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Funding of Technology Education in A Distressed Economy: Challenges, Implications, and Strategic Pathways for Nigeria

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Abstract **Original Research Article**

Technology Education (TE) is vital to economic diversification and youth employment, but there is always a challenge of funding, particularly in economies in distress. This study focused on sources, adequacy, challenges and implication of TE funding in Nigeria which is currently experiencing inflation, fiscal deficit and currency depreciation. The design used was descriptive survey and document analysis design. The primary data was gathered from the 420 administrators, lecturers and students of the 7 public Universities and Polytechnics in Southwest Nigeria with the use of a validated "Technology Education Funding Assessment Questionnaire (TEFAQ)" having Cronbach $\alpha = 0.87$. The secondary data was retrieved from the documents of TETFund, NUC, and Budget office documents from 2018 to 2024. The data were analyzed by mean, standard deviation, percentage, and content analysis. The largest source of funding was from government subvention and TETFund allocations, accounting for 78% of TE budgets. The adequacy of funding, however, was rated low with a mean score of 2.19 in the cluster. Due to inflation, real funding fell by 34% from 2018-24. While budgetary underfunding, delay in funding, dependence on government, limited contribution of the private sector, and lack of accountability were identified as key challenges. Consequences include outdated equipment, limited implementation time, and a lack of employability of graduates, as well as delayed entrepreneurship development. Nigeria needs to diversify the sources of funding for TE in an ailing economy by making use of PPPs, levies on sectors, alumni endowment fund and internally generated revenue from TE workshops. There is a need for performance-based funding and fiscal discipline. Originality/Value: This research is empirical and gives policy options for sustainability, not relying exclusively on oil revenue, during the era of economic crisis.

Keywords: Funding, technology education, distressed economy, TETFund, sustainability, Nigeria

1. Introduction

Education funding is a critical determinant of quality, access, and relevance, particularly for Technology Education (TE), which is capital-intensive (World Bank, 2024). TE encompasses engineering, applied sciences, vocational, and technical programs designed to produce manpower for industrial and technological development (Federal Ministry of Education, 2023). Unlike conventional academic programs, TE requires continuous investment in workshops, laboratories, modern equipment, consumables, and maintenance (Mohammed & Bello, 2023).

Nigeria is currently operating in a "distressed economy" characterized by double-digit inflation, currency depreciation, rising public debt, and dwindling oil revenue (National

Bureau of Statistics, 2024). Between 2018 and 2024, inflation averaged 18.7%, while the naira depreciated by over 150% against the dollar. This macroeconomic stress directly affects education budgets, purchasing power, and the cost of imported equipment critical for TE (Budget Office of the Federation, 2024).

Despite the strategic role of TE in driving SDG 4, SDG 8, and SDG 9, funding has remained grossly inadequate. UNESCO recommends that developing nations allocate at least 15-20% of annual budgets to education, yet Nigeria's allocation has hovered between 5-7% (UNESCO). Within this, TE receives a disproportionately smaller share due to its high cost and perception as "expensive education" (Oloruntoba & Okeke, 2024). While studies have examined general education funding in Nigeria (Oladipo & Adewale, 2024), few have focused specifically on TE funding dynamics during economic distress. This gap limits evidence-based policy for sustaining TE when government revenue is volatile. This study therefore examined: 1) Sources of TE funding, 2) Adequacy of funding, 3) Challenges of funding in a distressed economy, and 4) Implications for TE delivery and youth development. The findings will guide policymakers, TETFund, NUC, and institutional managers on sustainable funding strategies.

Funding is financial resources that are raised and used in support of TE programs. The sources are government subvention, TETFund, tuition, grants, donations, PPPs, as well as internally generated revenue (Ibrahim & Sani, 2024). One of the unique challenges of TE is the high costs of machines, tools, safety systems, and maintenance (Eze & Okoro, 2024). A Distressed Economy is one with macroeconomic instability, such as high inflation, fiscal deficit, currency depreciation, and less government income (Adebayo and Yusuf, 2023). In these settings, education faces scarcity of resources alongside other sectors and is typically underfunded (World Bank, 2024).

The study is based on the theory of Human Capital Theory as presented by Becker (1964) and Resource Dependence Theory by Pfeffer & Salancik (1977). Human Capital Theory suggests that returns on education investment are economic returns derived from skilled manpower. The lack of adequate funding for TE will result in a reduction in human capital, which, in turn, will restrict productivity and innovation (Becker, 2005). According to Resource Dependence Theory, organizations rely on external sources of resources to sustain their existence. Government-dependent TE institutions are fragile in times of economic crisis. Diversification of funding sources lessens dependence and increases sustainability (Pfeffer & Salancik, 2003).

Based on the survey conducted by Oladipo & Adewale (2024) in 15 Nigerian universities, it was reported that the TE departments received only 8% of the institutional budgets, while they consume 35% of the capital expenditure because of equipment costs. They decided that the primary reason for the lack of up-to-date workshops is underfunding. Mohammed & Bello studied TETFund allocations 2010-2022 and revealed that although the nominal allocations have gone up, the real value has come down by 29% because of inflation. The percentage of completed TE projects was 42% of the approved projects (Mohammed & Bello, 2023).

Oloruntoba & Okeke looked at the funding problems in the South West polytechnics and found that one of the big problems is the delay in the release of funds, corruption and lack of accountability. Approved budgets were not adequately released as reported by 67% of respondents (Oloruntoba & Okeke, 2024). In terms of TE in Germany and South Korea, both countries use industry levies, PPPs, and alumni funds to alleviate economic suffering globally. Germany is a country where 1.5% of payroll goes into TVET funding, which means that even in recessions, the funding is maintained (World Bank, 2024).

Much of the research to date is on general education funding or TE funding in less volatile economies. The empirical evidence in the area of TE funding strategies is quite limited, especially in a distressed economy such as Nigeria. This study aims to address this gap.

2. Methodology

2.1 Research Design

The research used in this study was a descriptive survey and document analysis. The descriptive survey design allowed quantitative data to be gathered from stakeholders in Technology Education on factors related to funding for Technology Education programmes, that is, the adequacy of funding, sources of funding, and challenges with funding for Technology Education programmes. The document analysis included an analysis of policy documents, funding reports, and budgetary records of relevant policies to look for trends and patterns of education funding for the period of study.

2.2 Population of the Study

The respondents were drawn from seven (7) public Universities and Polytechnics that run Technology Education programmes in Southwest Nigeria, and the target population of the study was 612 respondents. The population comprised Technology Education administrators, lecturers, and end-of-course students who were assumed to know the issues pertaining to funding.

2.3 Sample and Sampling Technique

The respondents were sampled by a stratified random sampling technique to ensure that there was adequate representation of the different categories of respondents across the participating institutions, to ensure that a sample size of 420 respondents were sampled. Besides, document analysis was also carried out with the funding and policy reports of the Tertiary Education Trust Fund (TETFund), the National Universities Commission (NUC), and the Budget Office of the Federation for the period 2018-2024.

2.4 Instrument for Data Collection

A researcher-made instrument called the Technology Education Funding Assessment Questionnaire (TEFAQ) was used to gather data. A questionnaire was divided into two sections. Section A was used to gather demographic data, and Section B had 28 items to measure the funding sources, funding level, funding challenges, and the effect of funding on the Technology Education programmes. The answers were given on a 4-point Likert scale from Strongly Agree to Strongly Disagree. A pilot study was conducted on the instrument, and the Cronbach's Alpha reliability coefficient was obtained as 0.87, which shows that the instrument has high internal consistency. The decision benchmark adopted was a mean score of 2.50.

2.5 Method of Data Analysis

Data were analyzed using descriptive statistics. To answer the research questions derived from the data from the questionnaire, mean and standard deviation were used, while the information from the reviewed documents was analysed using percentages. In the open-ended questions, responses were analysed using content analysis techniques in order to generate themes and insights. The Statistical Package for Social Sciences (SPSS) version 27.0 was used for all quantitative analyses.

3. Results

RQ1: Sources of TE funding

Source % Contribution	Mean		SD	Decision
Government subvention	52%	3.21	0.68	Major source
TETFund	26%	3.05	0.72	Major source

Tuition/fees		9%	2.18	0.89	Minor source
IGR from workshops	5%	1.98	0.91	Low	
PPP/Donations		4%	1.87	0.85	Low
Alumni/Grants	4%	1.79	0.83	Low	
Cluster Mean		*2.35*	*0.81*	*Govt-dependent*	

TE is over 78% dependent on government and TETFund, making it vulnerable to fiscal shocks.

RQ2: Adequacy of funding

Cluster mean = 2.19, indicating inadequate funding.

Item		Mean	SD	Decision
Budget allocation meets TE needs		2.12	0.94	Inadequate
Funds released on time		2.05	0.91	Inadequate
Purchasing power sufficient for equipment	2.21	0.88	Inadequate	
Maintenance budget adequate	2.31	0.82	Inadequate	
Cluster Mean		*2.19*	*0.89*	*Inadequate*

Document analysis showed nominal TE budget increased from ₦45.2bn in 2018 to ₦52.1bn in 2024, but real value declined 34% after adjusting for inflation.

RQ3: Challenges of TE funding in distressed economy

Cluster mean = 3.24. Top challenges: budgetary underfunding 89%, inflation 84%, late fund release 79%, overreliance on government 76%, weak private sector involvement 72%.

RQ4: Implications of poor funding

Cluster mean = 3.18. Implications: obsolete equipment 91%, reduced practical hours 87%, poor graduate skills 83%, low entrepreneurship 79%.

4. Discussion

Research Question 1: Sources of Technology Education Funding

The results showed that most of the programmes in Technology Education (TE) in the Southwest Nigerian tertiary institutions are funded through government subventions and TETFund allocations. Both government subvention (52% Mean = 3.21), and TETFund (26% Mean = 3.05) were the major funding sources. Tuition/fees, however, as well as internally generated revenue (IGR) from workshops, public-private partnerships (PPP), donations, and alumni support, had low contributions, suggesting low diversification of funding sources.

The overall mean of the clusters is 2.35, which also indicates that funding for TE is heavily reliant on the government. There was a narrow funding base with government subventions and TETFund comprising more than 78% of the total funding. This public funding dependency creates pro-cyclical TE financing as government funds rise during booms, and drop precipitously in times of crisis – especially during a drop in oil prices. This is consistent with Resource

Dependence Theory, which suggests that an organization that is significantly dependent on a restricted outside resource base is at risk of environment shocks and economic shocks.

This funding structure runs counter to the Human Capital Theory (Becker, 2005), which argues that continued and stable investment in education and skills would be an essential condition for productivity and economic growth. In the case of Technology Education, scarce and volatile funding does not support long-term human capital development, particularly in the areas of skills that demand ongoing investments in up-to-date equipment and infrastructure.

The small proportion of financial support from IGR, PPPs and alumni funding also suggests limited commercialization of workshops and poor industry involvement. The industries in Nigeria contribute little in funding for TE (World Bank, 2024) as opposed to the industries that are actively involved in co-financing training and development of equipment in the Technical and Vocational Education and Training (TVET) system in Germany. This weak connection restricts opportunities for innovation, equipment upgrades, and relevant training experiences in the workplace.

Research Question 2: Adequacy of Funding

The result revealed that the funding for Technology Education is insufficient (2.19), which is represented by the cluster mean. The respondents indicated that the budget is not sufficient for institutional needs, funds sometimes are delayed, insufficient purchasing power to acquire modern equipment, and inadequate maintenance budgets.

Document analysis shows that the real value of budget allocation for the last five years has experienced a decline from ₦45.2 billion in 2018 to ₦52.1 billion in 2024, with a 34% drop. This means that budgetary increases are not necessarily accompanied by funding capacity gains. The impact of inflation on purchasing power is significant; essential imported equipment, laboratory equipment, and diagnostic machines are becoming unaffordable (Budget Office of the Federation, 2024). Another factor is that funds are frequently delayed, cutting off procurement lines. During periods of price increases, the scarcity of funds is aggravated by institutions having to buy equipment. All of these constraints account for the fact that many TE workshops are outdated, even with the nominal budgets that they receive.

Research Question 3: Challenges of TE Funding in a Distressed Economy

The study found that there was a high perception of challenges (cluster mean = 3.24), which means that there were serious funding constraints. The biggest challenge was underfunding, while inflation, delayed fund release, overreliance on government funding, and low participation from the private sector were all a close second. In addition, macroeconomic uncertainty exacerbates these challenges. Inflation raises the price of equipment and instructional materials, and exchange rate fluctuations increase the cost of imported technical equipment. The delay in fund releases also hinders the planning and procurement of academics, which impacts the efficiency of the institution. Poor PPPs and industry participation indicate an overall underdevelopment of institutional industry linkages, a necessary precondition for sustainable TE financing.

Research Question 4: Implications of Poor Funding

The results indicated that the lack of adequate funding has a negative effect on Technology Education programmes (cluster mean = 3.18). The most significant one was obsolete equipment (91%), followed by fewer hours for practical trainings (87%), inadequate acquisition of graduate skills (83%) and entrepreneurship skills (79%).

The meaning of these outcomes is especially important since Technology Education is a learning field that requires modern technological infrastructure and is very much practice-oriented. Low funding leads to low exposure to current technologies and subsequently impacts students' employability and ability to innovate. As a result, graduates are equipped with outdated skills which leads to skills mismatch and under

employment in the labour market.

There are issues of a wider socio-economic nature. It continues to create unemployment among the youths and dependence on foreign technical expertise and services (Eze & Okoro, 2024). The lack of industry collaboration and training facilities with modern standard affects the ability of graduates to play an active role in achieving the productivity and technological development of the nation. The results indicate that the current and unstable funding mechanisms are adversely affecting the effectiveness of Technology Education in Nigeria and have implications for human capital development and economic competitiveness.

5. Conclusion and Recommendation

5.1 Conclusion

The study leaves it to the conclusion that funding of TE in Nigeria's distressed economy is not adequate and sustainable. Excessive reliance on government, inflation and inadequate funding systems have affected the acquisition of equipment, equipment maintenance and practical training. Diversified and resilient funding is essential to TE's mandate of economic diversification and youth employment.

5.2. Recommendation

There is need for institutions to diversify their funding sources by expanding their internally generated revenue through commercial workshops, consultancy services, and production units, besides the institutionalization of alumnae endowment funds for sustainable funding (Ibrahim & Sani, 2024). There should also be a strengthened public-private partnership framework with industries that gain from TE graduates paying a small payroll levy (e.g., 1% TE Development Levy) to improve industry participation, as seen in ITF and NSITF models (World Bank, 2024).

TETFund should implement performance-based funding whereby the institutions are rewarded on the basis of employability of their graduates, innovation, and research output, and not just inputs (UNESCO). The Budget Office should use inflation-indexed budgeting so that the real value of TE allocations are not eroded due to rising inflation (Budget Office of the Federation, 2024). Further, there is need for improved accountability measures by conducting annual audits on the procurement process by NUC and EFCC, with complete digitisation of the procurement process to reduce the leakages (Oloruntoba & Okeke, 2024). Lastly, the government should promote local production of TE equipment by giving targeted incentives to decrease imports and foreign exchange tension (Federal Ministry of Education, 2023).

Conflict of Interest

The authors declare that there is no conflict of interest

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