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## A Systems-Based Assessment Model of Technical and Vocational Education Constraints and Strategies for Enhancing Youth Empowerment Outcomes in Kano State, Nigeria

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### ABSTRACT

Technical and Vocational Education and Training (TVET) remains a strategic instrument for addressing youth unemployment and enhancing socio-economic development in Nigeria. However, persistent structural, institutional, and pedagogical constraints have limited its effectiveness in achieving meaningful youth empowerment outcomes, particularly in Kano State. This study develops a systems-based assessment model to analyze the interrelationships between TVET constraints and empowerment outcomes, drawing on secondary empirical literature. The model integrates curriculum relevance, institutional capacity, resource adequacy, policy implementation, and labor market alignment as interconnected subsystems influencing employability and entrepreneurial readiness among youths. Findings from synthesized literature indicate that inadequate training materials, weak curriculum integration, poor funding mechanisms, and limited industry linkage significantly reduce TVET effectiveness (Adebisi, 2007; Ofoha et al., 2009). Conversely, evidence suggests that strategic reforms in curriculum design, skills alignment, and policy execution can substantially improve youth employment outcomes (Ajibola, 2008; Kennedy, 2011). The study concludes that a holistic systems-based intervention is essential for optimizing TVET performance in Kano State. It recommends integrated policy coordination, enhanced infrastructure investment, and dynamic curriculum restructuring aligned with industrial demands.

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## 1. INTRODUCTION

### 1.1 Background

Juvenile Technical and Vocational Education and Training (TVET) has emerged as a critical driver of workforce development and economic transformation globally. In developing economies such as Nigeria, TVET plays a central role in equipping youths with practical skills necessary for employment, entrepreneurship, and industrial productivity. Despite its importance, the Nigerian TVET system has faced persistent challenges related to inadequate infrastructure, outdated curriculum structures, insufficient funding, and weak policy implementation mechanisms (National Policy of Education, 2004).

In Kano State, where youth unemployment rates remain significantly high, TVET is expected to serve as a strategic empowerment tool. However, systemic inefficiencies have undermined its potential impact. Studies have shown that training materials are often inadequate and poorly utilized, limiting students' employability outcomes (Adebisi, 2007). Additionally, misalignment between curriculum content and labor market demands has further reduced the relevance of vocational training programs (Ajibola, 2008).

### 1.2 Problem Statement

Despite numerous reforms, TVET in Nigeria continues to suffer from structural inefficiencies that hinder youth empowerment. The gap between policy intentions and practical implementation has resulted in a mismatch between acquired skills and labor market requirements. This disconnect is particularly evident in Kano State, where many TVET graduates struggle to secure employment or establish viable entrepreneurial ventures.

### 1.3 Objectives of the Study

The main objectives of this study are to:

1. Develop a systems-based model for assessing TVET constraints.
2. Identify key structural and institutional barriers affecting TVET effectiveness.
3. Examine the relationship between TVET quality and youth empowerment outcomes.
4. Propose strategic interventions for improving TVET systems in Kano State.

### 1.4 Scope and Significance

This study focuses on the Nigerian TVET system with particular emphasis on Kano State. It contributes to policy discourse by offering a systems-thinking approach that integrates multiple dimensions of TVET into a unified analytical framework.

## 2. LITERATURE REVIEW

TVET has been widely recognized as a mechanism for addressing unemployment and enhancing productivity in both developed and developing economies. Afeti (2007) emphasizes that TVET is essential for industrialization, particularly in economies transitioning from agrarian to industrial structures. Similarly, Alam (2008) highlights the role of vocational education in national development, noting its contribution to workforce skill enhancement and economic diversification.

In Nigeria, however, systemic challenges continue to undermine TVET effectiveness. Adebisin (2006) observes that the TVET system suffers from inadequate strategic focus and weak institutional frameworks. These challenges are compounded by insufficient budget allocation and poor expenditure control mechanisms in the education sector (Babalola, 2003).

Adebisi (2007) identifies inadequate training materials and poor utilization as major determinants of low employability among technical students. This aligns with findings by Omo-Ojugo and Ohiwerei (2008), who argue that institutional factors significantly affect teaching and learning outcomes in vocational education.

Curriculum relevance also remains a major concern. Ajibola (2008) notes that innovation in curriculum implementation is often hindered by policy-practice gaps. Kennedy (2011) further argues that work skill requirements in technical education are not adequately reflected in senior secondary school programs, leading to graduate skill mismatches.

From a broader perspective, Dike (2009) links youth unemployment in Nigeria to systemic educational failures, advocating for practical action-oriented reforms. Hartl (2009) expands this discussion by highlighting the importance of gender-sensitive TVET systems in poverty reduction, particularly in rural contexts.

International comparisons also provide valuable insights. Hao (2010) notes that China's vocational education system has been strategically prioritized for economic development, demonstrating the importance of policy consistency. Lynch (2009) similarly discusses reforms in the United States aimed at aligning career and technical education with labor market needs.

Martinez-Fernandez and Powell (2009) emphasize skills development strategies in Southeast Asia, highlighting the role of integrated policy frameworks in enhancing employability outcomes.

Collectively, the literature reveals a consistent pattern: TVET effectiveness is highly dependent on system-wide integration, adequate funding, curriculum relevance, and strong institutional coordination. However, there remains a research gap in applying systems-based analytical models to understand the interdependencies among these factors within the Nigerian context.

### 3. METHODOLOGY

#### 3.1 Research Design

This study adopts a systems-based analytical framework grounded in qualitative synthesis of existing literature. The systems approach is used to conceptualize TVET as an interconnected network of subsystems including policy, curriculum, institutional capacity, and labor market dynamics.

#### 3.2 Conceptual Framework

The proposed model conceptualizes TVET performance as a function of five interacting subsystems:

1. Policy Subsystem – Governs funding, regulation, and institutional direction (National Policy of Education, 2004).
2. Curriculum Subsystem – Determines relevance and adaptability of training content (Ajibola, 2008).
3. Institutional Subsystem – Includes infrastructure, teacher quality, and resource availability (Adebisi, 2007).
4. Labor Market Subsystem – Represents employment demand and industry requirements (Kennedy, 2011).
5. Outcome Subsystem – Measures youth empowerment indicators such as employability and entrepreneurship.

#### 3.3 Analytical Approach

The model uses systems thinking principles to analyze feedback loops between subsystems. For example, weak policy implementation reduces institutional capacity, which in turn affects curriculum delivery and labor market alignment. This creates a cyclical inefficiency that perpetuates poor youth outcomes.

#### 3.4 Limitations

The study is based on secondary data and literature synthesis, which limits empirical validation. However, the systems-based conceptualization provides a robust theoretical foundation for future quantitative modeling.

## 4. RESULTS

The synthesis of literature reveals a highly interconnected structure of constraints within the Technical and Vocational Education and Training (TVET) system in Nigeria, with specific implications for youth empowerment in Kano State. The systems-based analysis demonstrates that TVET inefficiencies are not isolated issues but rather interdependent failures across policy, curriculum, institutional capacity, and labor market alignment.

A dominant finding is that resource inadequacy and poor training infrastructure significantly weaken skill acquisition outcomes. Adebisi (2007) highlights that inadequate training materials directly reduce student employability, indicating that input-level deficiencies propagate through the entire educational system. In

Kano State, this manifests as outdated workshops, insufficient tools, and limited access to modern technical equipment, resulting in graduates with low industry readiness.

Another key finding is the curriculum irrelevance problem, where training content is misaligned with labor market needs. Ajibola (2008) emphasizes that curriculum implementation gaps hinder innovation in basic education, while Kennedy (2011) specifically identifies a mismatch between work skill requirements and technical education outcomes. This misalignment creates a structural disconnect between what is taught and what industries demand.

The study also identifies policy implementation inconsistency as a systemic barrier. Although the National Policy of Education (2004) provides a framework for vocational education development, weak execution and poor monitoring mechanisms reduce its effectiveness. This results in fragmented implementation across institutions, particularly at the state level.

Furthermore, institutional inefficiency emerges as a critical constraint. Ofoha et al. (2009) argue that secondary school curriculum implementation in Nigeria is poorly coordinated, limiting socio-economic empowerment outcomes. This inefficiency is compounded by inadequate teacher preparation, poor funding allocation, and weak administrative oversight (Babalola, 2003).

The findings also show that labor market disconnect is a persistent challenge. Dike (2009) notes that youth unemployment is largely driven by structural mismatches between education outputs and labor market demands. This is reinforced by Lynch (2009), who stresses the need for stronger career-technical alignment to ensure employability relevance.

Overall, the systems model reveals a reinforcing cycle of inefficiency: poor funding leads to weak infrastructure, which reduces training quality, resulting in unemployable graduates, thereby increasing unemployment rates and reducing incentives for system investment. This cyclical failure significantly limits youth empowerment outcomes in Kano State.

## 5. DISCUSSION

The findings of this study demonstrate that TVET constraints in Kano State are systemic rather than isolated, confirming the applicability of systems theory in understanding educational inefficiencies. The interdependence of policy, curriculum, institutional capacity, and labor market dynamics creates a complex adaptive system where failure in one subsystem amplifies weaknesses in others.

From a theoretical perspective, the study aligns with Afeti (2007), who argues that vocational education is central to industrialization. However, the Nigerian context reveals a contradiction: despite policy recognition of TVET importance, implementation remains weak. This gap between policy intent and operational reality reflects what Babalola (2003) describes as inefficient resource management and budget execution in education systems.

The curriculum mismatch identified in the findings supports Ajibola (2008) and Kennedy (2011), who both emphasize the need for curriculum reform aligned with modern labor market demands. In Kano State, outdated curricula hinder innovation and prevent students from acquiring relevant technical competencies. This suggests that curriculum reform must be continuous and industry-driven rather than static and institutionally controlled.

Institutional inefficiency is another major concern. The findings corroborate Ofoha et al. (2009), who highlight weak implementation mechanisms in Nigerian education systems. Without strong institutional governance, even well-designed policies fail to produce measurable outcomes. This indicates that institutional strengthening is a prerequisite for any successful TVET reform.

The labor market disconnect reinforces the argument made by Dike (2009), who links unemployment to structural educational failures. The inability of TVET graduates to meet industry requirements suggests a lack of feedback loops between educational institutions and employers. Lynch (2009) supports this by

advocating for integrated career and technical education systems that respond dynamically to workforce needs.

International comparisons, such as Hao (2010), show that countries with strong TVET systems prioritize policy consistency and industry collaboration. China's model demonstrates that sustained investment and strategic alignment can significantly enhance vocational education outcomes. Similarly, Martinez-Fernandez and Powell (2009) emphasize the importance of skills ecosystems, where education systems are closely integrated with economic planning.

However, this study also identifies limitations in applying international models directly to Nigeria due to contextual differences such as governance structure, funding capacity, and institutional maturity. Therefore, localized adaptation of systems-based strategies is necessary.

Overall, the discussion confirms that improving youth empowerment outcomes in Kano State requires a holistic systems intervention. Isolated reforms in curriculum or infrastructure alone are insufficient without addressing the interdependent nature of the TVET ecosystem.

## 6. CONCLUSION

This study developed a systems-based assessment model to examine constraints affecting Technical and Vocational Education and Training (TVET) and their impact on youth empowerment in Kano State, Nigeria. The findings reveal that TVET challenges are multidimensional and interconnected, spanning policy inefficiencies, curriculum misalignment, inadequate infrastructure, and weak labor market integration.

The study contributes theoretically by introducing a systems-thinking perspective to TVET analysis, demonstrating that educational outcomes are shaped by dynamic interactions among subsystems rather than isolated factors. Practically, the findings highlight the urgent need for policy harmonization, curriculum restructuring, and institutional capacity building.

To enhance youth empowerment outcomes, the study recommends strengthening industry-academia collaboration, increasing funding allocation, modernizing training infrastructure, and implementing continuous curriculum updates aligned with labor market demands.

Future research should focus on empirical validation of the proposed systems model using quantitative data and simulation-based approaches to measure causal relationships between TVET components and employment outcomes.

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