

RE-IMAGINING TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) IN NIGERIA: ADDRESSING ADMINISTRATIVE PROBLEMS THROUGH STRATEGIC INNOVATION FOR SUSTAINABLE DEVELOPMENT

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Abstract

Technical and Vocational Education and Training (TVET) is widely recognised as one of the most effective pathways for equipping young people with practical skills for employment, entrepreneurship, and national development. In Nigeria, despite policy recognition and sustained support from government and international development partners, the sector continues to face persistent administrative and structural problems that limit its effectiveness. These problems include inadequate and inconsistent funding, obsolete workshop facilities, curricula that are poorly aligned with contemporary labour-market demands, limited opportunities for instructors to update their industrial competencies, weak collaboration between institutions and industry, and the continued perception of vocational education as a second-choice pathway. Although previous studies have extensively documented these challenges, most have focused on describing individual problems and proposing isolated solutions. Consequently, there remains a need for an integrated and practical framework that enables TVET institutions to respond to these interconnected challenges in a systematic and sustainable manner. This paper addresses that gap by examining the major administrative and structural issues confronting TVET in Nigeria and proposing an original conceptual model known as the Adaptive Skill Ecosystem Framework (ASEF). The framework integrates four mutually reinforcing pillars: curriculum co-creation with industry, periodic instructor immersion in workplaces, diversified institutional funding mechanisms, and deliberate public rebranding of technical careers. Rather than treating these elements as separate reforms, ASEF presents them as components of a continuous adaptive system capable of responding to technological change, evolving labour-market demands, and local economic realities. By demonstrating how the framework bridges gaps identified in previous literature, this paper moves beyond problem identification to provide a practical model that can guide institutional reform and policy implementation. It concludes that adopting ASEF can strengthen the capacity of Nigerian technical colleges and polytechnics to produce industry-ready graduates, promote youth employment and entrepreneurship, and contribute more effectively to sustainable national development.

Keywords: *Technical and Vocational Education and Training (TVET); Adaptive Skill Ecosystem Framework (ASEF); Educational governance; Skills acquisition; Youth empowerment; Sustainable development.*

Introduction

Technical and Vocational Education and Training (TVET) has become increasingly important in national development because of its ability to equip individuals with practical knowledge, occupational competencies, and entrepreneurial skills needed for productive employment. In many developing countries, including Nigeria, TVET is widely regarded as a strategic response to the growing challenges of youth unemployment, poverty, and skills shortages. Beyond preparing individuals for

paid employment, it also empowers them to become self-employed, establish small businesses, and contribute meaningfully to economic growth.

According to the Federal Republic of Nigeria (2013), the primary goal of technical and vocational education is to produce competent craftsmen, technicians, and technologists who possess the practical skills and scientific knowledge required for national development. Similarly, UNESCO (2022) emphasised that

effective TVET systems are indispensable for building resilient economies, promoting social inclusion, and preparing workers for rapidly changing labour markets shaped by technological advancement, digital transformation, and environmental sustainability.

In the Nigerian context, the relevance of TVET has become even more pronounced as increasing numbers of graduates struggle to secure employment despite possessing formal academic qualifications. Asiyai (2021) argued that strengthening vocational and technical education offers one of the most practical approaches to reducing graduate unemployment by equipping learners with marketable skills that meet the needs of modern industries. In the same vein, Okwelle and Deebom (2017) & Onwennonye (2019) maintained that a functional TVET system promotes self-reliance, stimulates entrepreneurship, and enhances national productivity by producing graduates who are capable of creating employment opportunities rather than depending solely on government jobs.

Despite these recognised benefits, the performance of TVET institutions in Nigeria has remained below expectations. Many technical colleges and polytechnics continue to operate under conditions that limit effective skills development. According to Oviawe (2018), outdated workshop facilities, inadequate instructional equipment, obsolete teaching methods, and weak collaboration between educational institutions and industry have significantly reduced the capacity of TVET programmes to respond to contemporary labour-market needs. Okoye and Arimonu (2016) similarly observed that persistent funding constraints, poor infrastructure, and ineffective policy implementation continue to undermine the quality and relevance of vocational education across the country.

Over the years, scholars have consistently examined these challenges and proposed various recommendations for improving TVET in Nigeria. While these studies have made valuable contributions to the literature, most have addressed individual problems such as funding, curriculum development, industrial

training, or public perception as separate issues. Consequently, there is still limited attention to how these interconnected challenges can be addressed through a single, integrated, and continuously adaptable framework that institutions can implement in practice.

It is against this background that this paper proposes the Adaptive Skill Ecosystem Framework (ASEF) as an original conceptual contribution. Unlike previous approaches that consider administrative, financial, curricular, and industry-related issues independently, ASEF brings these elements together into a unified and dynamic system that encourages continuous adaptation to technological innovation, labour-market demands, and national development priorities. The framework recognises that meaningful reform cannot be achieved through isolated interventions; rather, sustainable improvement requires coordinated action across multiple aspects of the TVET system.

Accordingly, this paper pursues three specific objectives:

- a) To examine the major administrative and structural challenges confronting Technical and Vocational Education and Training institutions in Nigeria.
- b) To identify the gaps that remains in existing literature and policy interventions relating to TVET administration and reform.
- c) To propose and explain the Adaptive Skill Ecosystem Framework (ASEF) as an integrated model for strengthening TVET institutions and promoting sustainable development in Nigeria.

The Current Landscape of TVET in Nigeria

Technical and Vocational Education and Training (TVET) occupies a strategic position in Nigeria's educational system because it bridges the gap between formal education and the practical skills required in the world of work. The primary objective of TVET is to equip learners with the knowledge, technical competence, and entrepreneurial abilities needed for gainful employment, self-reliance, and national development. According to the Federal Republic of Nigeria (2013), technical

education is designed to produce skilled craftsmen, technicians, and technologists who can contribute effectively to industrial growth and economic transformation.

Over the years, successive governments have introduced policies and programmes aimed at strengthening TVET and improving the quality of technical manpower in the country. Among the key institutions driving these efforts are the National Board for Technical Education (NBTE), which regulates and maintains standards in technical and vocational institutions, and the Industrial Training Fund (ITF), which coordinates the Students' Industrial Work Experience Scheme (SIWES) and other industry-based training initiatives. These agencies have played significant roles in promoting practical learning, quality assurance, and collaboration between educational institutions and industry.

Despite the various policy commitments and institutional interventions, the overall performance of TVET in Nigeria has remained below expectations. According to Oviawe, Uwameiye, and Uddin (2017), many graduates of technical institutions still require considerable workplace retraining before they can perform effectively in modern industries. This suggests that a gap persists between the competencies acquired during training and the practical skills demanded by employers. Supporting this position, Oviawe (2018) argued that outdated instructional facilities, inadequate practical exposure, and weak collaboration between educational institutions and industry continue to undermine the quality of vocational education in Nigeria.

Another important concern is that the rapid pace of technological advancement has widened the gap between what many institutions teach and the competencies expected in today's workplaces. As Okoye (2025) observed, countries with successful TVET systems continuously review their curricula, strengthen partnerships with industry, and invest in modern training facilities to ensure that graduates remain globally competitive. By comparison, many Nigerian institutions still struggle to modernise their programmes because of financial constraints, ageing infrastructure, and limited

opportunities for innovation.

Although notable progress has been made through government reforms and the support of development partners, evidence from the literature suggests that many of these interventions have produced only modest improvements. This is largely because reforms have often focused on isolated aspects of the system rather than addressing the interrelated administrative, financial, instructional, and societal factors that collectively determine the effectiveness of TVET. Consequently, understanding the present landscape requires more than identifying existing programmes; it also requires recognising the systemic issues that continue to hinder meaningful transformation.

Administrative and Structural Problems Facing TVET in Nigeria

Despite the growing recognition of Technical and Vocational Education and Training (TVET) as a catalyst for economic growth and workforce development, the sector continues to face numerous administrative and structural problems that limit its effectiveness. These challenges are not isolated; rather, they interact in ways that weaken institutional capacity, reduce the quality of training, and diminish graduates' employability. According to Asiyai (2021), addressing these constraints requires more than isolated reforms because weaknesses in one aspect of the system often trigger problems in others. Understanding these interconnected problems is therefore essential for developing sustainable solutions. Some of these problems are; inadequate and inconsistent funding, outdated curricula and traditional teaching approaches, limited opportunities for instructor professional development, weak collaboration between institutions and industry as well as negative public perception of TVET. Okwelle and Deebom (2017) argued that several vocational programmes in Nigeria continued to emphasise theoretical instruction at the expense of practical competence. Likewise, Oviawe (2018) maintained that many curricula do not adequately integrate emerging areas such as digital technologies, automation, renewable energy, environmental sustainability, and entrepreneurship. Consequently, graduates often possess academic knowledge but lack the

practical competencies required to function effectively in contemporary workplaces. Beyond administrative and instructional problems, societal attitudes continue to influence the development of TVET in Nigeria. Okoye and Arimonu (2016) observed that the relatively low social status attached to technical occupations often affects student enrolment, parental support, and government commitment to sustained investment in the sector.

The Adaptive Skill Ecosystem Framework (ASEF): An Original Conceptual Contribution

The previous section of this paper has established the position of several authors on the various problems hindered meaningful progress of TVET in Nigeria. However, these scholars have largely examined each problem independently and proposed separate solutions. Consequently, there is still limited attention to how these interconnected challenges can be addressed through a unified and continuously adaptable framework. This paper addresses that gap by proposing the Adaptive Skill Ecosystem Framework (ASEF) as an integrated conceptual model for strengthening TVET administration and promoting sustainable development in Nigeria.

The ASEF is founded on the principle that Technical and Vocational Education and Training should function as a dynamic and responsive ecosystem rather than a collection of isolated administrative activities. Like every successful ecosystem, the different components of TVET must continuously interact, adapt, and reinforce one another in response to technological innovation, industrial transformation, labour-market expectations, and changing societal needs. Within this framework, curriculum development, instructor capacity building, resource mobilisation, and public engagement are viewed as mutually dependent elements whose effectiveness depends on continuous collaboration and feedback.

Rather than recommending one-time reforms, ASEF promotes an ongoing cycle of improvement in which institutions regularly evaluate their practices, strengthen partnerships with industry, mobilise diverse resources, and respond proactively to emerging economic

realities. In this way, the framework encourages continuous learning not only for students but also for instructors, institutional leaders, employers, and policymakers. For the purpose of clarity, this framework is organised around four interconnected pillars.

- a) **Pillar one (Curriculum Co-Creation Cycle):** This first pillar recognises that curriculum development should be a collaborative and continuous process rather than an occasional administrative exercise. According to UNESCO (2022), responsive TVET systems maintain close relationships with employers to ensure that learning programmes reflect current workplace realities. Consistent with this position, ASEF proposes that technical institutions should undertake structured curriculum reviews every three to five years in partnership with employers, professional associations, experienced graduates, and relevant regulatory bodies.
- b) **Pillar two (Instructor Immersion Programme):** The second pillar focuses on strengthening the professional competence of technical instructors through regular industrial exposure. As Haruna, & Kamin (2019) observed, instructors who remain disconnected from current industrial practices gradually lose familiarity with modern equipment, production techniques, and workplace standards. ASEF therefore proposes that instructors should participate in structured industrial attachments every two to three years as part of institutional staff development policies. Industrial immersion enables instructors to update their technical knowledge, improve practical teaching methods, establish professional networks with employers, and transfer current industrial practices directly into classroom and workshop instruction.
- c) **Pillar three (Diversified Resource Engine):** The third pillar addresses one

of the most persistent weaknesses of TVET administration which is overdependence on government funding. While public investment remains indispensable, Okoye and Arimonu (2016) argued that financial limitations continue to hinder infrastructure development and effective practical training. ASEF therefore encourages institutions to develop multiple and complementary sources of income. These may include commercial production through institutional workshops, consultancy services, short professional training programmes for industry, equipment-sharing arrangements among neighbouring institutions, alumni partnerships, philanthropic support, and carefully structured public-private partnerships. By diversifying revenue streams, institutions become more resilient, financially sustainable, and better positioned to invest in modern facilities and innovative teaching practices.

- d) **Pillar four (Visibility and Value Campaign):** The fourth pillar recognises that sustainable reform requires changing societal attitudes toward technical and vocational education. According to Asiyai (2021), negative public perception continues to discourage many academically capable students from pursuing vocational careers despite increasing demand for skilled workers. ASEF proposes a deliberate and sustained strategy for improving the public image of TVET through coordinated advocacy, media engagement, career awareness programmes, and community outreach initiatives. Institutions should actively showcase successful graduates, innovative student projects, entrepreneurial achievements, and contributions to local economic development. As public confidence grows, enrolment is likely to improve, industry participation may increase, and policymakers may become more willing to invest in the sector.

The Continuous Adaptive Cycle

The distinctive feature of ASEF lies not simply in the four pillars themselves but in the way they function as an integrated system. Each pillar continuously reinforces the others. Collaborative curriculum development identifies emerging industry needs, which in turn shapes instructor immersion programmes. Better-trained instructors produce graduates with stronger practical competencies, increasing employer confidence and strengthening institutional partnerships. These partnerships create new opportunities for resource mobilisation, technological support, and workplace learning. Visible graduate success further improves public perception, attracting more students, stronger community support, and additional investment. The cycle then begins again, enabling the system to adapt continuously to changing economic and technological conditions.

This adaptive interaction distinguishes ASEF from many previous reform proposals that treat funding, curriculum, instructor development, and industry collaboration as separate administrative concerns. Instead, the framework recognises that meaningful and sustainable improvement can only be achieved when these elements operate together as parts of a single, responsive ecosystem.

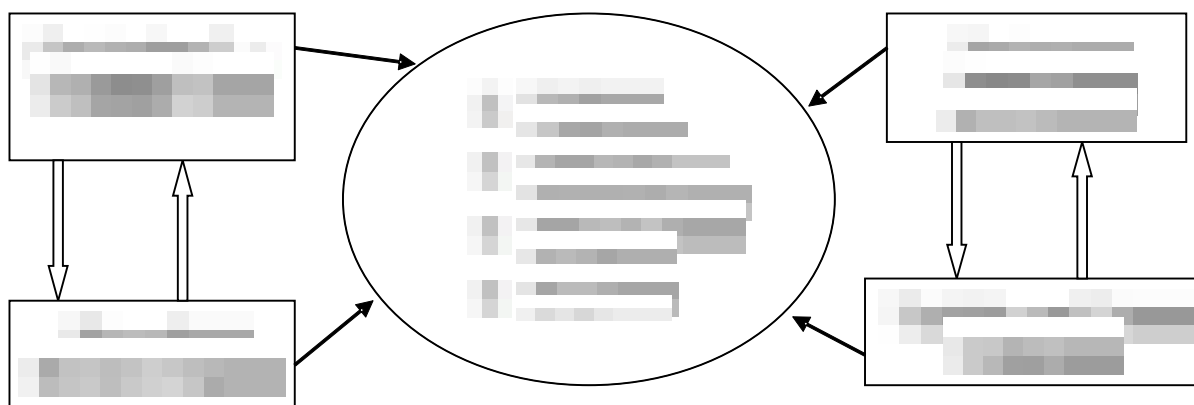
In this regard, ASEF represents the principal conceptual contribution of this paper. It offers educational administrators, policymakers, and institutional leaders a practical framework that can guide planning, implementation, monitoring, and continuous improvement of TVET programmes. More importantly, it shifts the focus of reform from isolated interventions to a coordinated system capable of supporting long-term institutional resilience, graduate employability, and sustainable national development.

Table 1: Previous Literature, Identified Gaps, and the Adaptive Skill Ecosystem Framework (ASEF)

Major Findings in Previous Studies	Identified Gap	ASEF Response
According to Asiyai (2021) and Okoye and Arimonu (2016), inadequate and inconsistent funding limits infrastructure development, equipment procurement, and practical instruction.	Most institutions depend almost entirely on government funding, making long-term planning and innovation difficult.	Diversified Resource Engine promotes multiple funding streams through institutional enterprises, consultancy services, alumni partnerships, equipment-sharing, and public-private partnerships.
Okwelle and Deebom (2017) and Oviawe (2018) argued that many TVET curricula remain outdated and insufficiently aligned with industry needs.	Curriculum review is often irregular and employers have limited involvement in programme development.	Curriculum Co-Creation Cycle institutionalises periodic curriculum review involving employers, industry experts, professional bodies, graduates, and regulatory agencies.
Haruna & Kamin (2019) observed that opportunities for instructor industrial exposure and continuing professional development remain inadequate.	Instructor capacity development is irregular and frequently disconnected from current industrial practices.	Instructor Immersion Programme provides structured industrial attachment for instructors at regular intervals to sustain professional competence.
Oviawe, Uwameiye, and Uddin (2017) reported that collaboration between institutions and industry remains weak and often limited to SIWES placements.	Existing partnerships are generally short-term and provide limited opportunities for curriculum improvement, innovation, or joint planning.	ASEF integrates curriculum co-creation and instructor immersion to establish continuous and mutually beneficial institutional-industry partnerships.
Asiyai (2021) & Okoye and Arimonu (2016) maintained that vocational education continues to suffer from negative public perception.	There are few coordinated efforts to improve the public image of technical careers.	Visibility and Value Campaign promotes sustained advocacy through media engagement, career awareness programmes, community partnerships, and graduate success stories.

The analysis presented in Table 1 demonstrates that the contribution of ASEF does not lie in introducing entirely new administrative concerns. Rather, its originality lies in bringing together well-established reform priorities within a single adaptive system that encourages continuous collaboration, institutional learning, and evidence-based improvement. By integrating these complementary elements, the framework offers educational administrators and policymakers a practical roadmap for strengthening TVET institutions in ways that are both sustainable and responsive to future economic and technological changes.

Fig. 1. Adaptive Skill Ecosystem Framework (ASEF): Interconnectivity of Four Pillars



Practical Strategies for Implementing the Adaptive Skill Ecosystem Framework (ASEF)

The successful implementation of the Adaptive Skill Ecosystem Framework (ASEF) depends on sustained collaboration among government agencies, educational institutions, industries, professional bodies, and local communities. Although comprehensive reform requires supportive national policies, meaningful progress can begin with practical actions at the institutional level. As UNESCO (2022) emphasised, effective TVET reforms are often achieved through continuous, incremental improvements that respond to local realities rather than relying solely on large-scale policy changes. Some of the practical strategies for implementing ASEF could include:

- a) Establishment of Industry Advisory Committees for each major trade programme. These committees should comprise employers, experienced industry professionals, successful graduates, representatives of professional associations, and institutional administrators. Their primary responsibility would be to provide regular feedback on curriculum relevance, emerging technological trends, workplace expectations, and graduate competencies.
- b) Institutionalisation of periodic industrial attachment programmes for instructors. Institutions can achieve this by negotiating structured attachment opportunities with industries within their geographical locations, allowing academic staff to update their technical

competencies while strengthening relationships with employers.

- c) While government funding remains indispensable, institutions should actively explore complementary revenue sources to generate additional income for institutional progress.
- d) Institutions can showcase successful graduates, organise annual skills exhibitions, participate in community development projects, strengthen career guidance programmes in secondary schools, and utilise digital media platforms to highlight the value and opportunities associated with technical occupations.
- e) Institutional leaders should adopt a culture of continuous monitoring and evaluation.

Conclusion

Technical and Vocational Education and Training remains one of Nigeria's most important instruments for promoting youth empowerment, industrial development, entrepreneurship, and sustainable economic growth. Although successive governments, regulatory agencies, and international development partners have demonstrated considerable commitment to strengthening the sector, persistent administrative and structural problems continue to limit its overall effectiveness. As discussed in this paper, inadequate funding, outdated curricula, limited opportunities for instructor development, weak institutional-industry collaboration, and negative societal perceptions are not isolated

problems. Rather, they interact in ways that reinforce one another and reduce the capacity of TVET institutions to produce graduates with the competencies required in contemporary workplaces. Addressing these problems therefore requires a coordinated and systemic approach rather than isolated interventions.

Against this background, this paper proposed the Adaptive Skill Ecosystem Framework (ASEF) as an original conceptual contribution to the growing literature on TVET reform. Unlike many previous approaches that address administrative problems individually, ASEF integrates curriculum co-creation, instructor immersion, diversified resource mobilisation, and public rebranding into a continuous cycle of institutional learning and improvement.

Recommendations and Policy Implications

The findings and discussions presented in this paper have important implications for educational policy, institutional leadership, and national workforce development. Drawing directly from the Adaptive Skill Ecosystem Framework (ASEF), the following recommendations are proposed:

- a) Federal Ministry of Education as well as other educational agencies such as NCCE, NUC, and NBTE should make periodic industry-driven curriculum review a mandatory requirement for programme accreditation. Such a policy would ensure that training programmes remain aligned with technological innovation and labour-market expectations.
- b) Governments at both the federal and state levels should establish a dedicated TVET Infrastructure and Innovation Fund to support workshop modernisation, digital technologies, instructor capacity development, and applied research.
- c) Technical institutions should establish long-term Memoranda of Understanding with industries, manufacturing firms, construction companies, agricultural enterprises, and technology organisations. These partnerships should extend beyond SIWES placements to

include curriculum development, instructor immersion, collaborative research, graduate recruitment, equipment support, and innovation projects.

- d) National and state education authorities should collaborate with the media, professional associations, employers, and civil society organisations to implement sustained public awareness campaigns that project technical and vocational education as a respected pathway to professional success, entrepreneurship, and national development.
- e) Future researchers should subject the Adaptive Skill Ecosystem Framework (ASEF) to empirical validation in different educational contexts to help determine the framework's effectiveness, adaptability, and long-term contribution to improving TVET administration and graduate employability.

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