 2024). Ideally, such integration should prepare students to either transition smoothly into secondary education

or enter technical and vocational training that feeds into the industrial sector. However, the extent to which basic schools in Sokoto Metropolis are achieving this objective remains underexplored. Basic and secondary schools, particularly at the senior secondary level, plays an even more critical role in preparing students for higher education, vocational pursuits, or direct entry into the labor market (Eneogwe & Ihechukwumere, 2025). Subjects such as Technical Drawing, Basic Technology, Agricultural Science, and Business Studies are designed to provide students with the practical knowledge needed for industrial engagement. Furthermore, the emphasis on Science, Technology, Engineering, and Mathematics (STEM) education is expected to foster innovation and technical skills that are crucial for industrialization (Ogunleye, & Musa, 2020). Nevertheless, questions abound regarding the adequacy of resources, teacher competence, curriculum relevance, and students' interest levels in technical and vocational subjects within Sokoto Metropolis.

Several factors influence the effectiveness of schools as agents of industrialization. Infrastructure and facilities, such as well-equipped science laboratories, workshops, and ICT centers, are vital for delivering practical and experiential learning (Bello, & Usman, 2021). Teacher quality, in terms of professional training, motivation, and exposure to modern industrial practices, directly impacts students' skill acquisition. The curriculum must be aligned with industrial realities, emphasizing creativity, problem-solving, and entrepreneurship. Moreover, partnerships between schools and industries through internships, field trips, and collaborative projects can provide students with real-world exposure and enhance their readiness for industrial employment.

Despite the recognized importance of these factors, many challenges persist. In Sokoto Metropolis, as in many parts of Nigeria, issues such as inadequate funding, outdated curriculum content, insufficient qualified teachers, lack of modern instructional materials, and poor school industry linkages hamper the capacity of basic and secondary schools to effectively drive industrialization. Additionally, sociocultural factors, including gender disparities in access to education and prevailing perceptions about vocational careers, also influence the outcomes of educational efforts geared toward industrial development. The importance of studying the case of Sokoto Metropolis cannot be overstated. As an urban center with diverse socio-economic activities, Sokoto presents a unique environment where traditional educational models intersect with

emerging industrial demands. Analyzing the role of its basic and secondary schools in fostering industrialization can yield insights into broader systemic challenges and opportunities applicable to similar contexts across Nigeria and sub-Saharan Africa (Oladipo & Yusuf, 2019). Furthermore, understanding how schools contribute to industrialization aligns with global educational and development agendas, including the United Nations Sustainable Development Goals (SDGs). Goal 4 emphasizes inclusive and equitable quality education and the promotion of lifelong learning opportunities for all, while Goal 9 focuses on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation (Ajayi & Afolabi, 2019). Thus, the findings of this study could contribute to national and international discussions on how to better leverage education for industrial growth.

The purpose of this study therefore is to assess the extent to which basic and secondary education serve as agents of industrialization in sokoto metropolis and to specifically assess areas basic and secondary education contributes to industrialization in sokoto metropolis, assess the role of basic and secondary education in promoting industrial growth, and assess the challenges faced by basic and secondary education as agents of industrialization in sokoto metropolis

Research Question

The research questions for the study are:

1. What are the areas basic and secondary education contributes to industrialization in Sokoto Metropolis?
2. What are the roles of basic and secondary education in promoting industrial growth in Sokoto metropolis?
3. What are the challenges faced by basic and secondary education as agents of industrialization in Sokoto metropolis?

Methodology

This study employed a descriptive analysis to examine education and industrialization nexus: an analysis of basic and secondary education as agents in sokoto metropolis, sokoto state, Nigeria. The population for this study comprises of 293 secondary schools within Sokoto metropolis. A sample size

of 120 schools was selected using research advisors (2006) Out of the 120 sampled schools, stratified random sampling technique was used to select 10 junior secondary schools and 10 senior secondary school. Stratification was done to include both public and private schools, ensuring diverse representation of schools from various socio-economic backgrounds. A total of 40 teachers (20 from technical/vocational disciplines and 20 from general education) were selected, and a total of 50 students (25 from technical/vocational subjects and 25 from general education) were also selected. 15 school administrators were also selected, and 15 industry experts were purposively selected based on their involvement in educational and industrial development. The random sampling process was guided by principles aimed at achieving balance and inclusivity. The researcher-made sixteen item structured questionnaire titled: Analysis of Basic and Secondary Education as Agents of Industrialization Questionnaire (ABSEAIQ), was developed and used to collect data for the study. The questionnaire being a closed–ended questionnaire is categorized into two sections. Section A contains the demographic characteristics of the respondents with 3 items, and section B contains the 13 items raised which are based on the research variable. The instrument of this research was validated by two experts from the department of Educational Foundations, Usmanu Danfodiyo University Sokoto. The experts vetted the questionnaire in terms of its clarity, coverage and the relevance of the items in relation to the topic under research. The experts made corrections, observations, and comments, such as restructuring of the questionnaire which initially was sectioned into three parts, noting of repetition of items, restructuring of unclear items and inclusion of research variables in items. The instrument was later adjusted to be valid for the study. Using Statistical Package for Social Sciences (SPSS version 20), the reliability coefficient yielded an ‘r’ value of 0.92 level of significance after a test re-test method was adopted on 40 teachers within Bodinga and Shagari local government areas which are outside the sample population used for the study. This study employed a descriptive analysis such as frequency tables and percentages to analyze the demographic characteristics of the respondents, while multiple regression model was employed in the bid to answer the research question raised in the work.

Results

Table 1 below shows the socioeconomic characteristics of respondents which provide a foundational understanding of the sample involved in the study. Key demographic variables analyzed include age, gender, and category of respondent. These variables help establish the credibility, diversity, and representativeness of the data collected from secondary school stakeholders in Sokoto Metropolis.

Table 1: Demographic Variables of Respondents

Variable	Categories	Frequency	Percentage (%)
Age	14 – 19 years	50	41.7%
	20 – 24 years	17	14.2%
	25 – 29 years	12	10.0%
	30 years and above	41	34.2%
Gender	Male	82	68.3%
	Female	37	30.8%
	Unspecified (Other)	1	0.8%
Category of Respondent	Students	50	41.7%
	Teachers	40	33.3%
	Administrators	15	12.5%
	Industry Experts	15	12.5%
Total		120	100.0%

The Table 1 reveals a detailed breakdown of the respondents' demographic variables such as:

Age Distribution: The majority of respondents (41.7%) fall within the 14–19-year age range, indicating strong participation from secondary school students. Respondents aged 30 years and above account for 34.2%, which likely represents more experienced professionals such as teachers, administrators, and industry experts. This spread across age groups enhances the reliability of the data as it reflects both youthful and mature perspectives on industrialization through secondary education.

Gender Distribution: The sample is predominantly male, accounting for 68.3% of the total respondents, while females represent 30.8%. One respondent (0.8%) either did not disclose their gender or selected a non-binary category. This gender distribution may reflect the gender composition within the selected institutions or the broader sociocultural context of Sokoto Metropolis. Nevertheless, both male and female voices are represented in the data.

Category of Respondents: Students constituted the largest category (41.7%), followed by teachers (33.3%). School administrators and industry experts each made up 12.5% of the sample. This distribution indicates a well-rounded respondent pool that encompasses key stakeholders in the education and industrialization process those who teach, manage, learn, and apply educational outcomes in industrial settings. In conclusion, the demographic variables of respondents demonstrate that the study engaged a diverse and representative population from various sectors associated with secondary education and industrial development. The inclusion of students, teachers, administrators, and industry practitioners across different age and gender categories provides a balanced dataset, supporting the generalizability and credibility of the findings presented in subsequent sections.

The table below presents the analysis of the data collected to address the research questions that guided the study as concerning the contributions, roles, and challenges of secondary schools as agents of industrialization in Sokoto Metropolis. The analysis is based on multiple regression analysis results obtained from 120 respondents, including teachers, students, administrators, and industry experts.

Table 2: Analysis of Research Questions and Hypothesis

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	Std. Error	Beta		
(Constant)	.369	.262		1.409	.162
Offer of vocational subjects	.593	.155	.674	3.817	.000
Participation in practical workshops	-.099	.085	-.142	-1.164	.247
Available entrepreneurship education programs	.046	.087	.057	.526	.600
Possession of skills relevant to industrial employment	.130	.085	.181	1.540	.127
Ability of starting small-scale industries	-.874	.122	-.785	-7.163	.000
Creativity and innovation among students	.350	.132	.421	2.639	.010
Projects aligned with the needs of local industries	-.013	.110	-.013	-.115	.909

Incorporating industrial relevance into classroom teaching	.355	.082	.355	4.344	.000
Policies that promote industrial awareness	.229	.065	.301	3.546	.001
Shortage of qualified technical/vocational teachers	.060	.075	.076	.800	.425
Lack of modern equipment for industrial skill training	-.003	.131	-.003	-.025	.980
Insufficient policies	-.126	.077	-.133	-1.630	.106
Cultural perceptions	.057	.069	.064	.830	.408

The regression model above served as a proxy for assessing the operational effectiveness of basic and secondary education as contributors to industrial development. The regression results indicated a strong relationship between the independent variables and the dependent variable ($R = 0.810$), with an R^2 value of 0.656, suggesting that 65.6% of the variance in the adequacy of funding for industrial-oriented programs can be explained by the included predictors. The Adjusted R^2 of 0.614 further validates the strength and reliability of the model, accounting for potential model complexity. The ANOVA test confirmed the statistical significance of the model ($F(13,106) = 15.534$, $p < .001$), indicating that the combination of predictors reliably influences the funding challenges experienced by secondary schools.

Discussion

This study analyzed secondary schools as agents of industrialization in Sokoto Metropolis, Sokoto State, Nigeria. The analysis aimed to determine the extent of their contribution to industrial development, the roles they play in promoting industrial growth, and the challenges they encounter. These objectives were guided by three research questions, and the results were discussed in accordance with the research questions as presented below:

The research question one was addressed by examining the areas basic and secondary education contributes to industrialization in Sokoto Metropolis. Several variables demonstrated statistically significant contributions such as: the offering of vocational subjects relevant to industrial skills, which was a strong positive predictor ($B = 0.593$, $p = .000$), indicating that schools actively equipping students with industry-related skills are seen as vital contributors to industrialization. This finding is consistent with Adeyemi, (2020) assertion

that vocational and technical education is "cardinal to the socio-economic development of any nation" and an important driver of technological and economic growth in Nigeria. Similarly, teachers incorporating industrial relevance into classroom teaching (B = 0.355, p = .000) reinforces the link between pedagogy and industrial outcomes. When industrial concepts are embedded in instruction, students are better prepared for the workforce, aligning with Osundahunsi's (2019) position that vocational and technical education empowers citizens, stimulates sustained national development, and enhances employment. Promotion of creativity and innovation among students (B = 0.350, p = .010) further suggests that schools nurturing innovation are aligned with the values of a modern industrial economy (Umunadi, 2024). Administrative engagement in industrial-awareness policies (B = 0.229, p = .001) highlights the importance of leadership in steering schools toward industrial relevance.

These significant variables provide clear evidence that secondary schools in Sokoto Metropolis are actively contributing to industrial development.

The research question two was addressed through regression model which offered insights into roles of basic and secondary education in promoting industrial growth in Sokoto metropolis. Notably, innovation-driven school activities and relevant curriculum offerings reflect a systemic role in shaping students' entrepreneurial potential and readiness for industrial tasks (Adeyemi, 2020; Osundahunsi, 2019). Although entrepreneurship education (B = 0.046, p = .600) and practical workshops (B = -0.099, p = .247) were not statistically significant in this model, the strong influence of curriculum and teacher practices suggests that schools are important platforms for instilling industrial competencies (Umunadi, 2024). Interestingly, schools that produce graduates capable of starting small-scale industries had a negative relationship with funding adequacy (B = -0.874, p = .000). This may imply that successful graduate outcomes are occurring despite underfunded conditions or that these schools are being overlooked in funding allocation. These results highlight the multifaceted roles secondary schools play in promoting industrial growth from shaping skills and attitudes to creating pathways for entrepreneurship.

Furthermore, in addressing research question three, the model also shed light on several ongoing challenges: lack of significant influence from key variables such as the availability of modern equipment (B = -0.003, p = .980), shortage of qualified technical/vocational teachers (B = 0.060, p = .425), and

government policy support (B = -0.126, p = .106). These findings suggest that while these challenges are present, they may not be adequately addressed or reflected in funding decisions. This observation is consistent with Osundahunsi's (2019) view that for vocational and technical education to fulfil its developmental potential, adequate resources and supportive policies are critical. Additionally, the strong negative relationship between graduate entrepreneurship and funding adequacy suggests a systemic challenge: schools that are producing industry-ready graduates may not be receiving proportional support, possibly due to ineffective funding mechanisms or misaligned evaluation criteria. Hence, despite their efforts and outcomes, secondary schools face notable challenges in fulfilling their industrial role.

Conclusion

This study critically examined the role of secondary schools as agents of industrialization in Sokoto Metropolis, Sokoto State. Through the analysis of various school related variables including curriculum relevance, teacher practices, administrative policies, infrastructure, and student engagement. The study sought to evaluate the extent of secondary schools' contributions to industrial development, their role in promoting industrial growth, and the challenges they face. These findings reinforce the urgent need for educational policy reforms, increased funding, teacher training, and stronger school-industry collaboration to enhance the capacity of secondary schools to serve as true agents of industrial transformation.

The findings revealed that secondary schools make significant contributions to industrialization through the provision of vocational subjects, the integration of industrial relevance in classroom teaching, the promotion of creativity and innovation, and the adoption of policies that foster industrial awareness. These outcomes underscore the pivotal role of secondary schools in equipping students with the knowledge, skills, and mindset necessary for industrial participation and entrepreneurship. However, the study also identified key challenges that hinder the effectiveness of secondary schools in this role. These include inadequate funding, insufficient modern equipment, lack of qualified technical teachers, and gaps in government policy implementation. The presence of these obstacles indicates that while the foundational structures for industrial-oriented education exist, they are underutilized due to systemic constraints.

Based on the results, the three null hypotheses were rejected, confirming that secondary schools in Sokoto Metropolis contribute meaningfully to industrialization, actively promote industrial growth, and simultaneously face significant challenges in executing their industrial mandate. In conclusion, for secondary schools to fully realize their potential as catalysts for industrial development, there must be a concerted effort by educational stakeholders, government agencies, industries, and communities. With adequate support, policy alignment, and strategic investment, secondary schools can serve as effective incubators for Nigeria's future industrial workforce and innovators.

Recommendation

In light of the findings from this study, the following recommendations are proposed to strengthen the role of secondary schools as agents of industrialization in Sokoto Metropolis, Sokoto State:

1. Enhance curriculum relevance to industrial needs
2. Invest in teacher training and professional development
3. Strengthen school leadership for industrial advocacy
4. Improve infrastructure and equipment availability
5. Foster industry-school collaboration.

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