VOL. 11 NO. 2,
FEBRUARY, 2026
E-ISSN 3027-1533
P-ISSN 3026-8648

African Scholar Publications & Research International
www.africanscholarpub.com

Journal of African Innovation & Advanced Studies (JAIAS)

Bridging the Skills Gap in Nigeria's Technical Education Sector: The Role of Industry Partnerships in Polytechnic Curriculum Development

Amobi P. Chiamogu; & Uchechukwu P. Chiamogu
Department of Public Administration, School of Business Studies, Federal Polytechnic, Oko.
Corresponding Author: amobi.chiamogu@federalpolyoko.edu.ng
DOI: https://doi.org/10.70382/ajaias.v11i2.094

Abstract

Technical and Vocational Education and Training (TVET) plays a pivotal role in equipping graduates with industry-relevant competencies critical for workforce productivity, technological advancement, and sustainable development. In Nigeria, polytechnics serve as key TVET institutions; however, persistent skills gaps undermine their effectiveness, with graduates often lacking practical, digital, and Industry 4.0 competencies. This study examines the role of industry partnerships in polytechnic curriculum development as a strategy for bridging these gaps. Anchored in Human Capital Theory and the Triple Helix Model of Innovation, the research employs a qualitative documentary approach, analyzing policy documents, institutional reports, and scholarly literature from 2010–2025. Findings reveal systemic misalignment between curricula and labour market requirements, weak institutional collaboration with industry, and limited integration of emerging technologies into training programmes. While initiatives such as the Student Industrial Work Experience Scheme (SIWES) exist, their impact is constrained by inadequate supervision, poor coordination, and minimal industry engagement. The study proposes actionable strategies for embedding structured industry participation, including institutionalized Industry Advisory Boards, co-designed competency-based curricula, dual training models, national skills forecasting frameworks, performance-based funding, lecturer industry immersion, and digital innovation labs. Operationalizing these strategies fosters demand-driven, competency-based technical education, enhances graduate employability, strengthens industrial productivity, and supports sustainable national development. The findings underscore that bridging Nigeria's polytechnic skills gap requires a coordinated institutional

framework that integrates industry collaboration into curriculum governance, training delivery, and assessment processes, positioning technical education to meet the evolving demands of the 21st-century economy.

Keywords: Technical and Vocational Education and Training (TVET), Industry 4.0 Competencies, Graduate Employability, Work-Based Learning, Curriculum Co-Creation, Institutional Governance.

Introduction

Technical and Vocational Education and Training (TVET) is widely acknowledged as a critical instrument for enhancing workforce productivity, industrial development, and technological advancement. By emphasizing applied knowledge and occupation-specific competencies, TVET systems facilitate the alignment of education with labour market demands and contribute to sustainable economic growth (Oketch, 2007; UNESCO, 2016).

In Nigeria, the polytechnic system constitutes a key component of the national TVET framework, with mandates to provide practical, career-oriented education and produce skilled manpower for national development. However, growing evidence indicates that this mandate is increasingly undermined by a persistent mismatch between the competencies acquired by graduates and the evolving needs of industry. Employers continue to report deficiencies in practical skills, technological proficiency, and problem-solving capacity among graduates of technical institutions (Aina, 2013; Oviawe, Uwameiye & Uddin, 2017).

Recent studies reinforce the depth of this challenge. For instance, Jebba et al. (2024) found that significant gaps exist in digital competencies within Nigeria's TVET system, particularly in the integration of modern technologies into teaching and learning processes, which ultimately affects graduates' workplace readiness. Similarly, Wombo (2023) emphasized that the rapid transformation associated with the Fourth Industrial Revolution (Industry 4.0) has significantly altered skill requirements, yet TVET curricula in Nigeria remain largely outdated and insufficiently responsive (Chiamogu & Chiamogu, 2025). Structural constraints, including inadequate infrastructure, limited funding, and weak institutional capacity, further exacerbate the disconnect between training and labour market expectations (Jebba et al., 2024).

A critical underlying factor is the weak linkage between educational institutions and industry. Evidence suggests that limited collaboration in curriculum development, training delivery, and skills assessment constrains the relevance of TVET programmes in Nigeria (Ayonmike et al., 2015; Alhasan & Tyabo, 2013). Globally, industry–academia partnerships are recognized as essential for ensuring that training systems remain demand-driven and responsive to emerging technological trends (OECD, 2018). However, in Nigeria, such partnerships remain largely fragmented and weakly institutionalized.

Although initiatives such as the Student

Industrial Work Experience Scheme (SIWES) were introduced to bridge this gap, their impact has been limited by weak coordination, inadequate supervision, and insufficient private sector participation (Oviawe, Uwameiye & Uddin, 2017). Consequently, the absence of structured institutional frameworks for integrating industry into curriculum governance continues to sustain the skills mismatch problem.

While existing studies have predominantly focused on graduate employability outcomes and skill deficiencies, they pay comparatively limited attention to the institutional and governance processes that shape curriculum responsiveness within TVET systems. This study moves beyond outcome-based assessments by interrogating the governance architecture of polytechnic–industry collaboration, with particular emphasis on curriculum co-design, regulatory frameworks, and mechanisms for institutionalized stakeholder engagement. By shifting the analytical focus from "what graduates lack" to "how institutional processes produce these outcomes," the study contributes a process-oriented perspective to the discourse on TVET reform in Nigeria.

Problem Statement and Research Questions

Despite extensive recognition of skills mismatch in Nigeria's TVET system, limited scholarly attention has been devoted to the institutional mechanisms required to systematically embed industry participation in curriculum development within polytechnics. Existing studies predominantly focus on outcomes rather than the governance structures that sustain these gaps, thereby constraining the development of effective policy responses.

Accordingly, this study addresses the following research questions:

1. To what extent are industry actors involved in curriculum development within Nigeria's polytechnic system?
2. What institutional and governance constraints limit effective industry–academia collaboration?
3. How can industry participation be systematically embedded in curriculum design to enhance labour market alignment?

Against this backdrop, this study examines the role of industry partnerships in polytechnic curriculum development as a strategy for bridging the skills gap in Nigeria. By advancing an institutional perspective on curriculum governance, the study contributes to ongoing policy debates on improving the quality, relevance, and responsiveness of TVET to contemporary labour market demands.

Objectives of the Study

The broad objective of the study is to examine the role of industry partnerships in polytechnic curriculum development as a strategy for bridging the skills gap in Nigeria's technical education sector. Specific objectives include:

1. To assess the skills gap in Nigeria's polytechnic system and evaluate the alignment of curricula with labour market and technological demands.

2. To examine the effectiveness of industry partnerships in enhancing curriculum relevance, work-based learning, and the integration of Industry 4.0 competencies.
3. To propose actionable institutional and policy strategies for embedding structured industry participation in curriculum governance to improve graduate employability.

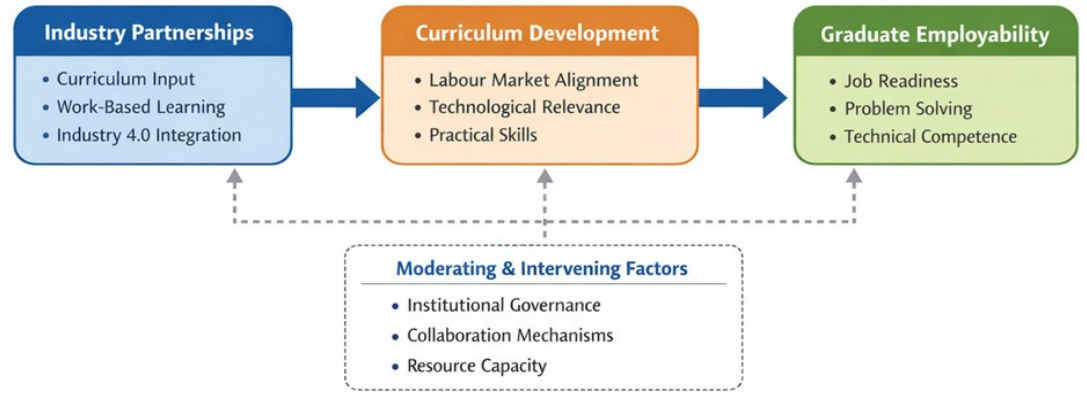


Figure 1: Conceptual Framework on Industry Partnership and Polytechnic Community Development

The framework illustrates how industry partnerships can influence polytechnic curriculum development to address the skills gap and improve graduate employability, moderated by institutional and governance factors.

Literature Review

Conceptual Clarifications

Skills Gap in Technical Education

The skills gap refers to the mismatch between graduates' competencies and labour market requirements. In Technical and Vocational Education and Training (TVET), this gap often emerges when curricula fail to align with technological advancements and industry needs. TVET is intended to provide practical and occupational skills for productivity and development (Oketch, 2007). However, excessive emphasis on theory with limited industry exposure reduces graduates' workplace readiness. This challenge is particularly evident in developing countries where training systems struggle to keep pace with rapid industrial change. Effective TVET requires strong industry linkages to ensure responsiveness to labour market demands (UNESCO, 2016). In Nigeria, employers frequently report deficiencies in graduates' practical skills, contributing to unemployment despite demand for technical expertise (Oviawe, Uwameiye & Uddin, 2017). Recent studies further link the skills gap to the demands of the Fourth Industrial Revolution, noting limited integration of digital, automation, and entrepreneurial competencies in training programmes (Chiamogu & Chiamogu, 2025). This gap constrains graduates' competitiveness and highlights the need for curriculum reform.

Polytechnic Curriculum Development

Curriculum development is the systematic design, implementation, and evaluation of educational programmes to achieve defined learning outcomes. In technical education, curricula should reflect industry needs, technological changes, and labour market dynamics. Effective curricula integrate theory with practical training to ensure skill acquisition (Ayonmike, Okwelle & Okeke, 2015). In Nigeria, curriculum standards for polytechnics are regulated by the National Board for Technical Education (NBTE). However, limited involvement of industry stakeholders in curriculum design reduces programme relevance and responsiveness (Alhasan & Tyabo, 2013). Modern approaches emphasize competency-based education, which prioritizes practical skills and workplace readiness, requiring continuous collaboration between institutions and industry.

Industry Partnerships in Technical Education

Industry partnerships are collaborative relationships between educational institutions and private sector organizations aimed at improving training relevance and quality. These partnerships include curriculum co-development, internships, apprenticeships, research collaboration, and provision of equipment. Globally, industry collaboration is critical to effective technical education, as it enhances labour market responsiveness and practical skill acquisition (OECD, 2018). In Nigeria, programmes such as the Student Industrial Work Experience Scheme (SIWES) were introduced to bridge the gap between theory and practice. However, their effectiveness has been constrained by weak coordination, inadequate supervision, and limited industry commitment (Uzoagulu, 2011; Oviawe, Uwameiye & Uddin, 2017). International models demonstrate the value of institutionalized industry participation. Germany's dual system combines classroom learning with structured apprenticeships; Singapore integrates industry in curriculum design and assessment through its Institute of Technical Education; while China aligns vocational institutions with industrial clusters. These models show that sustained industry involvement improves alignment between education outcomes and labour market needs.

Thematic Review

Industry–Academia Collaboration and Skills Development

One of the most widely discussed themes in the literature on technical education is the importance of collaboration between educational institutions and industry. Scholars argue that effective technical education systems depend on strong partnerships that enable the integration of workplace practices into academic training. Oketch (2007) observes that countries with successful technical education systems typically maintain close relationships between training institutions and industry actors. Such partnerships facilitate knowledge transfer, improve curriculum relevance, and enhance opportunities for work-based learning. Similarly, Ayonmike, Okwelle and Okeke (2015) emphasize that industry involvement in curriculum development helps ensure that training programmes reflect emerging technological trends.

When industry practitioners participate in curriculum design and programme evaluation, they provide valuable insights into the competencies required within specific occupational fields. However, the literature indicates that such collaboration remains relatively weak in many developing countries. In Nigeria, several scholars have highlighted the limited participation of industry stakeholders in curriculum development within polytechnic institutions. This situation often results in outdated training programmes that fail to reflect current industrial practices (Alhasan & Tyabo, 2013).

Technological Change and Industry 4.0 Skills

Another major theme in the literature relates to the impact of technological transformation on technical education. The emergence of Industry 4.0 technologies: such as artificial intelligence, robotics, digital manufacturing, and cyber-physical systems; has significantly altered the nature of industrial work and the competencies required from technical professionals. According to UNESCO (2016), technical education systems must continuously adapt their curricula to incorporate emerging technological competencies in order to remain relevant. Failure to do so may result in a widening gap between educational outcomes and labour market expectations. Chiamogu and Chiamogu (2025) further argue that Nigeria's TVET system has yet to fully integrate Industry 4.0 competencies into its training programmes. Their analysis reveals that many curricula continue to emphasize traditional technical skills while neglecting digital technologies, entrepreneurship, and innovation capabilities that are increasingly required in modern industrial environments.

Institutional Governance and Technical Education Reforms

The governance structure of technical education institutions also plays a significant role in shaping the effectiveness of curriculum development processes. Strong institutional governance frameworks can facilitate collaboration between polytechnics and industry while promoting innovation in training programmes. In Nigeria, the governance of polytechnic education is guided by the Federal Polytechnics Act and regulatory oversight from agencies such as the National Board for Technical Education. These institutions are responsible for establishing policies that ensure the quality and relevance of technical education programmes. However, scholars have argued that bureaucratic procedures and limited stakeholder participation often hinder effective curriculum reforms within technical institutions. Consequently, polytechnics may struggle to adapt their training programmes to rapidly changing technological and industrial environments (Oviawe, Uwameiye & Uddin, 2017).

Skills Gap and Implications for Curriculum–Labour Market Alignment in Nigeria

The persistence of skills gaps in Nigeria's technical education sector, particularly within polytechnic institutions, represents a critical constraint on national productivity, youth employment, and industrial competitiveness. This gap is fundamentally characterized by a

mismatch between the competencies acquired through formal education and the evolving demands of the labour market, especially in a technology-driven global economy.

Empirical evidence indicates that the magnitude of the skills gap in Nigeria is both systemic and widespread. Approximately 60–70% of employers' report that graduates lack the requisite technical, practical, and soft skills needed for employment**,** while about 65% of firms struggle to find suitably qualified workers despite a large pool of job seekers (Okechukwu, 2025, Salami, 2026). This paradox: coexistence of unemployment and labour shortages; indicates a structural misalignment between education outputs and industry requirements. Furthermore, Okechukwu (2025) observed that employers often incur significant post-recruitment training costs, spending between ₦500,000 and ₦1 million per graduate over a 6–12-month period to bridge competency deficiencies.

The challenge is further reflected in graduate labour market outcomes. Estimates suggest that 40–50% of Nigerian graduates are unemployed or underemployed, with many requiring 12–24 months to secure relevant employment. Although recent macro-level data indicate a national unemployment rate of about 4.3% and youth unemployment at 6.5%, the dominance of informal employment (approximately 93%) reveals that many graduates are engaged in low-quality or mismatched jobs (ILO, 2023; Oweh, 2025). This underscores the qualitative dimension of the skills gap, where employment does not necessarily equate to appropriate or productive utilization of acquired skills.

A critical dimension of the mismatch lies in curriculum relevance and structure. Studies show that 70–80% of academic curricula in Nigeria are not aligned with industry needs, with a predominant focus on theoretical instruction rather than practical application (Okechukwu, 2025). In technical disciplines such as computer science and engineering, only 20–30% of programmes incorporate practical training or structured industry exposure, limiting graduates' readiness for real-world problem-solving (Great Nigeria Network, 2025). This gap is particularly problematic in polytechnic education, which is designed to emphasize hands-on and competency-based training but often falls short due to weak industry linkages and inadequate infrastructure.

The deficit in digital and emerging technological skills further accentuates the misalignment. Evidence suggests that over 85% of Nigerian graduates lack basic digital skills, a major impediment in an increasingly digitized labour market (NAN, 2023). This is especially concerning given the growing demand for competencies in areas such as automation, data analytics, artificial intelligence, and digital manufacturing—core elements of Industry 4.0. The absence of these skills limits graduates' employability and constrains Nigeria's capacity to compete in global value chains.

From an industry perspective, the skills gap manifests in unfilled vacancies and reliance on foreign expertise. Firms in Nigeria have reported difficulties in sourcing specialized technical skills locally, sometimes resorting to importing talent from abroad to meet operational needs (Alli, 2025). Labour market data further indicate that while job vacancies exist, a significant proportion of job seekers: about 26% in some assessments; lack both the requisite education

and practical experience, thereby reducing the effective employable workforce (Alli, 2025).
Despite these challenges, evidence from Technical and Vocational Education and Training (TVET) initiatives suggests that skills-oriented education models yield better employment outcomes. Approximately 60% of TVET graduates are employed or self-employed, indicating that curricula aligned with practical and market-relevant skills significantly improve employability (Aladekoye, 2025). This contrast reinforces the argument that the core issue is not merely access to education, but the quality, relevance, and industry alignment of training programmes.

The economic implications of the skills gap are substantial. Estimates suggest that Nigeria loses between $10–15 billion annually in productivity and growth opportunities due to skills mismatches, with potential GDP growth gains of 1–2 percentage points annually if the gap is effectively addressed (Okechukwu, 2025). This highlights the macroeconomic urgency of reforming polytechnic curricula to align with labour market and technological demands.

1. In sum, the skills gap in Nigeria's polytechnic system is driven by three interrelated factors:
   curriculum misalignment with industry and technological trends;
2. weak industry–academia linkages; and
3. limited integration of practical and digital competencies.

Addressing this gap requires a transition from a theory-driven, supply-oriented education model to a demand-responsive, competency-based system anchored in sustained industry collaboration. Such alignment is essential not only for improving graduate employability but also for enhancing national productivity, innovation capacity, and sustainable economic development.

Table 1: Summary of Empirical Evidence on the Skills Gap in Nigeria's Polytechnic System

Dimension	Indicator	Key Statistics	Implication for Curriculum Alignment
Employer Skill Deficit	Employers reporting inadequate graduate skills	60–70%	Indicates mismatch between training and workplace expectations
	Firms unable to find qualified workers	~65%	Reflects structural disconnect between education output and labour demand
Training Cost Burden	Post-recruitment training cost per graduate	₦500,000–₦1,000,000 (6–12 months)	Suggests graduates lack job-ready competencies
Graduate Employment Outcomes	Unemployment/underemployment rate	40–50%	Signals weak employability of graduates

Dimension	Indicator	Key Statistics	Implication for Curriculum Alignment
	Time to secure relevant employment	12–24 months	Indicates delayed labour market absorption
	Youth unemployment rate	6.5%	Demonstrates labour market challenges among young graduates
	Informal employment rate	~93%	Suggests prevalence of low-quality or mismatched jobs
Curriculum Relevance	Curricula not aligned with industry needs	70–80%	Reflects outdated and theory-driven programmes
	Programmes with practical/industry exposure	20–30%	Indicates insufficient hands-on training
Digital Skills Gap	Graduates lacking digital skills	>85%	Limits participation in digital economy and Industry 4.0
Labour Market Mismatch	Job seekers lacking required skills/experience	~26%	Reduces effective employable workforce
	Firms relying on foreign expertise	Qualitative evidence	Indicates shortage of specialized local skills
TVET Outcomes	Employment/self-employment rate among TVET graduates	~60%	Demonstrates effectiveness of skills-oriented training
Macroeconomic Impact	Annual productivity loss due to skills gap	$10–15 billion	Highlights economic cost of misalignment
	Potential GDP growth gain	1–2% annually	Indicates benefits of curriculum reform

Source: Authors' compilation from Alli (2025), Oweh (2025), Okechukwu (2025), NAN (2023) and Aladekoye (2025)

Empirical Review

Empirical studies on technical education in Nigeria have consistently highlighted the challenges associated with skills mismatch and weak institutional linkages with industry. Ayonmike et al. (2015) conducted a study on the quality of technical education programmes in Nigeria and found that many institutions lacked adequate training facilities and industry collaboration necessary for effective skills development. Their findings indicate that strengthening partnerships with industrial organizations could significantly improve the relevance of technical education programmes. Similarly, Oviawe, Uwameiye and Uddin (2017) examined the relationship between TVET institutions and labour market outcomes in Nigeria and concluded that weak industry linkages contribute significantly to the employability challenges faced by graduates of technical institutions. Alhasan and Tyabo (2013) also investigated strategies for revitalizing technical education in Nigeria and identified curriculum modernization and stronger institutional–industry collaboration as key policy priorities for addressing the skills gap.

More recently, Chiamogu and Chiamogu (2025) analyzed the implications of Industry 4.0 for Nigeria's TVET system and emphasized the need for integrating digital competencies and entrepreneurial skills into technical education programmes. Their study highlights the importance of strengthening industry participation in curriculum development in order to ensure that training programmes remain responsive to technological and economic changes.

Identified Gaps in the Literature

Although existing studies provide valuable insights into the challenges facing Nigeria's technical education sector, several gaps remain in the literature.

First, many studies have focused primarily on the general challenges of technical education without specifically examining the institutional mechanisms through which industry partnerships influence curriculum development within polytechnic institutions. Second, while recent research has emphasized the importance of Industry 4.0 competencies, limited empirical attention has been given to how collaborative partnerships between polytechnics and industry can facilitate the integration of such competencies into training programmes. Third, there is a need for more policy-oriented analyses that explore how governance frameworks and institutional reforms can strengthen industry participation in technical education. Addressing these gaps is essential for developing practical strategies for improving the relevance and effectiveness of polytechnic education in Nigeria.

The literature reviewed in this study highlights the central role of technical education in national development and the importance of aligning training programmes with labour market needs. Scholars widely agree that the persistence of skills mismatch within Nigeria's technical education sector is largely attributable to outdated curricula, inadequate training facilities, and weak collaboration between educational institutions and industry stakeholders. The reviewed studies also emphasize the growing importance of integrating Industry 4.0 competencies into technical education programmes in order to prepare graduates for the demands of modern industrial environments. However, achieving this objective requires stronger institutional frameworks that facilitate sustained collaboration between polytechnics and industry actors.

Consequently, this study seeks to contribute to the existing body of knowledge by examining the role of industry partnerships in polytechnic curriculum development as a strategy for bridging the skills gap in Nigeria's technical education sector.

Theoretical Framework

The theoretical framework provides the conceptual foundation for explaining the relationship between industry partnerships and curriculum development in addressing the skills gap within Nigeria's technical education sector. This study is anchored primarily on the Human Capital Theory and complemented by the Triple Helix Model of Innovation. These theoretical perspectives offer analytical insights into how education systems, industry actors, and institutional frameworks interact to produce skilled manpower capable of driving economic development.

a) **Human Capital Theory:** popularized by the works of Theodore W. Schultz and Gary S. Becker, emphasized the importance of investment in education, training, and skill development as a means of enhancing the productivity and economic value of individuals. The theory posits that education and training constitute forms of investment that increase the productive capacity of individuals and contribute to economic growth and development (Becker, 1993). Within the context of technical education, human capital theory suggests that investments in skill-oriented education systems such as polytechnics can significantly improve labour productivity and technological advancement. Technical institutions are expected to equip learners with the competencies necessary for productive engagement in industrial and economic activities. When educational institutions provide relevant and high-quality training, graduates are more likely to possess the skills required to meet labour market demands. However, the theory also implies that the effectiveness of human capital development depends largely on the relevance and quality of training provided by educational institutions. When curricula fail to reflect contemporary technological practices or labour market needs, the skills acquired by graduates may not translate into productive employment. This situation often results in the phenomenon of skills mismatch, where the competencies possessed by graduates do not correspond with the requirements of employers. In Nigeria's polytechnic system, the persistent skills gap suggests that existing training programmes may not adequately reflect industry requirements. From the perspective of human capital theory, strengthening collaboration between educational institutions and industry stakeholders can improve the relevance of training programmes and enhance the employability of graduates. By incorporating industry input into curriculum development, polytechnics can ensure that training programmes align more closely with labour market needs.

b) **Triple Helix Model of Innovation:** The study also draws on the Triple Helix Model of Innovation developed by Henry Etzkowitz and Loet Leydesdorff. The model emphasizes the dynamic interaction between universities (or educational institutions), industry, and government in promoting knowledge production, technological innovation, and economic development (Etzkowitz & Leydesdorff, 2000). According to the Triple Helix framework, sustainable technological and economic development emerges from collaborative relationships among these three institutional actors. Educational institutions are responsible for knowledge creation and human capital development, industry actors contribute technological expertise and practical knowledge, while government provides policy frameworks and regulatory support that facilitate innovation and collaboration. Within technical education systems, the Triple Helix model portrays the importance of strong institutional linkages between training institutions and industrial organizations. Such partnerships enable the integration of real-world industrial practices into academic curricula, thereby ensuring that training programmes remain relevant to technological and economic developments. In the Nigerian context, polytechnics operate within a broader governance structure shaped by regulatory agencies such as the National Board for

Technical Education and policy frameworks established under the Federal Polytechnics Act. However, the effectiveness of this institutional arrangement in promoting collaboration between polytechnics and industry has often been questioned. Limited industry participation in curriculum development and training processes has contributed to the persistence of the skills gap within the technical education sector. Applying the Triple Helix framework to this study suggests the need for stronger collaborative mechanisms that facilitate interaction between polytechnics, industry actors, and government agencies. Such collaboration can promote curriculum innovation, improve training quality, and enhance the employability of graduates.

The integration of Human Capital Theory and the Triple Helix Model provides a more robust analytical lens for examining the role of industry partnerships in polytechnic curriculum development. While Human Capital Theory explains the *"why"* of skills development: emphasizing investment in education and training as a driver of productivity and economic growth; the Triple Helix Model explains the *"how"* through structured institutional collaboration among educational institutions, industry and government. In this sense, human capital theory establishes the foundational rationale for developing relevant technical skills, whereas the Triple Helix framework operationalizes this objective by identifying the institutional mechanisms necessary for aligning education with labour market demands.

By synthesizing these perspectives, the study moves beyond a unidimensional explanation of skills mismatch to a more integrated understanding that links skill formation to governance structures and collaborative processes. Specifically, the combined framework illustrates that the effectiveness of human capital development in Nigeria's polytechnic system is contingent not only on educational investment but also on the degree of institutionalized interaction between polytechnics, industry actors, and regulatory agencies. Consequently, weak or informal collaboration undermines both the quality and relevance of skills produced.

This theoretical integration therefore reinforces the central argument of the study: that bridging the skills gap in Nigeria's technical education sector requires not just curriculum reform, but the establishment of structured, policy-driven institutional frameworks that embed industry participation within curriculum governance, training delivery, and programme evaluation processes.

Methodology

This study adopts a qualitative research design based on documentary and analytical methods to examine the role of industry partnerships in polytechnic curriculum development as a strategy for bridging the skills gap in Nigeria's technical education sector. A qualitative approach is appropriate for analyzing policy frameworks, institutional arrangements, and governance structures that shape educational systems. According to Creswell (2014), qualitative research enables in-depth exploration of institutional processes, policy dynamics, and socio-economic contexts influencing educational outcomes.

The study employs a documentary research approach, which involves the systematic review and interpretation of policy documents, legislative instruments, scholarly literature, and institutional reports relating to technical education governance in Nigeria. This approach provides a robust basis for examining how existing institutional frameworks support or constrain collaboration between polytechnics and industry stakeholders in curriculum development.

Documents were selected based on clearly defined inclusion criteria to ensure analytical relevance and rigor. Specifically, materials were included based on:

1. Relevance to technical education, curriculum development, and industry partnerships;
2. Publication credibility, with priority given to peer-reviewed journals, official government publications, and reports from recognized institutions; and
3. Currency, focusing on documents published between 2010 and 2025 to capture contemporary developments in technical education and Industry 4.0 transformations.

Documents that lacked clear authorship, institutional credibility, or direct relevance to the study variables were excluded. This selection process ensured that the analysis was grounded in reliable and policy-relevant sources.

The study relies primarily on secondary data sources, including policy documents, academic publications, institutional reports, and regulatory guidelines relating to technical education in Nigeria. Key sources include:

1. Government policy documents on technical education.
2. Legislative frameworks such as the Federal Polytechnics Act.
3. Regulatory guidelines issued by the National Board for Technical Education (NBTE).
4. Reports from the Industrial Training Fund (ITF), particularly on programmes such as the Student Industrial Work Experience Scheme (SIWES).
5. Scholarly articles and empirical studies on skills mismatch, technical education reforms, and industry–academia collaboration.

These sources provide a comprehensive foundation for analyzing the institutional dynamics influencing curriculum development and industry participation in Nigeria's polytechnic system.

Data were analyzed using a three-stage thematic coding process, which enhances analytical depth and transparency. The study adopts:

a) Open coding, involving the identification of key concepts and recurring ideas within the documents (e.g., skills mismatch, curriculum gaps, industry collaboration).
b) Axial coding, which establishes relationships between identified themes by grouping them into broader analytical categories such as institutional frameworks, governance structures, and industry participation mechanisms.
c) Selective coding**,** which integrates these categories into core themes that explain how industry partnerships influence curriculum development and skills alignment within Nigeria's polytechnic system.

This structured coding process allows for a systematic interpretation of qualitative data and strengthens the analytical coherence of the study.

The thematic analysis focuses on key dimensions, including:

1. The nature and extent of the skills gap in Nigeria's technical education system.
2. Institutional frameworks governing polytechnic curriculum development.
3. The role and structure of industry partnerships in technical education.
4. Integration of Industry 4.0 competencies into training programmes.

To enhance analytical validity and reliability, the study employs triangulation by drawing on multiple categories of data sources, including policy documents, academic literature, and institutional reports. This triangulation approach enables cross-verification of findings and reduces the risk of bias associated with reliance on a single source of data.

In addition, the use of a systematic coding procedure and clearly defined data selection criteria enhances the transparency and replicability of the study. By grounding the analysis in credible and diverse sources, the study ensures that its findings are both analytically robust and policy-relevant.

Results and Discussion

This section presents an interpretive yet evidence-driven analysis of findings derived from documentary and thematic coding of policy documents, institutional reports, and scholarly literature. The discussion is organized around four key dimensions: skills gap, curriculum development, industry partnerships, and Industry 4.0 integration, and is anchored in Human Capital Theory and the Triple Helix Model.

1. **Skills Gap in Nigeria's Technical Education Sector**: The analysis confirms a persistent and systemic skills gap between polytechnic graduates' competencies and labour market requirements. Empirical evidence from employer surveys and prior studies (Oviawe, Uwameiye & Uddin, 2017; Alhasan & Tyabo, 2013) consistently highlights deficiencies in practical skills, digital competencies, and workplace readiness. Documentary evidence further indicates that graduates often lack exposure to modern equipment and industrial processes due to limited practical training infrastructure and weak industry linkages. Reports from the Industrial Training Fund (ITF) suggest that many students undergoing SIWES placements are either poorly supervised or assigned non-technical roles, thereby undermining the intended objective of skill acquisition. From a Human Capital Theory perspective, this reflects inefficient investment in education, where the returns on training are diminished by poor alignment with labour market needs. The findings reinforce that the value of human capital is contingent upon the relevance and applicability of acquired skills.
2. **Polytechnic Curriculum Development and Institutional Limitations:** Analysis of National Board for Technical Education (NBTE) curriculum guidelines reveals structural rigidity and slow responsiveness to technological change. While NBTE provides Minimum Academic Standards (MAS), evidence suggests that curriculum review cycles

are often prolonged and insufficiently informed by real-time industry input. Policy documents indicate limited formal mechanisms for integrating industry feedback into curriculum design, resulting in programmes that remain overly theoretical. For instance, several NBTE-accredited programmes continue to emphasize legacy technical content with minimal integration of digital tools, automation systems, or emerging industrial practices. This limitation reflects a breakdown in the Human Capital development process and a weak operationalization of the Triple Helix Model. Without structured industry involvement, curriculum development becomes internally driven and disconnected from labour market realities, thereby constraining graduate employability.

3. **Industry Partnerships and Curriculum Relevance:** The study finds that although frameworks such as the Student Industrial Work Experience Scheme (SIWES) exist, their implementation remains inconsistent and weakly institutionalized. Evidence from ITF reports and prior evaluations highlights key operational challenges, including: inadequate supervision of students during industrial attachment, weak monitoring and evaluation mechanisms, and limited commitment from private sector organizations. In many cases, SIWES placements are not aligned with students' fields of study, reducing their effectiveness as a tool for practical skill acquisition. Furthermore, there is little evidence of structured feedback loops where industry experiences inform curriculum revision. This weak institutional linkage undermines the Triple Helix interaction among polytechnics, industry, and government. Where collaboration is informal or episodic, it fails to produce sustained curriculum innovation or meaningful skill transfer. Conversely, evidence from isolated best-performing institutions suggests that stronger industry engagement leads to improved curriculum relevance and graduate outcomes.
4. **Integration of Industry 4.0 Competencies:** Findings reveal a significant gap in the integration of Industry 4.0 competencies within polytechnic curricula. Documentary analysis shows limited inclusion of digital literacy, automation technologies, artificial intelligence, and entrepreneurial skills in many technical programmes. Recent studies (Chiamogu & Chiamogu, 2025) emphasize that this gap reduces graduates' competitiveness in modern labour markets. Policy documents also reveal that while there is growing awareness of digital transformation, institutional capacity and curriculum frameworks have not fully adapted to these changes. From a Human Capital perspective, this represents a misalignment between educational investment and future labour market needs. The Triple Helix Model further explains that without active industry participation, knowledge of emerging technologies is not effectively transferred into training programmes.

Table 2: Structured Evidence Summary

Issue	Evidence	Implication
Weak SIWES supervision	ITF reports; Uzoagulu (2011)	Poor practical skill acquisition; limited workplace readiness

Issue	Evidence	Implication
Outdated NBTE curricula	NBTE MAS guidelines; Ayonmike et al. (2015)	Graduates lack exposure to modern technologies
Limited industry participation	Alhasan & Tyabo (2013)	Curriculum misalignment with labour market needs
Poor Industry 4.0 integration	Chiamogu & Chiamogu (2025)	Low digital and technological competence
Weak policy enforcement	Institutional reports	Ineffective implementation of collaboration frameworks

Source: Compiled by the Authors

The findings collectively demonstrate that the skills gap in Nigeria's polytechnic system is not merely a pedagogical issue but a deeply embedded structural and institutional problem. While Human Capital Theory highlights the importance of relevant skill acquisition, the evidence shows that current training systems fail to translate educational investments into productive outcomes due to weak curriculum relevance and limited industry alignment. The Triple Helix Model provides a systemic explanation for this failure, emphasizing the absence of sustained and institutionalized collaboration among polytechnics, industry, and government agencies.

However, a more critical reading of the evidence suggests that the persistence of these challenges cannot be fully explained by structural deficiencies alone. Rather, they are reinforced by enduring cultural and institutional barriers that shape the interaction between academia and industry in Nigeria.

First, there exists a deep-seated epistemic hierarchy within the Nigerian education system, where theoretical knowledge is privileged over applied and practice-based expertise. This cultural orientation, rooted in colonial academic traditions and reinforced through institutional reward systems, often leads to the marginalization of industry input in curriculum design. As a result, academic institutions tend to prioritize internal validation processes over external relevance, limiting the integration of real-time industrial knowledge into training programmes.

Second, the study reveals a persistent institutional distrust and misalignment of incentives between academia and industry. While industry actors often perceive polytechnics as slow-moving and disconnected from production realities, academic institutions, in turn, view industry engagement as ad hoc, extractive, or insufficiently aligned with educational goals. This mutual skepticism weakens collaboration and discourages long-term partnerships, thereby undermining the operationalization of the Triple Helix framework.

Third, the findings point to a broader pattern of policy inertia and reform mimicry. Over the past decades, Nigeria has witnessed repeated policy recommendations emphasizing industry linkage, curriculum modernization, and skills development. However, these reforms have largely resulted in symbolic compliance rather than substantive transformation. Institutions adopt policy frameworks such as SIWES or curriculum review mandates in form, but not in function, due to weak enforcement mechanisms, limited accountability, and entrenched bureaucratic practices.

Furthermore, the governance structure of the TVET system reflects a compliance-driven rather than performance-driven culture, where adherence to regulatory standards (e.g., NBTE guidelines) often takes precedence over innovation and responsiveness. This discourages institutional experimentation and reduces the incentives for proactive engagement with industry partners. Consequently, curriculum reforms remain periodic and reactive, rather than continuous and demand-driven.

Importantly, these cultural and institutional dynamics help explain why decades of similar policy prescriptions have failed to produce significant structural change. The issue is not the absence of appropriate policy ideas, but the lack of transformative institutional conditions necessary for their effective implementation. Without addressing these underlying constraints—particularly the status hierarchy between theory and practice, weak trust ecosystems, and incentive misalignments—efforts to strengthen industry partnerships and modernize curricula are likely to yield only marginal improvements.

In this regard, the study extends existing literature by shifting the focus from identifying skill deficits to interrogating the institutional logic that reproduces those deficits. It argues that meaningful reform in Nigeria's TVET sector requires not only technical adjustments but also a reorientation of institutional culture, governance frameworks, and stakeholder relationships toward a more collaborative, adaptive, and practice-oriented system.

Policy Recommendations

Drawing upon the study's empirical findings and its theoretical grounding in Human Capital Theory and the Triple Helix Model of Innovation, this section advances a structured and operational policy framework designed to embed sustained industry participation in polytechnic curriculum governance. Unlike normative prescriptions, the recommendations are actionable, with clearly defined implementation pathways, measurable indicators, and anticipated outcomes.

Institutionalized Industry Advisory Boards (IABs)

Problem: Weak and informal industry input in curriculum development, leading to misaligned graduate competencies.

Action Steps:

- NBTE should mandate the establishment of IABs in every polytechnic.
- Ensure a minimum of 40% representation from industry stakeholders.
- Institutionalize quarterly curriculum review meetings with active industry participation.

Implementation Strategy:

- Provide statutory backing through amendments to NBTE accreditation guidelines.
- Finance IAB operations via public–private partnerships (PPPs) and direct industry contributions.

Measurable Indicators:

- Percentage of programmes reviewed annually.
- Employer satisfaction index on graduate competencies.
- Number of industry-led curriculum recommendations adopted.

Mandatory Co-Designed Curriculum Model

Problem:

Outdated and academically driven curricula lacking responsiveness to industry demands.

Action Steps:

- Implement a co-creation model: 50% academic experts, 50% industry professionals.
- Integrate industry-recognized certifications (e.g., Cisco, Siemens, Microsoft) into course structures.

Implementation Strategy:

- Utilize digital curriculum development platforms for real-time collaboration.
- Establish NBTE-regulated curriculum co-design committees.

Outputs:

- Modular, competency-based curricula aligned with contemporary industry standards.
- Graduates possessing both academic qualifications and industry-recognized certifications.

Dual Training System (Nigerian Adaptation)

Problem: Weak practical exposure and limited workplace readiness among graduates.

Action Steps:

- Adopt a dual training model inspired by global best practices (Germany, Singapore): 3 days in industry, 2 days in classroom.
- Embed structured apprenticeships into all technical programmes.

Implementation Strategy:

- Introduce tax incentives and subsidies for participating firms.
- Establish a legal framework through the Industrial Training Fund (ITF).
- Develop formal agreements between polytechnics and industry partners.

Outcomes:

- Graduates acquire real-time workplace experience.
- Reduced transition gap between education and employment.

National Skills Forecasting Framework

Problem: Limited alignment between training programmes and evolving labour market demands.

Action Steps:

- Establish a National Skills Intelligence Unit (NSIU).
- Produce annual labour market analytics and skills demand reports.

Implementation Strategy:

- Foster inter-agency collaboration: NBTE, National Bureau of Statistics (NBS), Federal Ministry of Labour and Employment.
- Integrate insights into mandatory curriculum review cycles.

Impact:

- Data-driven curriculum development.
- Proactive alignment with emerging industry requirements.

Performance-Based Funding Model

Problem: Weak accountability and limited incentives for effective institutional-industry collaboration.

Action Steps:

- Tie institutional funding to performance indicators: graduate employability, industry partnership index, and number of co-designed programmes.

Implementation Strategy:

- Policy reform spearheaded by the Federal Ministry of Education.
- Annual institutional performance audits and reporting.

Outcomes:

- Enhanced institutional accountability.
- Incentivized collaboration, innovation, and curriculum responsiveness.

Lecturer Industry Immersion Programme

Problem: Outdated teaching knowledge and limited exposure to current industry practices.

Action Steps:

- Mandatory six-month industry attachment for lecturers every three years.
- Promote secondments and exchange programmes with industry partners.

Implementation Strategy:

- Fund placements through TETFund and other interventionist agencies.
- Establish formal agreements between polytechnics and industry organizations.

Outcomes:

- Improved teaching quality.
- Enhanced integration of contemporary industry knowledge into the classroom.

Digital and Industry 4.0 Integration Labs

Problem: Inadequate infrastructure for modern technical training.

Action Steps:

- Establish Smart Technology Labs in polytechnics focusing on: AI, Robotics, IoT, and Digital Manufacturing Systems.

Implementation Strategy:

- Develop PPP models with telecom and technology firms.

- Leverage donor funding, innovation grants, and national development funds.

Outcomes:

- Strengthened digital and technological competencies among graduates.
- Alignment of technical education with Industry 4.0 requirements.

Bridging the skills gap in Nigeria's polytechnic system demands a coordinated institutional framework that places industry participation at the core of curriculum governance. Effective technical education reform is not merely the act of curriculum revision; it requires structured collaboration, regulatory enforcement, and performance accountability.

Operationalizing these strategies enables a transition from a supply-driven to a demand-responsive technical education system, fostering:

a) Higher graduate employability
b) Enhanced industrial productivity
c) Sustainable national development aligned with 21st-century economic and technological demands

This policy architecture provides a practical roadmap for Nigeria to cultivate a skilled, industry-ready workforce capable of contributing to technological advancement and inclusive economic growth.

Table 3: Summary of the 7 Policy Strategies Recommended to Bridge Skills Gaps

Policy Strategy	Problem	Action Steps	Implementation Strategy	Expected Outcome
1. Institutionalized Industry Advisory Boards (IABs)	Weak and informal industry input in curriculum development	1) Mandate IABs in every polytechnic department 2) Ensure ≥40% industry representation 3) Conduct quarterly curriculum review meetings	1) Legal backing via NBTE guideline amendments 2) Funded through PPPs and industry contributions	1) Percentage of programmes reviewed annually 2) Increased employer satisfaction 3) Adoption of industry-led curriculum inputs
2. Mandatory Co-Designed Curriculum Model	Outdated and academically driven curricula	1) Co-creation model: 50% academic, 50% industry 2) Integrate industry certifications (Cisco, Siemens, Microsoft)	1) Deploy digital curriculum platforms 2) Establish NBTE-regulated co-design committees	1) Modular, competency-based curricula 2) Graduates with academic and industry-recognized certifications
3. Dual Training System (Nigerian Adaptation)	Weak practical exposure and limited workplace readiness	1) Adopt dual system: 3 days industry, 2 days classroom 2) Embed structured apprenticeships	1) Tax incentives and subsidies for participating firms 2) Legal framework via ITF 3) Formal contracts between polytechnics and industry	1) Graduates with real workplace experience 2) Reduced education-to-employment transition gap

Policy Strategy	Problem	Action Steps	Implementation Strategy	Expected Outcome
4. National Skills Forecasting Framework	Limited alignment with labour market needs	1) Establish National Skills Intelligence Unit 2) Produce annual labour market analytics reports	1) Collaboration between NBTE, NBS, and Federal Ministry of Labour 2) Integrate findings into mandatory curriculum review cycles	1) Data-driven curriculum updates 2) Proactive alignment with emerging industry demands
5. Performance-Based Funding Model	Weak accountability and limited institutional incentives	1) Link funding to graduate employability, industry partnership index, and co-designed programs	1) Policy reform via Federal Ministry of Education 2) Annual institutional performance audits	1) Enhanced institutional accountability 2) Incentivized collaboration and curriculum innovation
6. Lecturer Industry Immersion Programme	Outdated teaching knowledge and limited industry exposure	1) Mandatory six-month industry attachment every 3 years 2) Promote industry secondments and exchanges	1) Funded through TETFund 2) Formal agreements with industry partners	1) Improved teaching quality 2) Integration of current industry knowledge into curricula
7. Digital & Industry 4.0 Integration Labs	Inadequate infrastructure for modern technical training	1) Establish smart labs: AI, Robotics, IoT, Digital Manufacturing Systems	1) PPP models with tech firms 2) Leverage donor funding and innovation grants	1) Enhanced digital and technological competencies 2) Alignment with Industry 4.0 standards

The table outlines seven actionable policy strategies to bridge Nigeria's polytechnic skills gap by enhancing industry involvement in curriculum development. Each strategy targets a specific challenge: such as weak industry input, outdated curricula, limited practical exposure, and inadequate infrastructure; and pairs clear action steps with implementation mechanisms, including legal amendments, PPPs, and regulatory oversight. Expected outcomes are measurable, focusing on improved curriculum relevance, graduate employability, and alignment with Industry 4.0 standards. Together, the framework provides a concise, evidence-based roadmap for operationalizing human capital development through structured industry–academia collaboration.

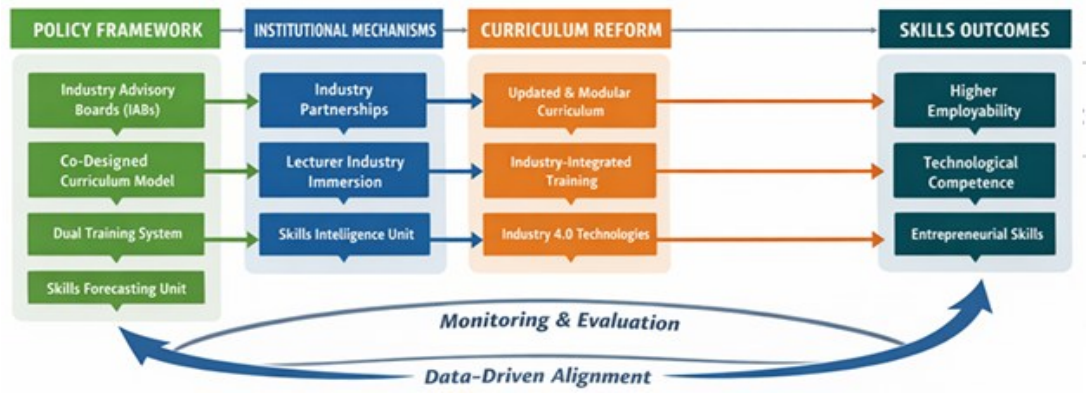


Figure 2: Conceptual Framework for Bridging the Skills Gap in Nigeria's Polytechnic Education System

The framework illustrates how policy interventions, implemented through institutional mechanisms, drive curriculum reforms that address Nigeria's polytechnic skills gap. Policies such as Industry Advisory Boards, co-designed curricula, and dual training systems are operationalized via partnerships, lecturer immersion, and skills intelligence units. These mechanisms ensure curricula integrate practical training and Industry 4.0 competencies, producing graduates with enhanced employability and technological skills. Continuous monitoring and feedback align education with labour market and technological demands, reflecting the coordinated interaction of government, industry, and institutions as highlighted by Human Capital Theory and the Triple Helix Model.

Concluding Remarks

Bridging the skills gap in Nigeria's polytechnic system is critical for achieving economic growth, technological advancement, and sustainable development. The study demonstrates that effective curriculum reform is not solely an institutional responsibility but a collective effort requiring strong partnerships among educational institutions, industry, and government. By adopting the recommendations above, policymakers and institutional leaders can enhance the relevance, quality, and employability outcomes of Nigeria's technical education system, thereby ensuring that graduates are equipped to meet the demands of the 21st-century economy.

However, the implementation of these reforms is likely to encounter significant structural and institutional barriers. Bureaucratic inertia within regulatory agencies and educational institutions may slow the pace of curriculum revision and limit the flexibility required for innovation. In addition, persistent infrastructure deficits: particularly unreliable power supply, inadequate training equipment, and limited digital facilities; constrain the practical delivery of modern, technology-driven curricula. Equally important is the weak incentive structure for private sector participation. Many firms lack clear financial or strategic motivation to invest time and resources in curriculum co-creation, especially in the absence of tax incentives, cost-sharing frameworks, or enforceable partnership models. These constraints are further

compounded by fragmented policy coordination and weak accountability mechanisms, which often result in partial or symbolic implementation of well-designed reforms.

Addressing these barriers requires a shift from policy formulation to institutional redesign and incentive alignment. This includes strengthening regulatory enforcement, introducing targeted incentives for industry participation, investing in critical infrastructure, and fostering a governance framework that prioritizes collaboration, accountability, and continuous curriculum adaptation. Without confronting these practical constraints, even the most well-conceived reforms may fail to achieve meaningful and sustained impact.

References

Aina, O. (2013). Technical and vocational education and training as a mechanism for sustainable development in Nigeria. *Journal of Educational and Social Research, 3*(2), 43–50. https://doi.org/10.5901/jesr.2013.v3n2p43

Aladekoye, O. (2025, June 16). 60% of TVET graduates now employed or self-employed, says FG. *The Nigeria Education News.* https://thenigeriaeducationnews.com/2025/06/16/60-of-tvet-graduates-now-employed-or-self-employed-says-fg/

Alhasan, N. U., & Tyabo, A. (2013). Revitalizing technical and vocational education (TVET) for youth empowerment and sustainable development. *Journal of Educational and Social Research, 3*(4), 149-154. https://doi.org/10.5901/jesr.2013.v3n4p149

Alli, W. (2025, March 9). Widening skills gap keeps millions of Nigerians jobless. *BusinessDay.* https://businessday.ng/news/article/widening-skills-gap-keeps-millions-of-nigerians-jobless/

Ayonmike, C. S., Okwelle, P. C., & Okeke, B. C. (2015). Towards quality technical vocational education and training programmes in Nigeria: Challenges and improvement strategies. *Journal of Education and Learning, 4*(1), 25–34. https://doi.org/10.5539/jel.v4n1p25

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis with special reference to education* (3rd ed.). University of Chicago Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Chiamogu, A. P., & Chiamogu, U. P. (2025). Bridging skills mismatch in Nigeria's TVET system: Integrating Industry 4.0 competencies for entrepreneurial readiness. *African Journal of Science, Innovation and Technology Research, 9*(9), 11–21. https://doi.org/10.70382/ajsitr.v9i9.032

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and "Mode 2" to a Triple Helix of university–industry–government relations. *Research Policy, 29*(2), 109–123. https://doi.org/10.1016/S0048-7333(99)00055-4

International Labour Organization (2023). *Global employment trends for youth 2023: Investing in transforming futures for young people*. ILO. https://www.ilo.org

Jebba, M. M., Nordin, M. S. B., Wushishi, A. J., & Quadri, A. T. (2024). Skills gap assessment among technical and vocational education and training educators (TVET) on adopting digital technologies in teaching at technical colleges. *International Journal of Academic Research in Progressive Education and Development, 13*(3), 1489–1502.

NAN. (2023, August 28). 85% of Nigerian graduates have no digital skills – Report. *Pulse Nigeria.* https://www.pulse.ng/story/85-of-nigerian-graduates-have-no-digital-skills-report-2024072616442269634

National Bureau of Statistics (2024). *Labour force statistics report*. NBS. https://www.nigerianstat.gov.ng

OECD (2018). *Seven questions about apprenticeship: Answers from international experience*. OECD Publishing. https://doi.org/10.1787/9789264306486-en

Okehukwu, S. C. (2025, December 21). Skills gap: When education does not match employment. *Great Nigeria Network.* https://greatnigeria.net/story/skills-gap-when-education-does-not-match-employment

Oketch, M. (2007). To vocationalise or not to vocationalise? Perspectives on current trends and issues in technical and vocational education and training (TVET) in Africa. *International Journal of Educational Development, 27*(2), 220–234. https://doi.org/10.1016/j.ijedudev.2006.07.004

Oviawe, J. I., Uwameiye, R., & Uddin, P. S. O. (2017). Bridging the gap between technical and vocational education and training and the labour market in Nigeria. *International Journal of Vocational and Technical Education, 3*(1), 7–14. https://doi.org/10.11648/j.ijvetr.20170301.12

Oweh, I. (2025, October 14). Youth unemployment rate in Nigeria peaks at 6.5% – ILO's research. *Independent Newspaper Nigeria.* https://independent.ng/youth-unemployment-rate-in-nigeria-peaks-at-6-5-ilos-research/

Salami, U. (2026, March 30). *60% of employers say graduates not job-ready — Report*. *Punch Newspapers*. https://punchng.com/60-of-employers-say-graduates-not-job-ready-report/

Schultz, T. W. (1961). Investment in human capital. *The American Economic Review, 51*(1), 1–17. http://www.jstor.org/stable/1818907

UNESCO. (2016). *Strategy for technical and vocational education and training (TVET) 2016–2021.* UNESCO Publishing. https://unesdoc.unesco.org/ark:/48223/pf0000245833

Uzoagulu, A. E. (2011). *Practical guide to writing research project reports in tertiary institutions* (2nd ed.). Cheston Ltd.

World Bank (2020). *The skills balancing act in Sub-Saharan Africa: Investing in skills for productivity, inclusivity, and adaptability*. World Bank. https://doi.org/10.1596/978-1-4648-1539-0