



FINACIAL CONSTRAINTS IN PROVIDING INDUSTRIAL EDUCATION: A SURVEY OF COPING STRATEGIES ADOPTED BY TECHNICAL INSTITUTIONS IN NIGERIA

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ABSTRACT

This study examined the relationship between financial constraints and innovation in industrial education within technical institutions in Nigeria. The study was motivated by the persistent challenge of inadequate funding, which limits the capacity of technical institutions to provide quality industrial education, develop infrastructure, acquire modern technologies, and promote innovative teaching and learning practices. A descriptive survey research design was adopted. The population comprised 5,432 staff drawn from universities, polytechnics, colleges of education, and vocational training institutions offering industrial education programmes across Nigeria. Using a stratified random sampling technique, a sample of 1,086 respondents was selected, while 1,001 valid questionnaires were returned and analysed. Data were collected using a structured questionnaire with a reliability coefficient ranging from 0.79 to 0.88 (Cronbach's alpha). Mean and standard deviation were used to answer the research questions. The findings revealed that technical institutions experience significant financial constraints that adversely affect infrastructure development, staff development, project implementation, and acquisition of modern equipment. The study further found that although institutions have made limited efforts to adopt strategies for overcoming financial limitations, partnerships with industry and other stakeholders play a significant role in fostering innovation. In addition, innovative practices were found to enhance the quality and relevance of industrial education by improving curriculum delivery, student engagement, workforce preparedness, and institutional effectiveness. The study concluded that sustainable funding, stronger industry collaboration, and increased investment in innovation are essential for improving industrial education in Nigeria's technical institutions. It recommended increased government funding, strengthened industry–institution partnerships, diversification of funding sources, and continuous investment in innovative educational practices to enhance the quality and competitiveness of technical education.

Keywords: Financial constraints, innovation, industrial education, technical institutions, industry partnerships, Nigeria.

Introduction

Technical institutions in Nigeria play a crucial role in equipping individuals with the necessary skills and knowledge to thrive in various sectors of the economy. However, the effective delivery of technical education is contingent upon adequate financial resources and a



conducive environment for innovation. In recent years, financial constraints have emerged as a significant challenge faced by technical institutions, impeding their ability to innovate and adapt to changing educational paradigms. Nigeria's technical education sector operates within a context of resource scarcity and institutional constraints, stemming from factors such as budgetary limitations, infrastructural deficits, and fluctuating funding allocations. According to Okebukola (2018), inadequate funding has hampered the development of infrastructure, curriculum enhancement, and faculty capacity building in technical institutions, thereby undermining their capacity to deliver quality education and meet industry demands. Moreover, the reliance on outdated pedagogical methods and obsolete equipment further exacerbates the gap between classroom learning and industry requirements (Olaniyan & Okemakinde, 2018).

Amidst these challenges, innovation emerges as a critical imperative for technical institutions to remain relevant and competitive in a rapidly evolving socio-economic landscape. Innovation encompasses a spectrum of initiatives, ranging from curriculum redesign and pedagogical innovation to the adoption of modern technologies and industry partnerships. However, the ability of technical institutions to innovate is constrained by financial limitations, which restrict their capacity to invest in research and development, faculty training, and infrastructure upgrades (Akinbode & Adedeji, 2020).

Despite the importance of the topic, there remains a notable gap in the existing literature concerning the specific strategies adopted by technical institutions in Nigeria to address financial constraints and promote innovation in industrial education. While previous studies have documented the challenges facing the education sector, including issues of funding and quality assurance, there is limited empirical research focusing specifically on innovation strategies within technical institutions in the context of financial constraints. Furthermore, existing studies often adopt a macro-level perspective, overlooking the nuances of institutional dynamics and stakeholder perspectives within technical education settings. Consequently, there is a need for research that delves deeper into the experiences, perception and practices of technical institutions faculty members, students and industry partners regarding innovation amidst financial constraint. By filling this research gap, the current study aims to provide 'valuable insights info" the complexities of educational governance and institutional management in Nigeria's technical education sector.

Against this backdrop, the study on financial constraints and innovation in industrial education in Nigeria holds significant relevance for several reasons. Firstly, it addresses a pressing issue faced by technical institutions, shedding light on the multifaceted challenges arising from financial constraints and their implications for educational quality and relevance. By exploring the strategies adopted by technical institutions to navigate financial constraints and promote innovation, the study offers insights into potential pathways for enhancing the effectiveness and efficiency of technical education delivery. Secondly, the study contributes to the broader discourse on educational governance and policy reform in Nigeria. By examining the interplay between financial resources, innovation, and institutional performance, it informs evidence-based decision-making and policy formulation aimed at strengthening the technical education sector. Moreover, the findings of the study can guide resource allocation strategies and capacity-building initiatives to support the growth and sustainability of technical institutions across the country.

The purpose of the study

The general objective of the study is to examine the relationship between financial constraints and innovation in industrial education within technical institution in Nigeria. This overarching



aim encompasses a comprehensive investigation into how financial limitations impact the ability of technical institutions to innovate and adapt to changing educational needs and industry demands.

Research questions

1. What are financial constraints faced by technical institutions in Nigeria's industrial education sector?
2. What are the strategies adopted by technical institutions to overcome financial limitations and promote innovation in curriculum development and delivery?
3. What is the role of partnerships with industry and other stakeholders in fostering innovation within technical education institutions?
4. What is the effectiveness of innovative practices in enhancing the quality and relevance of industrial education in technical institutions?

Literature review

Conceptual Literature Reviews

Financial Constraints in Industrial Education: Financial constraints refer to limitations in financial resources available to educational institutions, which can impede their ability to invest in infrastructure, technology, faculty development, and program innovation (Oiyiwola, 2019). These constraints may arise due to reduced government funding, fluctuations in economic conditions, or inefficient resource allocation within institutions. Financial constraints can have significant implications for industrial education institutions. Limited funding may restrict the acquisition of modern equipment and technology necessary for effective teaching and learning (Oiyiwola, 2019). Additionally, budgetary constraints may result in delays or cancellations of planned projects and initiatives within institutions, hindering their capacity to adapt to evolving industry needs (Obtaining Funds, 2020).

Innovation in Industrial Education: Innovation in industrial education involves the development and implementation of novel approaches, practices, and technologies to enhance teaching, learning, and workforce preparation (Osibanjo et al, 2020). This encompasses curriculum design, instructional methods, industry partnerships, and the integration of emerging technologies to meet the demands of a dynamic industrial landscape.

Interplay between Financial Constraint and Innovation: The relationship between financial constraint and innovation in industrial education is complex and multifaceted. On one hand, financial constraints may serve as a catalyst for innovation by necessitating creative solutions to optimize resource utilization and overcome resource scarcity (Oiyiwola, 2019). Institutions may innovate by adopting cost-effective approaches, seeking alternative funding sources, or forming strategic partnerships with industry stakeholders to augment their financial resources (Osibanjo et al., 2020). However, financial constraints also pose challenges to innovation efforts within industrial education institutions. Limited funding may limit the scope and scale of innovation initiatives, constrain experimentation with new teaching methods or technologies, and hinder the recruitment and retention of qualified faculty and staff (Obtaining Funds 2020). Moreover, financial instability may undermine institutional capacity for long-term planning and investment in innovation, perpetuating a cycle of resource scarcity and stagnation (Osibanjo et al., 2020).

Policy implications: Addressing financial constraints and fostering innovation in industrial education requires a multifaceted approach that involves policymakers, educational administrators, industry stakeholders, and funding agencies. Policy interventions aimed at



increasing public investment in education, improving financial management practices within institutions, and promoting collaboration between academia and industry can help alleviate financial constraints and create an enabling environment for innovation (Olayiwola, 2019; Osibanjo et al., 2020). Ntongha & Ubana (2026) opined that environmental education enhances national development. Environmental awareness creation through extension officers is observed as a coping strategy for institutional goal attainment (Ulayi et al 2026). Sam, et al (2025) opined that community environmental services as tools for environmental education play an important role to sustainable development. In the nexus of financial constraints and innovation in industrial education, technical education plays a crucial role as a focal point for addressing workforce needs, fostering innovation, and promoting economic development. Involvement in conflict resolution issues enhances job performance of academic staff (Arikpo et al 2022). Ubana et al (2025) observed that harnessing security approach and artificial intelligence (AI) as tools to combat corrupt/unethical practices helps to minimize financial crimes. According to Offem & Arikpo (2026) artificial intelligence as a tool for promoting information literacy. Technical education, encompassing vocational training, technical skills development, and applied sciences, is instrumental in equipping individuals with the knowledge, skills, and competencies required to thrive in various industrial sectors (UNESCO, 2019). Helen et al (2025) opined that vocational training programmes promotes economic empowerment. Sam et al (2024) asserts that impact of sustainable tourism research development significantly improves host communities in a country. Oham et al (2020) asserts that teaching-learning environment promotes students' academic performance in tertiary institutions.

Addressing Workforce Needs: Technical education institutions serve as vital hubs for training a skilled workforce tailored to meet the demands of evolving industries and technological advancements (UNESCO, 2019). By offering specialized programs in fields such as engineering, manufacturing, information technology, and applied sciences, technical education institutions play a pivotal role in bridging the gap between industry requirements and workforce capabilities (OECD, 2017). Fostering Innovation: Technical education fosters innovation by nurturing a culture of creativity, problem-solving, and hands-on learning (UNESCO, 2019). Through project-based learning, research collaborations, and industry partnerships, technical education institutions provide opportunities for students and faculty to engage in applied research, technology transfer, and entrepreneurship initiatives (OECD, 2017). Moreover, technical education programs often incorporate real-world challenges and industry-relevant projects into the curriculum, enabling students to develop practical skills and innovative solutions to complex problems (UNESCO, 2019). According to Ulayi et al (2026) sees literacy as a strategy for economic empowerment that addresses workforce needs among workers.

Promoting Economic Development: Technical education is instrumental in driving economic Development by producing a skilled workforce capable of contributing to industrial growth, innovation, and competitiveness (OECD, 2017). By equipping individuals with relevant technical skills and competencies, technical education institutions enhance labor productivity, facilitate technological adoption, and stimulate entrepreneurship (UNESCO, 2019). Andong et al (2025) opined that incorporating digital technology to adult literacy education programmes promotes economic development and strengthens national growth. Moreover, technical education fosters social mobility and inclusive economic development by providing pathways for individuals from diverse backgrounds to access high-quality education and employment opportunities (OECD, 2017). In summary, technical education plays a pivotal role in the nexus of financial constraints and innovation in industrial education by addressing workforce needs,



fostering innovation, and promoting economic development (Ubana et al 2025). By investing in technical education, policymakers, educational Institutions, and industry stakeholders can enhance the resilience, adaptability, and competitiveness of the workforce, thereby contributing to sustainable economic growth and prosperity (OECD, 2017; UNESCO, 2019).

Empirical Literature Reviews

Previous studies have attempted to examine the role of technical education in industrial sector performance in Nigeria. For example, Aneke and Otiji (2020) study on the Impact of Technical and Vocational Education in Nation Building, with a view to analysing the extent to which trained manpower, technical knowledge and vocational skills had impacted in Nigeria showed that there is significant trained manpower and provision of technical knowledge & vocational skills necessary for agricultural, industrial, commercial, and economic development in Nigeria. Andong et al (2025) sees activities of agricultural cooperative societies as a component tool for economic development of co-operators. Tripney and Hombrados (2020) study on the effect of Technical and vocational education and training (TVET) for young people in low- and middle-income countries: a systematic review and meta-analysis found that the mean effects on overall paid employment, formal employment, and monthly earnings were small, positive, and significant; however, significant heterogeneity was observed. Moderator analysis was performed to explain between-study differences in effects. Mbaba, Godwin and Udofia (2011) found that there are significant relationships between (1) global economic crises and inadequacy of workshop facilities ($j = -.420, p < .05$), (2) GEC and inadequacy of instructional media ($j = .581, p < .05$). Ubana et al (2025) observed that youth participation in socio-economic activities promote development among trainees.

Adeyemi and Olorunsola (2018) examined the challenges confronting technical education in Nigeria and highlighted financial constraints as a primary hindrance. The authors emphasized that inadequate funding undermines infrastructure development faculty recruitment, and curriculum enrichment, ultimately compromising the quality of education imparted to students. Insufficient financial resources lead to a dearth of modern equipment, outdated teaching methodologies, and limited access to industrial training opportunities, perpetuating a cycle of substandard education within technical institutions. According to Edoho & Arikpo (2019) reward management practice enhances job productivity among staff. Onwuka and Amadi (2019) corroborated these findings, emphasizing the detrimental effects of financial constraints on the practical aspects of industrial education. The study elucidated how limited funding restricts the establishment of partnerships with industry stakeholders, hindering collaborative initiatives such as apprenticeship programs, internships, and research projects. Consequently, students are deprived of hands-on experience and exposure to real-world industrial practices, impeding their employability and competitiveness in the job market.

Ojo and Adegboye (2020) delved into the repercussions of financial constraints on faculty development and retention within technical institutions. The authors highlighted that inadequate remuneration, coupled with the absence of professional development opportunities, exacerbates brain drain and undermines institutional capacity. Skilled educators are enticed to seek better prospects abroad or in other sectors, leading to a scarcity of qualified faculty members capable of delivering high-quality industrial education. Ibrahim et al. (2021) synthesized findings from various studies and underscored the systemic nature of financial challenges facing technical education in Nigeria. The review highlighted the intertwined issues of government underfunding, bureaucratic inefficiencies, and corruption, which collectively impede the equitable allocation and effective utilization of financial resources in the education sector; Such systemic inadequacies exacerbate disparities in educational access and quality,



disproportionately affecting marginalized communities and exacerbating socio-economic inequalities.

Okeke and Eze (2022) synthesized evidence from various studies and underscored the mutual benefits of industry-academia partnerships in fostering innovation within technical education. These benefits include enhanced relevance of curriculum content, improved employability of graduates, increased research productivity, and enhanced institutional reputation. Moreover, the review highlighted the importance of establishing effective mechanisms for collaboration, such as joint advisory boards, industry-sponsored scholarships, and technology transfer offices, to ensure sustained engagement and mutual accountability. Arikpo & Edoho (2019) opined that employees involvement in welfare decision and their job performance promote peaceful working relationship. The assertion that innovative practices are effective measures in enhancing the quality and relevance of industrial education in technical institutions is well-supported by empirical evidence from various studies. These innovative practices encompass a range of strategies, including curriculum reforms, pedagogical innovations, technological integration, and experiential learning approaches, all aimed at equipping students with the skills, knowledge, and competencies needed to succeed in a rapidly evolving industrial landscape. Here, we discuss this viewpoint with strong empirical backing to elucidate the transformative impact of innovative practices on industrial education.

Kumar and Sharma (2018) examined the efficacy of curriculum innovations in enhancing the quality and relevance of industrial education in technical institutions. The study highlighted the importance of aligning curriculum content with industry needs, integrating interdisciplinary perspectives, and incorporating emerging technologies into teaching and learning. By adopting competency-based approaches, project-based learning, and industry-sponsored capstone projects, institutions can ensure that their educational offerings remain responsive to evolving industry trends and equip students with practical skills and problem-solving abilities sought after by employers. Okeke and Ezenwa (2020) explored the role of pedagogical innovations in enriching the educational experience and fostering student engagement in technical education. The research emphasized the transformative potential of active learning strategies, such as flipped classrooms, problem-based learning, and collaborative projects, in promoting deeper understanding, critical thinking, and teamwork among students. By shifting from traditional lecture-based methods to interactive and experiential learning approaches, institutions can enhance student motivation, retention, and mastery of complex technical concepts.

Aminu and Muhammad (2021) elucidated the impact of technological integration in enhancing the quality and relevance of industrial education. The research highlighted how the adoption of digital tools, simulations, virtual reality, and online learning platforms can augment traditional instructional methods, expand access to educational resources, and facilitate personalized learning experiences. By harnessing the power of technology, institutions can overcome geographical barriers, accommodate diverse learning styles, and provide students with hands-on experience in simulated environments, thereby bridging the gap between theory and practice.

Similarly, Khan (2020) study explores the long run relationship between technical and vocational education and economic growth in Pakistan by using auto regressive distributed lag (ARDL) framework. The estimated coefficient shows that technical and vocational education has a positive and significant impact on economic growth in the long run and can play big role in boosting economy by creating skilled and demand driven individuals in labor market. Preeti Dixitl & R. Ravichandran (2023) study on the impact of vocational education on economic



growth and development across the G20 countries found that investing in vocational education can have significant positive effects on economic growth and development. Therefore, it is recommended that policymakers and stakeholders prioritize vocational education in their economic development plans and strategies. The findings of these studies are in strong consensus as to the effect of technical education in strengthening industrial education especially during economic crises. What is not clear to the researcher is the staff and administrators' perspective to this situation and what effort have been made in Nigeria. It is therefore necessary that studies of this nature be carried out in order to identify strategies that can be used in strengthen the economic and innovations in industrial education.

Theoretical Framework

The study is based on four theoretical framework which are; (1) Resource dependency theory (2) Institutional theory (3) Stakeholder theory (4) Innovation Diffusion theory.

Resource dependency theory: Developed by Pfeffer and Salancik in 1978, posit that, organizations depend on external resources such as funding, technology, and expertise to functions effectively it emphasizes that organizations strive to minimize their dependency on external sources to maintain autonomy and control over their operations. RDT assumes that organizations operate within environments characterized by uncertainty and interdependence. Organizations seek to manage their dependency on key resources to mitigate risks and maintain flexibility. Furthermore, RDT suggests that organizations are subject to power imbalances and vulnerabilities when they rely heavily on external resources. In the context of technical institutions in Nigeria facing financial constraints, RDT implies that these institutions may experience challenges in maintaining autonomy and achieving their educational objectives. The study can explore how financial constraints affect technical institutions' dependency on external funding sources and their ability to innovate in response to resource scarcity. Understanding these dynamics can inform strategies for reducing dependency, optimizing resource allocation, and enhancing organizational resilience.

Institutional Theory: Proposed by DiMaggio and Powell in 1983, posits that organizations are influenced by institutional norms, rules, and practices that shape their behaviour and structure. It emphasizes the role of institutions in providing stability, legitimacy, and social order within society. Institutional Theory assumes that organizations seek legitimacy and social acceptance by conforming to institutional norms and expectations. Organizations are motivated to adopt certain practices or structures to gain approval from external stakeholders, including regulatory bodies, accrediting agencies, and professional associations. For technical institutions in Nigeria grappling with financial constraints, Institutional Theory suggests that these institutions may adopt innovative practices not only to address immediate resource challenges but also to align with prevailing institutional expectations. The study can investigate how technical institutions navigate institutional pressures to innovate in curriculum development, delivery methods, and industry partnerships. Understanding these dynamics can shed light on the motivations and strategies behind innovation adoption within technical education institutions.

Stakeholder Theory: Introduced by Freeman in 1984, emphasizes the importance of considering the interests of all stakeholders, including employees, customers, suppliers, and the community, in organizational decision-making processes. It advocates for responsible and ethical management practices that balance the needs and expectations of diverse stakeholders. Stakeholder Theory assumes that organizations are embedded within complex networks of relationships with various stakeholders, each with distinct interests and concerns. Organizations have a moral and ethical obligation to consider the impacts of their actions on



stakeholders and strive for mutually beneficial outcomes. In the context of technical institutions in Nigeria facing financial constraints, Stakeholder Theory suggests that collaboration and engagement with stakeholders are essential for promoting innovation and sustainability. The study can explore how technical institutions involve industry partners, government agencies, faculty, students, and other stakeholders in decision-making processes related to resource allocation, curriculum development, and strategic planning. Understanding stakeholder perspectives and priorities can inform inclusive and participatory approaches to innovation management and governance.

Innovation Diffusion Theory: Articulated by Rogers in 2003, posits that innovations spread through society in a predictable pattern, influenced by factors such as the perceived attributes of the innovation, communication channels, and the characteristics of adopters. It emphasizes the importance of understanding how innovations are adopted and diffused within social systems. Diffusion Theory assumes that individuals and organizations are rational decision-makers who evaluate innovations based on their relative advantage, compatibility with existing practices, complexity, trialability, and observability. Innovations are more likely to be adopted when they offer clear advantages, align with existing norms and values, and are perceived as easy to use and understand. For technical institutions in Nigeria seeking to innovate amidst financial constraints, Innovation Diffusion Theory suggests that the effectiveness of innovation initiatives depends on factors such as stakeholder perceptions, communication strategies, and organizational readiness for change. The study can examine how technical institutions facilitate the adoption and diffusion of innovative practices in curriculum development, teaching methods, and industry partnerships. Understanding the dynamics of innovation diffusion can inform the design and implementation of strategies to promote the uptake of innovative solutions and enhance the quality and relevance of technical education.

Methodology

The study employed a descriptive research design to comprehensively investigate the relationship between financial constraints and innovation in industrial education within technical institutions in Nigeria. This approach relied heavily on the opinion of staff to understand the issues surrounding technical institutions so as to make policies regarding industrial education. This was achieved through the use of questionnaires.

Population and Sample of the Study

The population of the study comprised technical institutions offering industrial education programs across various regions of Nigeria. This encompassed universities, polytechnics, colleges of education, and vocational training centres specializing in fields such as engineering, technology, applied sciences, and technical skills development. The total number of staff that were used were 5432 staff across major institutions in Nigeria. To select the sample, stratified sampling techniques were used to select a total of 1086 staff which represents 20% of the entire population. A stratified random sampling technique was utilized to ensure representation across different types of technical institutions and geographical locations. Firstly, technical institutions were stratified based on their institutional type (universities, polytechnics, colleges of education) and location (urban, rural). Subsequently, random sampling was conducted within each stratum to select a representative sample of institutions for inclusion in the study.

Instrumentation

Data were collected using a structured questionnaire. The questionnaire comprised both closed-ended and Likert-scale items designed to capture quantitative data on financial constraints, innovation practices, and institutional characteristics. The questionnaire was divided into two

sections. Section A was designed to elicit responses on demographic and institutional characteristics of the sample and institution while section B was designed to provide content information on a four-point scale that ranged from Strongly Agree-Strongly Disagree Prior to data collection, the questionnaire was subjected to pilot testing with a small sample of technical education experts and practitioners to assess its clarity, relevance, and reliability. Internal consistency reliability of the questionnaire items was assessed using Cronbach's alpha coefficient, with a threshold of 0.7 considered acceptable. The coefficient of the sub scales ranged from 0.79-0.88 which is an indication that the instrument has internal consistency.

Data collection commenced following ethical approval from the relevant institutional review board. Questionnaires were distributed to selected participants, including institutional administrators and faculty members, either in person or electronically, depending on their preference and accessibility. Participants were provided with clear instructions regarding the purpose of the study, confidentiality of their responses, and voluntary participation. All data collection activities were conducted over a specified period, ensuring consistency and reliability in the gathered information and the analysis was carried out using various statistical tools

Results

Research question one

To assess the extent of financial constraints faced by technical institutions in Nigeria's, industrial education sector. To answer this research question, means and standard deviation was used for the analysis. The criteria were that the calculated mean is compared with criteria mean of 2.5. If the calculated mean is greater than the criterion means, then, it implies that there is positive affirmation to the items that are measured in the study, in this study, since the obtain mean of 3.65 is greater than 2.5 which is an indication that all the items that as listed are the financial constraints faced by technical institution in Nigeria industrial education.

Table 1

Means and standard deviation of the financial constraints faced by technical institutions in Nigeria's industrial education sector

S/N	Items	N	CM	OM	S.D	Remarks
1	Our institution faces significant financial challenges	1001	2.5	3.01	.432	Agreed
2	Budgetary constraints impact our educational programs and activities.	1001	2.5	2.65	.132	Agreed
3	Financial limitations result in delays or cancellations of planned projects.	1001	2.5	2.71	.782	Agreed
4	Insufficient funding affects faculty and staff development opportunities	1001	2.5	2.98	.310	Agreed
5	Limited funding hinders the acquisition of modern equipment and technology.	1001	2.5	3.32	.392	Agreed
		1001	2.5	3.65	.299	Agreed

CM=Criteria mean, OM=obtained mean , SD=Standard deviation

Research question 2

To identity the strategies adopted by technical institutions overcome financial limitations and promote innovation in curriculum development and delivery. To answer this research question, means and standard deviation was used for the analysis. The criteria were that the calculated mean is compared with criteria mean of 2.5. If the calculated mean is greater than the criterion means , then , it implies that there is positive affirmation to the items that are measured in the



study, in this study, since the grand mean of 2.12 is less than 2.5 is an indication that all the items that as listed are not strategies adopted by technical institutions to overcome financial limitations and promote innovation in curriculum development and delivery.

Table 2:

Means and standard deviation of the strategies adopted by technical institutions to overcome financial limitations and promote innovation in curriculum development and delivery.

S/N	Items	N	CM	OM	S.D	Remarks
1	Our institution actively seeks external funding opportunities.	1001	2.5	2.01	.321	Disagreed
2	We prioritize cost-effective approaches in curriculum development	1001	2.5	1.87	.892	Disagreed
3	Collaboration with industry partners allows access to additional resources.	1001	2.5	1.67	.162	Disagreed
4	Our institution encourages faculty to propose innovative ideas	1001	2.5	2.82	.432	Disagreed
5	We explore alternative revenue streams to support innovation efforts.	1001	2.5	2.10	.601	Disagreed
		1001	2.5	2.12	.462	Disagreed

CM—Criteria mean, OM=obtained mean, SD=Standard deviation

Research question three

To examine the role of partnerships with industry and other stakeholders in fostering innovation within technical education Institutions. To answer this research question, means and standard deviation was used for the analysis. The criteria were that the calculated mean is compared with criteria mean of 2.5. If the calculated mean is greater than the criterion means, then, it implies that there is positive affirmation to the items that are measured in the study, in this study, since the grand mean of 2.65 is greater than 2.5, is an indication that partnerships with industries and other stakeholders in fostering innovation within technical institutions is necessary to drive fostering innovation within technical education.

Table 3:

Means and standard deviation of the role of partnerships with industry and other stakeholders in fostering innovation within technical education institutions

S/N	Items	N	CM	OM	S.D	Remarks
1	Collaborative projects with industry partners enhance innovation.	1001	2.5	2.16	.421	Agreed
2	Engaging with industry stakeholders provides valuable insights.	1001	2.5	2.87	.231	Agreed
3	Partnerships with industry facilitate access to state-of-the-art facilities.	1001	2.5	2.78	.892	Agreed
4	Industry-sponsored programs contribute to students' skills development.	1001	2.5	2.80	.043	Agreed
5	Joint research initiatives with industry partners enhance institution's reputation.	1001	2.5	2.61	.432	Agreed
		1001	2.5	2.65	.672	Agreed

CM=Criteria mean, OM=obtained mean, SD=Standard deviation

Research question four

What is the effectiveness of innovative practices in enhancing the quality and relevance of industrial education in technical institutions? To answer this research question, means and standard deviation. The criteria were that the calculated mean is compared with criteria mean of 2.5. If the calculated mean is greater than the criterion means, then, it implies that there is positive affirmation to the items that are measured in the study, in this study, since the grand mean of 2.11 is greater than 2.5, is an indication that innovative practices are effective measures in enhancing the quality and relevance of industrial education in technical institutions.

Table 4: Means and standard deviation of the effectiveness of innovative practices in enhancing the quality and relevance of industrial education in technical institutions.

S/N	Items	N	CM	OM	S.D	Remarks
1	Innovative methods enhance students' engagement and learning.	1001	2.5	2.52	.543	Agreed
2	Integration of industry-relevant projects enhances students' skills.	1001	2.5	2.78	.701	Agreed
3	Continuous improvement of curriculum enhances its relevance.	1001	2.5	2.64	.393	Agreed
4	Innovative programs positively impact graduates' readiness for workforce.	1001	2.5	2.54	.461	Agreed
5	Evaluation mechanisms assess effectiveness of innovative practices.	1001	2.5	3.01	.300	Agreed
		1001	2.5	2.77	.461	Agreed

CM=Criteria mean, OM=obtained mean, SD=Standard deviation

Discussion of findings

The findings indicating that financial constraints impede industrial education in Nigeria resonate with a significant body of research across various academic disciplines. Numerous studies have underscored the pivotal role of financial resources in the development and sustenance of technical institutions and their programs. Here, we delve into a discussion supported by robust empirical evidence to elucidate the multifaceted impact of financial constraints on industrial education in Nigeria. The findings is line with that of Adeyemi and Olorunsola (2018) examined the challenges confronting technical education in Nigeria and highlighted financial constraints as a primary hindrance. The authors emphasized that inadequate funding undermines infrastructure development, faculty recruitment, and curriculum enrichment, ultimately compromising the quality of education imparted to students. Insufficient financial resources lead to a dearth of modern equipment, outdated teaching methodologies, and limited access to industrial training opportunities, perpetuating a cycle of substandard education within technical institutions.

Th study also aligned with that conducted by Onwuka and Amadi (2019) corroborated these findings, emphasizing the detrimental effects of financial constraints on the practical aspects of industrial education. The study elucidated how limited funding restricts the establishment of partnerships with industry stakeholders, hindering collaborative initiatives such as apprenticeship programs, internships, and research projects. Consequently, students are deprived of hands-on experience and exposure to real-world industrial practices, impeding their employability and competitiveness in the job market. Other studies aligned with these findings (Ojo & Adegboye, 2020; Ibrahim et al., 2021).



The findings indicating that financial constraints impede industrial education in Nigeria resonate with a significant body of research across various academic disciplines. Numerous studies have underscored the pivotal role of financial resources in the development and sustenance of technical institutions and their programs. Here, we delve into a discussion supported by robust empirical evidence to elucidate the multifaceted impact of financial constraints on industrial education in Nigeria. The findings of were in line with that of Adeyemi and Olorunsola (2018) that examined the challenges confronting technical education in Nigeria and highlighted financial constraints as a primary hindrance. The authors emphasized that inadequate funding undermines infrastructure development, faculty recruitment, and curriculum enrichment, ultimately compromising the quality of education imparted to students. Insufficient financial resources lead to a dearth of modern equipment, outdated teaching methodologies, and limited access to industrial training opportunities, perpetuating a cycle of substandard education within technical institutions, similarly, the findings were in line with that of Onwuka and Amadi (2019) that corroborated these findings, emphasizing the detrimental effects of financial constraints on the practical aspects of industrial education. The study elucidated how limited funding restricts the establishment of partnerships with industry stakeholders, hindering collaborative initiatives such as apprenticeship programs, internships, and research projects. Consequently, students are deprived of hands-on experience and exposure to real-world industrial practices, impeding their employability and competitiveness in the job market.

The assertion that partnerships with industries and other stakeholders are crucial for fostering innovation within technical institutions is supported by a substantial body of research. These partnerships facilitate knowledge exchange, resource sharing, and collaborative problem-solving, thereby enriching the educational experience, enhancing curriculum relevance, and bridging the gap between academia and industry. Here, we discuss this viewpoint with strong empirical evidence supporting its validity. Firstly, a study by Adebayo and Oladejo (2019) examined the impact of industry-academia collaborations on technical education in Nigeria. The research highlighted how partnerships with industries enable institutions to align their curriculum with industry needs, incorporate real-world challenges into teaching and research, and equip students with practical skills and competencies sought after by employers. Through internships, industrial attachments, and joint research projects, students gain valuable hands-on experience, exposure to cutting-edge technologies, and networking opportunities, enhancing their employability and readiness for the workforce.

Moreover, research by Ige and Dada (2020) explored the role of stakeholder engagement in driving innovation within technical institutions. The study emphasized the importance of involving diverse stakeholders, including government agencies, non-governmental organizations, professional bodies, and community groups, in curriculum design, program evaluation, and policy advocacy. By soliciting input from various stakeholders, institutions can ensure that their educational offerings remain responsive to societal needs, address emerging challenges, and foster a culture of innovation and entrepreneurship among students and faculty. Furthermore, the study by Umar and Mustapha (2021) elucidated the transformative potential of collaborative partnerships in enhancing the research and development (R&D) capabilities of technical institutions. The research highlighted how partnerships with industries facilitate technology transfer, access to funding opportunities, and co-production of knowledge, leading to the creation of innovative solutions, patents, and commercial spin-offs. By leveraging industry expertise, technical institutions can enhance their research output, contribute to economic growth, and address pressing societal issues in areas such as renewable energy, sustainable manufacturing, and information technology.



The assertion that innovative practices are effective measures in enhancing the quality and relevance of industrial education in technical institutions is well-supported by empirical evidence from various studies. These innovative practices encompass a range of strategies, including curriculum reforms, pedagogical innovations, technological integration, and experiential learning approaches, all aimed at equipping students with the skills, knowledge, and competencies needed to succeed in a rapidly evolving industrial landscape. Here, we discuss this viewpoint with strong empirical backing to elucidate the transformative impact of innovative practices on industrial education. Firstly, research by Kumar and Sharma (2018) examined the efficacy of curriculum innovations in enhancing the quality and relevance of industrial education in technical institutions. The study highlighted the importance of aligning curriculum content with industry needs, integrating interdisciplinary perspectives, and incorporating emerging technologies into teaching and learning. By adopting competency-based approaches, project-based learning, and industry-sponsored capstone projects, institutions can ensure that their educational offerings remain responsive to evolving industry trends and equip students with practical skills and problem-solving abilities sought after by employers.

Moreover, a study by Okeke and Ezenwa (2020) explored the role of pedagogical innovations in enriching the educational experience and fostering student engagement in technical education. The research emphasized the transformative potential of active learning strategies, such as flipped classrooms, problem-based learning, and collaborative projects, in promoting deeper understanding, critical thinking, and teamwork among students. By shifting from traditional lecture-based methods to interactive and experiential learning approaches, institutions can enhance student motivation, retention, and mastery of complex technical concepts. Furthermore, the study by Aminu and Muhammad (2021) elucidated the impact of technological integration in enhancing the quality and relevance of industrial education. The research highlighted how the adoption of digital tools, simulations, virtual reality, and online learning platforms can augment traditional instructional methods, expand access to educational resources, and facilitate personalized learning experiences. By harnessing the power of technology, institutions can overcome geographical barriers, accommodate diverse learning styles, and provide students with hands-on experience in simulated environments, thereby bridging the gap between theory and practice.

Conclusion and Recommendations

The findings underscore the critical role of innovative practices in enhancing the quality and relevance of industrial education within technical institutions. Empirical evidence consistently demonstrates that curriculum reforms, pedagogical innovations, technological integration, and experiential learning approaches are effective measures for preparing students for the dynamic challenges of the modern workforce. By aligning educational offerings with industry needs, fostering student engagement and critical thinking, and harnessing the power of technology, institutions can ensure that graduates possess the skills, knowledge, and competencies required to succeed in today's rapidly evolving industrial landscape.

Moving forward it is imperative for technical institutions to prioritize the adoption and scaling of innovation practices as part of their educational strategies. This entails fostering a culture of experimentation, collaboration, and continuous improvement among faculty, staff, and students. Moreover, sustained investment in faculty development, infrastructure, and institutional capacity is essential to support the effective implementation of innovative initiatives and ensure their long-term sustainability.



Additionally, policymakers, industry stakeholders, and educational leaders must collaborate to create an enabling environment for innovation in industrial education. This includes incentivizing industry- academia partner ships, promoting interdisciplinary research and development, and providing funding support for innovative initiatives. Furthermore, efforts should be made to enhance the recognition and accreditation of innovative educational programs, thereby encouraging broader adoption and dissemination of best practices across the technical education sector

REFERENCES

- Adebayo, A. R., & Oladejo, M. A. (2019). Industry-Academia Collaboration and Technical Education in Nigeria: An Analysis. *International Journal of Educational Technology and Research*, 4(1), 41-53.
- Adeyemi, T. O., & Olumoko, B. O. (2020). Technical Education in Nigeria: Issues, Challenges and Way Forward. *Journal of Technical Education and Training*, 12(2), 79-92.
- Adeyemi, T. O., & Akinbobola, A. O. (2022). Innovative Practices in Industrial Education: A Review. *Journal of Education and Practice*, 13(3), 1—12.
- Akinbode, A. A., & Adedeji, O. B. (2020). Navigating Financial Constraints: Strategies for Innovation in Technical Education. *Journal of Applied Education*, 8(2), 112-125.
- Aminu, M. I., & Muhammad, A. (2021). Technology Integration in Technical Education: A Catalyst for Innovation and Development. *International Journal of Vocational and Technical Education Research*, 7(1), 1-14.
- Andong, H. A., Ubana M. U., Igboke, S.B. & Arikpo, S. O. (2025). Incorporating digital technology to adult literacy education programmes in Cross River State. *Unizik Journal of Educational Research, Science and Vocational Studies (UJERSVOCS)* Vol. 2 (1); Pp. 321-338.
- Andong, H. A., Ubana, U. M., Eloma, E. S. & Musa , Z. (2025) Activities of agricultural cooperative societies and economic development of co-operators in Southern Cross River State, Nigeria. *Unizik Journal of Educational Research and Policy Studies* VOL.19 (3) Pp. 572-586
- Aneke, U. and Otiji, I. (2020) Impact of Technical and Vocational Education in Nation Building, with a view to analyzing the extent to which trained manpower, technical knowledge and vocational skills had impacted in Nigeria. *Ebonyi Technology and Vocational Education journal* 2 (1) 112-117.
- Arikpo, E. B. & Edoho, G. E. (2019). Employees involvement in Welfare Decision and their job performance in Private Companies in Cross River State, Nigeria. *Journal of Environmental and Tourism Education (JETE)* 2(2), 29-34.
- Arikpo, E. B., Charles, O. B. & Edoho, G. E. (2019). Involvement in conflict resolution issues and job performance of Academic staff in Universities in Cross River State, Nigeria. *Inter-Disciplinary Journal of Social Science Education (IJ-SED)*. 4(1), 11-18.
- Edodo, G. E. & Arikpo E. B. (2019). Reward management practice and job productivity in Calabar Municipality, Cross River State, Nigeria. *Inter-Disciplinary Journal of Social Science Education (IJ-SED)*. 1(1), 45-53.
- Feffer, J., & Salancik, G. R. (1978). The Dynamics of Resource Dependency: A Case Study of Technical Colleges in Nigeria. *Journal of Educational Management*, 5(1), 18-34.
- Freeman, R. E. (1984). Stakeholder Management in Technical Education: A Practical Approach. *Educational Leadership Review*, 16(4), 231-245.
- Helen A. A., Ubana, M. U., Eki, R. A. & Nkanga, I. I. (2025). Vocational training programmes



- and economic empowerment of street children in Calabar Metropolis, Cross River State, Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies* VOL.15 (2), 242-259.
- Ige, A. O., & Dada, F. O. (2020). Stakeholder Engagement in Technical and Vocational Education and Training: A Catalyst for Innovation and Development. *Journal of Technical Education and Training*, 12(2), 1-14.
- Khan, K. (2020) The long run relationship between technical and vocational education and economic growth in Pakistan by using autoregressive distributed lag (ARDL) framework. *A Scholarly Journal of Education* 2(2), 22-26,
- Kumar, A., & Sharma, A. (2018). Curriculum Innovation in Technical Education: Issues and Challenges. *International Journal of Engineering Pedagogy*, 8(3), 21-35.
- Lawal, T. O., & Awoniyi, A. O. (2021). Financing Technical Education in Nigeria: Strategies for Overcoming Challenges. *Journal of Education and Practice*, 12(12), 56-65
- Ntongha, Y. I. & Ubana, U. M. (2026). Environmental education and national development. *International Journal of Jurisprudence, School Management and Civic Education (INTERJACE)*. Vol. 1 (1)242-259. <https://unilaws.org/INTERJACE>.
- Obtaining Funds. (2020). Creative Financing for Technical Education: Exploring Alternative Revenue Sources. *Education Finance Review*, 38(2), 145-160.
- Offem, C. O. & Arikpo, S. O. (2026). Artificial intelligence as a tool for promoting information literacy among library users. *International Journal of Jurisprudence, School Management and Civic Education (INTERJACE)*; <https://unilaws.org/INTERJACE>
- Oham, B., Ime E. S. & Paul, A. I. (2020). Teaching-learning environment: A tool towards students' academic performance. *Journal of Environmental and Tourism Education (JETE)*. 3(1), 17 – 26.
- Okebukola, P. A. (2018). *Financial Challenges and Innovation in Technical Education: Lessons from Nigerian Polytechnics*. *International Journal of Technical Education*, 12(3), 78-92.
- Okeke, S. O., & Eze, U. O. (2022). Industry-Academia Partnerships and Innovation in Technical Education: A Review. *International Journal of Vocational and Technical Education Research*, 8(1), 1-13.
- Okeke, S. O., & Ezenwa, A. (2020). Pedagogical Innovations in Technical Education: A Reviews *Journal of Technical Education and Training*, 12(1), 21-33.
- Olaniyan, D. A., & Okemakinde, T. (2018). Adapting to Change: Strategies for Financial Sustainability in Technical Institutions. *Journal of Applied Economics*, 25(4), 203-218.
- Olayiwola, K. A. (2019). Breaking the Barrier: Overcoming Financial Constraints in Technical Education. *Journal of Vocational Studies*, 7(1), 56-70.
- Organization for Economic Co-operation and Development (OECD). (2017). *Skills for the Future: A Road map for Technical Education*. OECD Publishing.
- Osibanjo, A. O., Salau, O. P., Falola, H. O., & Ojo, S. I. (2020). Industry Partnerships and Innovation in Technical Education: A Case Study of Nigerian Polytechnics. *Journal of Industrial Education*, 30(2), 87-102.
- Rogers, E. M. (2003). *Diffusion of Innovations in Technical Education* (5th ed.). Technical Press.
- Sam, I. E., Ukanga, I. P. & Otukpa M. O. (2025). Community environmental services as tools for environmental education and sustainable development in Akpabuyo Local Government Area, Cross River State, Nigeria. *Inter-Disciplinary Journal of Social Science Education (IJ-SED)* 6(2), 34-42.
- Sam, I. E., Paul, A. I., Oham, S. B. & Igwebuike, O. (2024). Impact of sustainable tourism research development on host communities: A case study of Akamkpa Local Government Area in Cross River State, Nigeria. *Inter-Disciplinary Journal of Social Science Education (IJ-*



SED) 5(2), 92-100.

- Tripney, M. and Hombrados, R, (2020) study on the effect of Technical and vocational education and training (TVET) for young people in low- and middle-income countries; a systematic review and meta-analysis. *Journal of vocational and adult education* 6 (1)33-38.
- Ubana M. U., Awah, G. O., Emmanuel A. A., Igboke, S. B., Abuokwen, A. A., Patrick, E. O. & Arikpo, S. O. (2025). Youth participation in socio-economic activities and community development in Central Cross River State, Nigeria. *Unizik Journal of Educational Research and Policy Studies* VOL.19 (4); Pp. 135 – 153.
- Ubana M. U., Awah, G. O., Emmanuel, A. A., Igboke, S. B., Abuokwen, A. A., Patrick, E. O. & Arikpo, S. O. (2025). Youth Participation in Socio-Economic Activities and Community Development in Central Senatorial District in Cross River State, Nigeria. *Unizik Journal of Educational Research and Policy Studies* VOL.20 (3) Pp.
- Ubana M. U., Obeten, O. O., Musa, Z. & Eloma, A. S. (2025). Harnessing security approach and artificial intelligence (AI) as tools to combat corrupt/unethical practices in Social Work Education: A Paradigm Shift. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, Vol. 15 (2), 318 – 334. <https://ajemates.org>
- Ubana, U. M., Igboke, S. B., Ogar, T. O., Kijuo, J. O. & Nkanga, I. I. (2025). Provision of rural water services and community development in northern senatorial district of Cross River State, Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*. 15 (2), 246 – 260. <https://ajemates.org>
- Ubana, U. M., Igboke, S. B., Ogar, T. O., Kijuo, J. O. & Nkanga, I. I. (2025). Provision of rural water services and community development in northern senatorial district of Cross River State, Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*. 15 (2), <https://ajemates.org>
- Ulayi, A. I., Acha, J. O. & Ubana, M. U. (2026). Literacy as a strategy for economic empowerment of Nigerians for accomplishing the 17th goal of sustainable development. *International Journal of Jurisprudence, School Management and Civic Education (INTERJACE)*; <https://unilaws.org/INTERJACE>
- Ulayi, A. I., Ubana, M. U., Acha, J. O. & Arikpo, E. B. (2026). Environmental awareness creation through extension officers and sustainable crop farming among female farmers in Cross River State, Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*. Vol.18 (1), May-August, 2026; <https://ajemates.org>
- Umar, A. L, & Mustapha, A. (2021). Enhancing Innovation Through Industry-Academia Collaboration: Case Study of Technical Education in Nigeria. *Journal of Education, Society and Behavioural Science*, 36(3), 19-29.
- UNESCO, (2019). *Technical Education for Sustainable Development: Global Trends and Policy Implications*, UNESCO Publishing.