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Technical and Vocational Education and Training (TVET) as a Catalyst for Sustainable Development in Nigeria

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Abstract: Technical and Vocational Education and Training (TVET) is globally recognised as a strategic tool for economic revitalisation, youth empowerment, and sustainable development. This study explores the role of TVET in advancing sustainable development in Nigeria, drawing from secondary data including institutional reports, policy documents, and international literature. The findings reveal that TVET, when effectively structured and adequately supported, can significantly address Nigeria's economic, social, and environmental challenges. However, systemic issues such as funding gaps, institutional fragmentation, and societal stigma continue to undermine its impact. The study concludes with policy recommendations aimed at repositioning TVET as a key driver of sustainable development in Nigeria.

Keywords: **TVET, sustainable development, Nigeria, youth empowerment, strategic tool**

1. INTRODUCTION

Technical and Vocational Education and Training (TVET) has gained global recognition as a critical driver of sustainable development, specifically in equipping individuals with practical skills that makes them employable, innovative and have entrepreneurial drive. In this era of dynamic technological transformation, globalisation, and climate change concerns, countries around the world are prioritising skill development systems that respond to the evolving demands of labour markets and support inclusive, sustainable economic growth (UNESCO, 2016). TVET is increasingly positioned as a transformative tool that not only reduces poverty and unemployment but also promotes lifelong learning and green economies.

From a global perspective, developed nations such as Germany, Singapore, and South Korea have successfully integrated TVET into their national development strategies. These countries have demonstrated that a skilled workforce is foundational to industrial growth and economic resilience (OECD, 2018). Germany's dual apprenticeship system, for instance, has been widely praised for its close collaboration between industry and educational institutions, resulting in low youth unemployment and high productivity levels (CEDEFOP, 2020).

In Africa, the relevance of TVET has become more pronounced given the continent's demographic structure, with over 60% of the population under the age of 25. Despite this youthful population, Africa faces a growing skills gap, with millions of young people entering the labor market each year without adequate competencies (AfDB, 2020). As a result, TVET is increasingly seen as a pathway to address youth unemployment, reduce inequality, and promote sustainable development. However, the TVET sector across many African countries remains underdeveloped, facing challenges such as poor funding, outdated curricula, and negative social perceptions (UNESCO-UNEVOC, 2019). In Botswana, the National Policy on Vocational Education and

> Training, therefore, provides clear direction for future development of vocational education and training. The main objective of Botswana's vocational and technical education and training system is to develop a well-trained workforce with the skills necessary to foster economic development (World Bank, 2015). Employment creation, productivity improvement, and overall human resource capacity building are seen to be major challenges in Botswana's efforts to achieve economic competitiveness and sustained development (Adebisi, 2023).

In Nigeria, the largest economy and most populous nation in Africa, the situation is particularly urgent. With a youth unemployment rate exceeding 40% and millions of graduates lacking employable skills, the need for a revitalized and responsive TVET system is critical (NBS, 2023). The National Policy on Education emphasises the importance of vocational and technical education in fostering national development, yet implementation remains weak (FRN, 2013). Moreover, there is limited alignment between TVET programs and industry needs, resulting in a mismatch that hinders productivity and economic inclusion. While technical and vocational education has continued to thrive in many societies, Nigeria has neglected this aspect of education. Consequently, the society lacks skilled technicians: bricklayers, carpenters, painters and auto mechanics; laboratory and pharmacy technicians, electrical/electronic technicians and skilled vocational nurses, etc (Adeyemi, 2023). The consequence is a wide gap between real skill set and real income.

Given Nigeria's ambition to achieve the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education) and Goal 8 (Decent Work and Economic Growth), investing in TVET presents a strategic opportunity. A reformed and adequately funded TVET system has the potential to empower youth, promote gender equity, reduce poverty, and support environmentally sustainable industries.

This study therefore explores the role of TVET as a catalyst for sustainable development in Nigeria, drawing on global practices and local realities. It critically examines how TVET can contribute to economic, social, and environmental dimensions of sustainability, while offering policy recommendations for its effective implementation.

LITERATURE REVIEW

Theoretical Foundations of TVET and Sustainable Development

The connection of Technical and Vocational Education and Training (TVET) and sustainable development is grounded in human capital theory, which posits that investment in education and training enhances individual productivity and, by extension, national economic performance (Becker, 1993). TVET, in particular, is designed to develop practical and occupational skills, thereby addressing the skills mismatch in labor markets and enabling people to contribute meaningfully to economic and social development (UNESCO, 2015).

Additionally, the sustainable development framework emphasises three pillars; economic growth, social inclusion, and environmental sustainability, each of which TVET can support (UN, 2015). For instance, by promoting green skills and eco-friendly practices, TVET can play a pivotal role in building a green economy and fostering environmental stewardship.

Global Perspectives on TVET and Development

In many developed economies, TVET has been central to national industrial strategies and labor market stability. Germany's dual system combines school-based education with hands-on work experience, ensuring that trainees graduate with both theoretical knowledge and practical competencies (Euler, 2013). In Singapore, the Institute of Technical Education (ITE) and polytechnics offer world-class training that aligns with evolving industry demands, helping reduce youth unemployment and stimulate innovation (Tan, 2014).

A study by the Organisation for Economic Co-operation and Development (OECD), shows that countries with strong technical and vocational education systems tend to have higher productivity growth and lower levels of youth unemployment (OECD, 2020). Furthermore, the World Bank (2019) notes that effective TVET systems are those that are flexible, demand-driven, and inclusive, with strong linkages to employers and industries.

TVET and Sustainable Development in Africa

In Africa, the recognition of TVET's role in sustainable development is growing, but implementation remains inconsistent. Many African Union (AU) initiatives, including the Continental Education Strategy for Africa (CESA 2016–2025), emphasise the need to revamp TVET systems to address youth unemployment and promote entrepreneurship (AU, 2016). However, challenges such as weak institutional capacity, poor funding, and low societal regard for vocational training persist (UNESCO-UNEVOC, 2019).

Empirical studies in countries like Rwanda, Kenya, and Ghana show that targeted investments in TVET can lead to increased employment opportunities, reduced poverty, and enhanced economic inclusion (Oketch, 2014; AfDB, 2021, Ogur, 2023). Nevertheless, TVET institutions often struggle to keep pace with technological advancements and labor market changes, leading to a persistent skills gap across the continent.

The State of TVET in Nigeria

In Nigeria, the role of TVET has been acknowledged in several national policy documents, including the National Policy on Education and Vision 2050. However, the sector continues to face major systemic challenges. According to Ayonmike et al. (2015), issues such as outdated curricula, lack of qualified instructors, and inadequate infrastructure undermine the effectiveness of TVET programs. Additionally,

many Nigerian youths perceive vocational education as a last resort, contributing to low enrollment rates.

Research by the National Board for Technical Education (NBTE) highlights that less than 10% of secondary school graduates transition to vocational institutions, despite the growing need for skilled labour in sectors like construction, agriculture, and ICT (NBTE, 2020). Furthermore, the mismatch between TVET offerings and market needs exacerbates unemployment and underemployment, particularly among graduates of technical institutions.

Recent initiatives, such as the Nigerian Youth Employment Action Plan (NIYEAP) and partnerships with international bodies like GIZ and UNESCO, aim to reposition TVET as a viable pathway for youth empowerment and sustainable development (ILO, 2021). However, without coordinated policy implementation, consistent funding, and private sector engagement, the potential of TVET remains largely untapped.

TVET as a Catalyst for Sustainable Development in Nigeria

Sustainable development, as defined by the United Nations (1987), involves meeting the needs of the present without compromising the ability of future generations to meet theirs. This multidimensional concept requires a strategic balance between economic advancement, social well-being, and environmental protection. Technical and Vocational Education and Training (TVET) has the potential to be a powerful instrument in achieving this balance, particularly in a developing country like Nigeria with a large youth population and an urgent need for inclusive growth.

Economic Sustainability: Addressing Unemployment and Enhancing Productivity

One of Nigeria's most pressing challenges is youth unemployment, which stood at over 40% in 2023 (NBS, 2023). TVET provides a direct response by equipping individuals with employable and entrepreneurial skills relevant to key sectors such as manufacturing, agriculture, construction, and ICT. By training individuals in trades and technical competencies, TVET reduces reliance on formal employment and fosters self-reliance through entrepreneurship (Aina, 2009).

Furthermore, TVET contributes to national productivity by narrowing the skills gap that often hampers industrial performance. Skilled technicians and artisans are essential for achieving Nigeria's industrialization goals and for participating in the African Continental Free Trade Area (AfCFTA). For example, the agricultural value chain can be boosted through training in agro-processing, post-harvest handling, and mechanized farming—all critical for food security and export potential.

Key impact areas include:

- Employment generation and job readiness
- Growth of small and medium enterprises (SMEs)
- Increased industrial competitiveness

Social Sustainability: Promoting Inclusion, Equity, and Social Stability

TVET also promotes social sustainability by offering marginalized groups—such as rural youth, women, and persons with disabilities—opportunities for economic inclusion. Unlike conventional academic routes, vocational training often requires shorter durations and is more adaptable to local contexts, making it accessible to those who might otherwise be excluded from formal education systems (UNESCO, 2016).

By engaging youths constructively, TVET can help reduce crime rates, curb youth restiveness, and promote peace and civic participation. It also plays a role in achieving gender equity, as programs tailored for women and girls can help close the gender gap in traditionally male-dominated trades and professions (ILO, 2018).

Key social benefits include:

- Poverty reduction and social mobility
- Empowerment of disadvantaged groups
- Youth engagement and crime prevention

Environmental Sustainability: Advancing Green Skills and Sustainable Practices

Environmental degradation and climate change present significant threats to Nigeria's development. TVET institutions can lead the way in fostering environmental awareness and building green competencies in renewable energy, sustainable agriculture, waste management, and eco-friendly construction (ILO-UNESCO, 2019).

By incorporating environmental education and green skills into curricula, TVET can prepare the workforce for emerging green jobs and support Nigeria's transition to a low-carbon economy. For example, training in solar panel installation or sustainable building techniques not only creates employment but also aligns with Nigeria's climate commitments under the Paris Agreement.

Examples of green TVET pathways:

- Renewable energy technicians (solar, wind)
- Organic and sustainable farming specialists
- Green construction and environmental auditing

Linking TVET and Sustainable Development

The impact of TVET is not isolated. Economic empowerment through TVET enhances household incomes, which improves health, education, and well-being. Socially, empowered citizens are more likely to participate in governance and demand accountability. Environmentally, a trained workforce reduces harmful practices and promotes sustainable alternatives. These interlinkages underscore the transformative power of TVET in achieving the Sustainable Development Goals (SDGs), particularly Goals 1 (No Poverty), 4 (Quality Education), 8 (Decent Work), and 13 (Climate Action). Adebisi, (2023) emphasised that: Vocational and technical education helps to tackle the problems of unemployment and reduces the number of people seeking white collar jobs. Training the youths and adults in vocational and technical trades empowers them to be self-reliant and self-employable by acquiring work skills in different vocations such as electrical, plumbing, automobile, vulcanizing, computer engineering, agriculture, cloth weaving among others culminating in adequate money circulation in the economy. Vocational and technical education is a motivating force in individuals to work for the nation because it stimulates technological and industrial development through the production of competent and honest workers who are capable of utilising the abundant natural and human resources available in a country for economy and industrial growth and development. These is in line with SDGs 1, 4 and 8, which is No poverty, Quality education and decent work respectively. With TVET knowledge acquisition and application, quality education is enhanced, skilled workers are engaged the work that is dignifying (decent work), which in the long run results in reduced deprivation of basic necessities of life (No poverty).

Conceptual Framework

The conceptual framework for this study is grounded in the understanding that **Technical and Vocational Education and Training (TVET)** is both a policy instrument and a developmental pathway that can drive progress across the three pillars of **sustainable development**: economic growth, social inclusion, and environmental protection.

This framework integrates **Human Capital Theory** (Becker, 1993) and the **Sustainable Development Paradigm** (UN, 2015) to explain how investment in TVET leads to skill acquisition, productivity, and social equity, which collectively contribute to national development goals.

1) **Components of the Framework**

a) A. TVET Inputs

- Government policy and funding
- Curriculum and pedagogy
- Teacher training and infrastructure
- Public-private partnerships
- Industry-aligned standards

b) B. TVET Processes

- Skill acquisition (technical, vocational, entrepreneurial)
- Competency-based training
- Green and digital skill integration
- Internships, apprenticeships, and dual training

C. Sustainable Development Outcomes

Economic Outcomes

- Job creation and reduced unemployment
- Increased entrepreneurial activity
- Growth in non-oil sectors (e.g., manufacturing, agriculture)

Social Outcomes

- Youth empowerment and reduced crime
- Poverty alleviation
- Gender equality and inclusion of marginalized groups

Environmental Outcomes

- Workforce prepared for green jobs
- Adoption of sustainable practices in energy, farming, and construction
- Environmental awareness and community resilience

TVET Inputs → TVET Processes → Development Outcomes

Where:

- The **inputs** (e.g., policy, curriculum, funding) support effective **TVET delivery**.
- The **TVET processes** produce a skilled and adaptable workforce.
- The **outcomes** span the **economic, social, and environmental** dimensions of sustainable development.

This model emphasises the **systems-thinking approach**, showing how different inputs and processes interact to achieve national development goals and align with stated sustainable development goals.

GAPS IN THE LITERATURE

While existing literature underscores the transformative potential of TVET, few empirical studies in Nigeria directly link TVET reforms to measurable outcomes in sustainable

development. Additionally, there is limited research on the integration of green skills and environmental sustainability within Nigerian vocational programs. There is also a need for more context-specific evaluations of public-private partnerships in TVET delivery.

EMPIRICAL REVIEW

Ye, et.al, (2024), reviewed connect between sustainability of technical and vocational education and training (TVET) and vocational psychology in line with sustainable development goals. The study basically was exploratory and exposed factor. Key finding from the study: Although TVET is considered an important and irreplaceable educational system, research on TVET internationally still constitutes a relatively small proportion of research within the entire field of education.

Adebisi, (2023), examined policy formulation and implementation of Vocational and Technical Education (VTE) in some African countries. Exposed factor was adopted dealing basically with secondary data. Apart from Nigeria in West Africa, three other countries were randomly selected one each from South, East and North Africa respectively. The study found different objectives set on TVET by each country selected in the study, but unanimously agreed to proper implementation of TVET policy will be a panacea to youth unrestiveness in Africa.

Adeyemi, (2023), focused on vocational and technical education as a tool for sustainable development in Nigeria. Secondary data was deployed inferencing previous relevant studies. The study found that vocational technical education is useful in achieving sustainable development through a complete learning system providing relevant knowledge, skills and competencies for employability, quality living and learning outcomes.

Ogur, O.O. (2023). reviewed the role of TVET in promoting sustainable development and economic growth, with a focus on its potential to address issues of poverty, inequality, and unemployment. The study acknowledged with the proper acquisition and deployment of skill, TVET can contribute positive and significantly to sustainable development. The study may be relevant as it was done in Kenya, with almost similarities as Nigeria.

Lambini, et.al., (2021), highlighted available evidence from the ESD literature on VET skills development in advancing the SDGs. The study was exploratory as the researchers aim was to extract facts based on deductive reasoning. They found there was a need for further empirical work and policy discourse on educational transfer research in the framework of VET for sustainable development. The study relevance in Nigeria may be constrained as the study was done in Germany, a highly developed nation.

THEORETICAL REVIEW

Human Capital Theory was propounded by Gary Becker in 1964, and further developed by other scholars. The theory posits that investments in education, training, and health can increase an individual's productivity and earnings. The detailed that human capital simply is the stock of knowledge, skills, and personal attributes that makes individuals productive and valuable to employers and themselves. Investments in human capital, such as education and training, can generate returns in the form of higher earnings and improved employment prospects.
The theory assumes that individuals make rational decisions about investments in human capital based on expected returns. Proponents of the theory include: Theodore Schultz and Gary Becker. Schultz, emphasised the importance of human capital in economic development, particularly in developing countries. While Becker's work on human capital theory focused on the economic returns to education and training. Criticism of the stress on; Overemphasis on economic returns, Critics argue that human capital theory prioritises economic returns over social and personal benefits of education. The theory has been criticised for its narrow focus on individual investments in human capital, neglecting broader social and institutional factors.

Relevance to TVET in Nigeria: Developing skilled human capital theory highlights the importance of investing in TVET to develop a skilled workforce that meets industry needs. By developing human capital through TVET, Nigeria can drive economic growth and development. Furthermore, TVET can equip individuals with skills to secure gainful employment, reducing poverty and promoting sustainable development. In Nigeria, TVET can play a vital role in developing human capital, particularly in areas such as: Technical Skills: TVET programs can provide individuals with technical skills in areas like construction, manufacturing, and healthcare. Vocational Training: Vocational training centers can offer practical training in specific trades and occupations. Industry Partnerships and engagement: Collaboration with industry partners can ensure that TVET programs are aligned with industry needs, increasing the employability of graduates.

This framework suggests that **a well-structured and inclusive TVET system**, supported by effective policies, industry partnerships, and adequate resources, can serve as a **catalyst for sustainable national development**. By addressing unemployment, social inequality, and environmental challenges simultaneously, TVET becomes more than just an educational option rather, it becomes a strategic tool for positive change.

METHODOLOGY

Research Design

This study adopts a **qualitative, desk-based research design** that relies exclusively on **secondary data.** The aim is to analyse existing literature, policy documents, institutional reports, and national/international statistics to evaluate the role of Technical and Vocational Education and Training (TVET) in advancing sustainable development in Nigeria.

Data Sources

Secondary data were sourced from:

- **Academic journals and research articles (e.g.,** Google Scholar, JSTOR, ResearchGate)
- **Government publications** (e.g., National Bureau of Statistics [NBS], National Board for Technical Education [NBTE])
- **International organisations** (e.g., UNESCO, ILO, World Bank, African Union)
- **Policy documents and strategy papers** (e.g., National Policy on Education, NIYEAP 2021–2024)
- **Institutional reports** from TVET institutions and donor-funded programs (e.g., GIZ, DFID, TETFund)

Data Analysis

A **thematic analysis** was employed to identify recurring patterns across the secondary sources. Themes were structured according to the **three pillars of sustainable development—** economic, social, and environmental and how TVET contributes to each. Data were synthesised to uncover:

- Trends in TVET enrollment and employment outcomes
- Challenges facing the TVET sector
- Opportunities for policy reform and innovation

RESULTS AND DISCUSSION

Economic Impact of TVET in Nigeria

Secondary data indicate a strong correlation between effective TVET programs and reduced youth unemployment. According to the **National Bureau of Statistics (2023),** youth unemployment exceeds 40%, yet sectors such as agriculture, construction, and ICT report persistent skill shortages. TVET programs offer a viable route to close this gap by producing middle-level manpower.

The **NBTE (2020)** reports that graduates of accredited technical colleges have higher rates of self-employment and informal sector participation. TVET has also contributed to growth in SMEs, especially in trades like welding, fashion design, electrical works, and agro-processing.

However, challenges such as poor industry alignment, outdated equipment, and societal stigma persist. Comparative data from countries like **Ghana and Rwanda,** where strong public-private partnerships exist, suggest that **Nigeria lags in linking TVET to labor market demands** (Oketch, 2014).

Social Inclusion and Gender Equity

TVET plays a critical role in addressing social inequality. UNESCO (2019) emphasizes that TVET offers flexible, context-appropriate learning pathways for youth who are excluded from formal academic systems. In Nigeria, the **National Youth Employment Action Plan (2021–2024)** targets 3.7 million youths for skills acquisition, with emphasis on girls and persons with disabilities.

Programs like **N-Power and YouWin** have included vocational skill tracks, though sustainability and impact evaluations remain limited. Despite government efforts, only about 20% of TVET beneficiaries are female (NBTE, 2021), highlighting persistent gender disparities.

Societal perceptions that stigmatize vocational careers as inferior to university degrees further limit TVET uptake, especially among urban youth. Yet data show that **graduates from dual-system vocational schools (e.g., GIZ-supported centers)** are more likely to find decent work than their counterparts in overloaded universities.

Environmental Integration and Green Skills

Evidence from UNEVOC and ILO (2021) suggests that Nigerian TVET institutions have begun integrating **green skills**, though the pace remains slow. Pilot projects in Lagos, Abuja, and Kaduna have introduced modules on solar energy, sustainable construction, and climate-smart agriculture.

Despite this progress, **there is no unified national green TVET policy**, and many institutions lack the capacity to deliver environmentally focused curricula. In contrast with, South Africa and Kenya where green TVET is embedded in national sustainability strategies.

Lack of coordination leaves Nigeria's workforce unprepared for emerging "green jobs" in energy, such as waste management, and sustainable transport sectors, which are vital for meeting the country's **Net Zero 2060 commitment.**

Challenges

Secondary data reveal several structural barriers to effective TVET implementation in Nigeria:

- **Inadequate funding:** Only a fraction of education budgets are allocated to vocational training.
- **Fragmentation:** Multiple agencies oversee TVET without coordination.
- **Weak private sector engagement:** Employers often find graduates lacking in practical experience. Graduates are unemployable
- **Low prestige:** Cultural attitudes continue to position vocational education as second-tier or last resort.

FINDINGS

Based on the reviewed literature and secondary data analysis, the following key findings emerge:

i. TVET can significantly contribute to Nigeria's economic growth and poverty reduction.
ii. TVET enhances social inclusion but suffers from gender disparity and poor public perception.
iii. TVET encourages environmental education which is a new concept, but lacks strategic integration.
iv. Institutional, financial, and cultural challenges hinder full implementation and realisation of TVET's developmental potential.

CONCLUSION

Conclusively, **Technical and Vocational Education and Training (TVET)** is a viable and underutilised tool for achieving **sustainable development** in Nigeria. By equipping individuals with practical, market-relevant, and environmentally conscious skills, TVET directly contributes to the three pillars of sustainability; **economic empowerment, social inclusion, and environmental stewardship**.

Despite its potential, Nigeria's TVET sector is plagued by systemic challenges, including underfunding, fragmented oversight, weak industry linkages, and negative societal perceptions. Addressing these issues is essential for unlocking the full potential of TVET as a catalyst for national development and for achieving the Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 8 (Decent Work), and SDG 13 (Climate Action).

RECOMMENDATIONS

To maximise the contribution of TVET to sustainable development in Nigeria, the following recommendations are proposed:

i. Develop a national green TVET policy aligned with climate goals and emerging job markets.
ii. Increase budgetary allocation and private sector investment in TVET infrastructure.
iii. Align curricula with labor market needs and emphasize practical learning.
iv. Promote gender-sensitive programs and campaigns to rebrand TVET.
v. Establish a centralised data system for tracking TVET outcomes and employment trends.

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