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Financing Mechanisms of Public TVET Institutions and Their Implications for Quality Education and Training in Kenya

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ABSTRACT

Sustainable financing is essential for the effective functioning of Technical and Vocational Education and Training (TVET) institutions and the provision of quality education and training. In Kenya, expanding enrolments, technological advancements, and increasing demand for industry-relevant skills have heightened the need for diversified and sustainable financing mechanisms. This study examined the financing mechanisms of public TVET institutions and their implications for the quality of education and training in Kenya. Specifically, the study sought to: (i) identify the principal sources of financing for public TVET institutions; (ii) assess the status of educational and training resources supported through these financing mechanisms; and (iii) establish financing-related challenges and their implications for training quality. The study was anchored on Human Capital Theory and Resource Dependency Theory. A descriptive survey design, complemented by documentary and library-based analysis, was employed. From a target population of 300 public TVET institutions, a sample of 190 respondents comprising principals, Board of Management members, and Quality Assurance and Standards Officers (QUASOs) was selected using the Yamane formula with a 5% margin of error and a 10% adjustment for non-response. Data were collected through questionnaires and key informant interviews, and analyzed using SPSS and thematic techniques. Findings revealed that the major financing sources for public TVET institutions included government capitation and budgetary allocations, student fees, Higher Education Loans Board (HELB) support, National Government Constituencies Development Fund (NG-CDF) allocations, income-generating activities, donor funding, and public-private partnerships. Financing mainly supported classrooms, workshops, laboratories, training equipment, and digital infrastructure. However, inadequate funding, delayed disbursements, overreliance on government support, and disparities in resource allocation constrained the provision of quality training. The study recommends a blended financing model integrating government funding, student financial aid, industry partnerships, donor support, and institutional income-generating initiatives to enhance financial sustainability, improve training quality, promote equity and access, and strengthen graduate employability.

Keywords: Technical Vocational Education and Training (TVET), financing mechanisms, quality education and training, Human Capital

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1. INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Contextual Background

Technical and Vocational Education and Training (TVET) has increasingly assumed a central role in global efforts to promote economic competitiveness, workforce development, technological innovation, and sustainable development. Across both developed and developing countries, TVET is recognized as a strategic mechanism for equipping individuals with practical competencies, occupational skills, and entrepreneurial capabilities required to participate effectively in dynamic labour markets (UNESCO, 2021; UNESCO-UNEVOC, 2023). The growing emphasis on knowledge-based economies, digital transformation, industrial modernization, and the Fourth

Industrial Revolution has elevated the importance of TVET as a critical component of human capital development and national productivity (World Bank, 2022; OECD, 2021).

The theoretical justification for investing in TVET is rooted in Human Capital Theory, which posits that expenditure on education and skills development constitutes an investment that enhances individual productivity, employability, and economic growth (Schultz, 1961; Becker, 1964, 1993). Countries that invest substantially in technical and vocational education tend to develop a more competent workforce capable of supporting industrial growth, innovation, and economic transformation. Similarly, UNESCO-UNEVOC (2023) argues that modern TVET systems are essential for preparing workers to adapt to rapidly changing technologies, evolving occupational structures, and emerging labour market demands. Consequently, governments worldwide are increasingly prioritizing TVET reforms aimed at improving access, quality, relevance, and employability outcomes.

International experiences demonstrate that successful TVET systems are characterized by sustainable financing mechanisms, strong industry linkages, effective quality assurance frameworks, and substantial investment in training infrastructure and human resources. Countries such as Germany, Finland, Switzerland, and Singapore have developed robust TVET systems through consistent public investment, employer participation, apprenticeship financing, and diversified funding arrangements (Gustafsson, 2011; King & Palmer, 2010). In these countries, financing extends beyond government allocations to include employer contributions, training levies, student support schemes, and public-private partnerships. Such diversified financing structures have enabled institutions to maintain modern workshops, laboratories, training equipment, and highly qualified instructors, thereby enhancing the quality and labour-market relevance of training.

In Africa, TVET has become a major policy priority due to persistent youth unemployment, skills mismatches, and the need to support industrialization and economic diversification. The African Union's Continental Education Strategy for Africa (CESA 2016–2025) identifies skills development and technical training as critical drivers of socio-economic transformation and sustainable development (African Union, 2018). Nevertheless, many African countries continue to face significant challenges related to inadequate financing, weak infrastructure, limited industry engagement, and poor quality assurance systems (Johanson & Adams, 2004; McGrath, 2012). These challenges have constrained the capacity of TVET institutions to produce graduates with competencies that match labour market requirements.

In Kenya, the importance of TVET has been recognized since independence. The Government has consistently viewed education and training as critical instruments for national development, social mobility, poverty reduction, and economic modernization (Government of Kenya, 1965; Abagi & Ogachi, 2014). The Sessional Paper No. 10 of 1965 emphasized education as the principal means of developing indigenous skilled manpower and expanding economic opportunities for all citizens. Over the years, successive education reforms have strengthened the role of TVET in supporting industrial development and workforce preparation.

The policy significance of TVET was further reinforced through the Constitution of Kenya (2010), which obligates the State to provide young people with access to relevant education and training opportunities. Kenya Vision 2030 similarly identifies TVET as a critical pillar for producing the middle-level technical workforce required to support the country's industrialization agenda and transition to a globally competitive middle-income economy (Republic of Kenya, 2007). The enactment of the Technical and Vocational Education and Training Act of 2013 and subsequent establishment of the TVET Authority (TVETA) strengthened institutional governance, quality assurance, accreditation, and regulation within the sector (Government of Kenya, 2013).

Recent reforms have transformed the TVET landscape in Kenya. Public investment in infrastructure development, student financing through the Higher Education Loans Board (HELB), curriculum reforms under the Competency-Based Education and Training (CBET) framework, and increased collaboration with industry have contributed to significant growth in enrolment and institutional expansion (Ministry of Education, 2023; TVETA, 2023). The Kenya Universities and Colleges Central Placement Service (KUCCPS) has also facilitated increased access to TVET programmes, reflecting changing societal perceptions regarding the value of technical and vocational skills.

Despite these achievements, the expansion of TVET has generated substantial financial pressures. Technical training is considerably more resource-intensive than general education because it requires specialized workshops, laboratories, consumable materials, simulation facilities, digital technologies, industrial attachments, and continuous upgrading of equipment to align with technological changes (Lauglo, 2005; UNESCO, 2016). Furthermore, the implementation of Competency-Based Education and Training requires significant investment in trainer capacity building, assessment systems, learning resources, and industry-based learning opportunities.

Consequently, sustainable and diversified financing has become an indispensable requirement for maintaining educational quality, institutional effectiveness, and labour-market responsiveness.

1.2. Problem Statement

Although Kenya has made significant progress in expanding access to Technical and Vocational Education and Training, concerns continue to emerge regarding the adequacy, sustainability, and effectiveness of financing mechanisms supporting public TVET institutions. The rapid growth in enrolment, institutional expansion, and implementation of competency-based training have increased demand for financial resources needed to support infrastructure development, acquisition of modern equipment, digital transformation, trainer recruitment, industrial attachments, and quality assurance systems (TVETA, 2023; Ministry of Education, 2023).

Evidence from previous studies suggests that many public TVET institutions continue to operate under significant financial constraints despite increased government support (Abagi & Ogachi, 2014; Onsomu et al., 2006). Inadequate funding, delayed disbursement of capitation funds, dependence on tuition fees, and limited alternative revenue sources have constrained the ability of institutions to provide modern and industry-responsive training environments. As a result, many institutions struggle with obsolete equipment, inadequate workshops and laboratories, shortages of qualified trainers, insufficient learning materials, and limited opportunities for industrial exposure. These deficiencies undermine the effective implementation of competency-based curricula and negatively affect the quality of graduates produced.

The challenge is particularly significant because TVET quality is directly linked to the availability of financial resources. Unlike conventional academic programmes, technical training depends heavily on practical instruction, modern technologies, and close collaboration with industry. Without adequate and predictable financing, institutions may be unable to maintain training facilities, update equipment, support industrial attachments, or recruit and retain competent trainers. Consequently, graduates may enter the labour market with skills that are outdated or insufficiently aligned with employer expectations, thereby reducing employability and productivity (World Bank, 2022; UNESCO-UNEVOC, 2023).

Although existing literature has examined TVET reforms, employability, access, governance, and curriculum implementation in Kenya, limited empirical attention has been devoted to understanding how different financing mechanisms influence the quality of education and training in public TVET institutions. Moreover, little is known about the extent to which government funding, student fees, HELB support, donor funding, income-generating activities, public-private partnerships, and constituency development funds collectively contribute to quality enhancement. This knowledge gap limits evidence-based policymaking and institutional planning regarding sustainable TVET financing.

It is against this background that the present study sought to examine the financing mechanisms of public TVET institutions and their implications for the quality of education and training in Kenya. Specifically, the study aimed to identify the principal sources of financing, assess the educational and training resources supported through these mechanisms, and establish financing-related challenges that influence the quality of training outcomes in public TVET institutions.

1.3. Purpose of the Study

The purpose of this study was to examine the financing mechanisms of public Technical and Vocational Education and Training institutions and their implications for the quality of education and training in Kenya.

Objectives of the Study

The following objectives guided the study:

1. To identify the principal financing mechanisms supporting public TVET institutions in Kenya.
2. To assess the status of educational and training resources supported through these financing mechanisms.
3. To establish the financing-related challenges affecting public TVET institutions and their implications for quality education and training.

1.4. Theoretical Framework

This study was anchored on two complementary theories: Human Capital Theory (HCT) and Resource Dependency Theory (RDT). Together, the theories provide a robust framework for understanding how investments in education and training, as well as the availability and management of financial resources, influence the quality of Technical and Vocational Education and Training (TVET) institutions in Kenya.

1.4.1. Human Capital Theory

Human Capital Theory was pioneered by Schultz (1961) and further developed by Becker (1964, 1993). The theory posits that investments in education, training, and skills development enhance the productive capacities of individuals, thereby contributing to economic growth, improved labour market outcomes, and national development. According to the theory, expenditure on education should be viewed not as consumption but as an investment that generates long-term social and economic returns through increased productivity, employability, innovation, and earnings.

The theory has become one of the most influential frameworks in educational planning and financing because it explains the relationship between educational investment and economic performance (Psacharopoulos, 1994; Psacharopoulos & Patrinos, 2018). Governments invest in education and training with the expectation that graduates will acquire relevant knowledge, skills, and competencies that contribute to national productivity and competitiveness. In the context of TVET, Human Capital Theory suggests that adequate financing is essential for the provision of quality training facilities, modern workshops, laboratories, digital technologies, instructional materials, and competent trainers. Such investments enhance the acquisition of technical and entrepreneurial skills that improve graduate employability and support industrial and economic development (World Bank, 2022; UNESCO-UNEVOC, 2023).

The theory is particularly relevant to this study because public TVET institutions are expected to produce skilled human resources capable of supporting Kenya's industrialization agenda as envisioned in Kenya Vision 2030 (Republic of Kenya, 2007). Consequently, financing mechanisms that ensure adequate and sustainable resource allocation are critical for enhancing training quality and maximizing the returns to educational investment.

1.4.2. Resource Dependency Theory

Resource Dependency Theory (RDT), developed by Pfeffer and Salancik (1978), provides a complementary perspective by focusing on how organizations acquire and manage resources necessary for their survival, effectiveness, and growth. The theory argues that organizations do not operate in isolation but depend on external actors and environmental conditions for critical resources. As a result, institutions continually seek to establish relationships with governments, donors, industries, households, and other stakeholders that control the resources required for organizational functioning.

Applied to the education sector, Resource Dependency Theory suggests that educational institutions rely on diverse funding sources to support infrastructure development, instructional delivery, staff remuneration, quality assurance, and student support services. Public TVET institutions in Kenya depend on government capitation, student fees, Higher Education Loans Board (HELB) support, donor funding, income-generating activities, National Government Constituencies Development Fund (NG-CDF) allocations, and public-private partnerships to sustain their operations (TVETA, 2023; Ministry of Education, 2023). The theory further explains why institutions that depend excessively on a single funding source may become vulnerable to financial instability, delayed disbursements, policy changes, and resource shortages.

Resource Dependency Theory therefore provides an appropriate lens for examining how TVET institutions mobilize, diversify, allocate, and utilize financial resources to achieve educational objectives. It also underscores the importance of establishing diversified and sustainable financing mechanisms that reduce institutional vulnerability while enhancing efficiency and quality outcomes.

1.4.2. Relevance of the two theories

The two theories are complementary and collectively provide a comprehensive explanation of the relationship between financing mechanisms and educational quality in public TVET institutions. Human Capital Theory emphasizes the importance of investing in education and skills development to improve productivity, employability, and economic growth, while Resource Dependency Theory explains how institutions acquire, manage, and utilize financial resources necessary for delivering quality training. Together, the theories suggest that adequate, predictable, and diversified financing enables TVET institutions to provide modern facilities, competent trainers, relevant learning experiences, and industry-responsive programmes that ultimately enhance graduate competence, employability, and national development. The theories therefore provide the conceptual foundation for examining how financing mechanisms influence the quality of education and training in Kenya's public TVET institutions.

2.0 Research Design and Methodology

This study adopted a descriptive survey research design complemented by documentary analysis and qualitative inquiry. The design was considered appropriate because it facilitated the systematic collection, analysis, and interpretation of data on financing mechanisms, resource allocation patterns, and their implications for the quality of education and training in public TVET institutions in Kenya. Descriptive survey designs are particularly useful for examining prevailing conditions, practices, perceptions, and relationships within educational settings without manipulating study variables (Creswell & Plano, 2018; Orodho, 2017).

The target population comprised 300 public TVET institutions distributed across Kenya. Using Yamane's (1967) sample size determination formula at a 5% margin of error and 95% confidence level, a sample of 171 institutions was obtained. To cater for possible non-response and incomplete returns, the sample was adjusted upward by 10%, yielding a final sample of 190 respondents comprising principals, members of Boards of Management (BOMs), and Quality Assurance and Standards Officers (QUASOs).

Data were collected using structured questionnaires and key informant interview schedules. Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) through descriptive and inferential statistical techniques, while qualitative data were analyzed thematically following established qualitative analytical procedures (Braun & Clarke, 2022). The integration of quantitative and qualitative findings enhanced methodological triangulation and provided a comprehensive understanding of financing mechanisms and their implications for educational quality in public TVET institutions (Creswell & Plano Clark, 2018; Orodho et al., 2016).

3.0 FINDINGS AND DISCUSSIONS

3.1 Sources of Financing of Public TVET Institutions and Their Implications for Quality Education and Training

3.1.1. Overview of findings on sources of Financing TVET

The findings presented in Figure 1 indicate that public TVET institutions in Kenya rely on a diversified financing structure comprising government capitation and budgetary allocations (34.21%), trainee fees and household contributions (18.42%), Higher Education Loans Board (HELB) financing (13.16%), income-generating activities (10.53%), development partner support (10.53%), and comparatively lower contributions from Constituency Development Fund (CDF) and County Government support. These findings suggest that although government funding remains the dominant financing mechanism, public TVET institutions increasingly depend on complementary sources to meet growing demands associated with quality training provision.

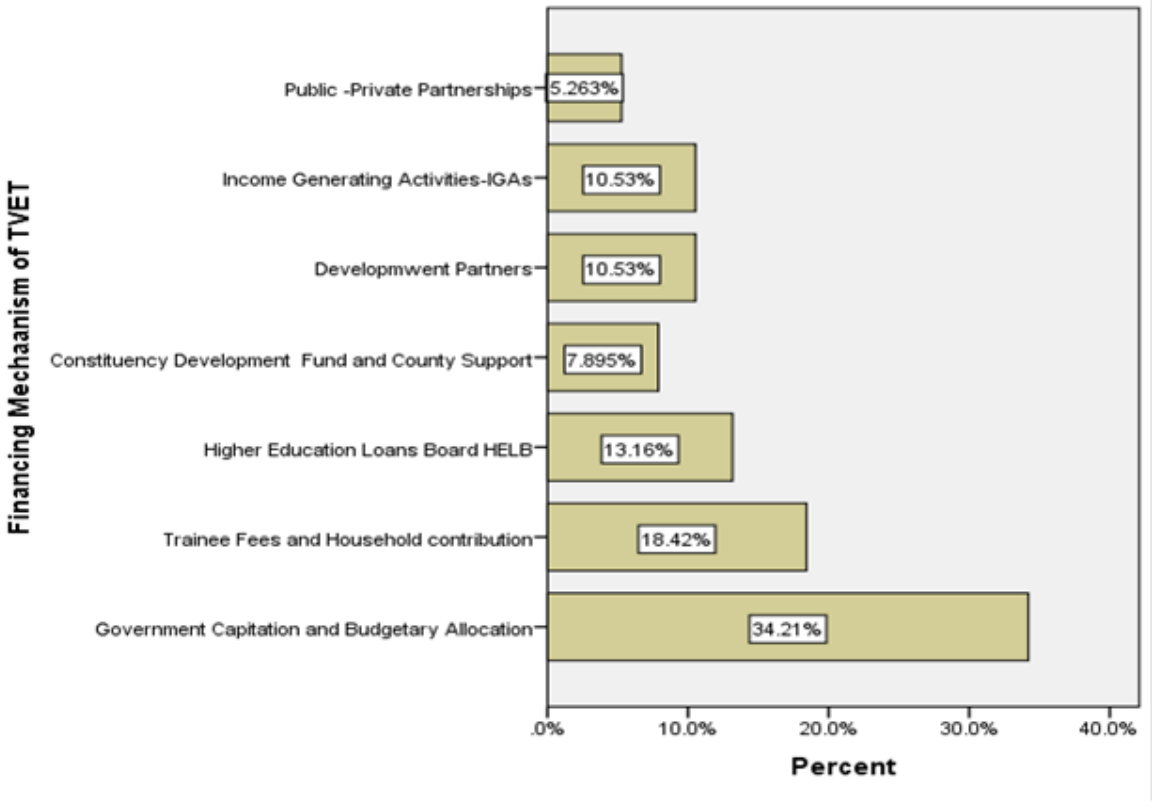

Figure 1: Financing Mechanisms of TVET

3.1.2. Government Capitation and Budgetary Allocations

The findings revealed that government capitation and budgetary allocations constitute the most significant source of financing for public TVET institutions. This finding is consistent with studies by Abagi and Ogachi (2014), Johanson and Adams (2004), and UNESCO (2016), which established that public financing remains the cornerstone of TVET systems globally because of the high costs associated with technical training. Similarly, TVETA (2023) and the Ministry of Education (2023) report that the Kenyan Government has substantially increased investment in TVET infrastructure, trainer recruitment, and student support as part of efforts to enhance access and skills development.

The foregoing implies that the predominance of Government of Kenya funding through appropriations and budgetary allocations is aligned to the assumptions of the Human Capital Theory, which views public expenditure on education and training as an investment capable of generating economic growth, productivity enhancement, and workforce effectiveness (Shultz,1961 . Becker,1993). Additionally, it is arguable that adequate government financing facilitates the construction of workshops, laboratories, classrooms, and digital learning facilities while supporting the recruitment and retention of qualified trainers.

Nonetheless, the findings also align with concerns raised by Onsomu et al. (2006) and KIPPRA (2021) that government funding often remains insufficient relative to institutional needs. Respondents cited delayed disbursement of funds and inadequate allocations as major constraints. This finding diverges somewhat from experiences in countries such as Germany and Finland, where long-term financing frameworks provide greater predictability and sustainability (Gustafsson, 2011). The implication is that while government funding is indispensable, overreliance on it exposes institutions to fiscal uncertainties that may compromise training quality.

3.1.3. Student Fees and Household Contributions

Student fees and household contributions emerged as the second most important financing source. This finding concurs with Resource Dependency Theory, which suggests that institutions seek supplementary resources beyond government allocations to sustain operations (Pfeffer & Salancik, 1978). Similar findings have been

reported by Onsomu et al. (2006), who observed that cost-sharing policies have increasingly shifted part of the financial burden of education to households.

The contribution of student fees enables institutions to finance recurrent expenditures, procure consumable training materials, maintain facilities, and respond to operational funding gaps. This finding is consistent with OECD (2021), which notes that cost-sharing arrangements have become common internationally as governments seek to diversify education financing.

Nevertheless, concerns emerge regarding equity and access. While fee-based financing enhances institutional sustainability, excessive dependence on household contributions may exclude learners from low-income backgrounds, thereby undermining social inclusion and educational equity (World Bank, 2018). This finding reinforces previous observations by UNESCO (2021) that financing mechanisms should balance cost recovery with equitable access to skills development opportunities.

3.1.4. Higher Education Loans Board (HELB) Financing

The finding that HELB financing accounted for 13.16% of TVET financing underscores the growing role of student financial aid in expanding access to technical education. This result converges with studies by the World Bank (2022) and Ministry of Education (2023), which identify student loan schemes as important instruments for promoting participation in post-secondary education.

HELB support reduces financial barriers to enrolment and retention, particularly among students from disadvantaged households. From a Human Capital Theory perspective, student financing enables individuals to invest in skills acquisition that yields future economic returns (Becker, 1993). The increased availability of loans and bursaries has contributed to rising TVET enrolments and enhanced participation among vulnerable groups.

However, respondents noted challenges related to limited coverage and delays in loan processing. Similar concerns have been reported in other developing countries where student aid programmes are unable to meet growing demand (African Development Bank, 2022). Such delays may negatively affect student welfare, attendance, and completion rates, ultimately compromising training outcomes.

3.1.5. Development Partner Funding

Development partners accounted for a significant proportion of institutional financing, highlighting the continued importance of international cooperation in TVET development. This finding aligns with UNESCO-UNEVOC (2023), the African Development Bank (2022), and the World Bank (2022), all of which emphasize donor contributions in supporting infrastructure modernization, curriculum reforms, digital transformation, and capacity building.

Development partner funding has played a critical role in advancing Competency-Based Education and Training (CBET), strengthening quality assurance systems, and equipping institutions with modern training technologies. Similar contributions have been observed in countries such as Rwanda, Ethiopia, and Ghana, where donor-supported TVET reforms have enhanced institutional capacity and training quality (McGrath, 2012).

Despite these benefits, concerns persist regarding sustainability. The findings corroborate Resource Dependency Theory by illustrating the vulnerability associated with dependence on externally controlled resources (Pfeffer & Salancik, 1978). Once donor-funded projects end, institutions may struggle to maintain programmes and equipment, thereby threatening long-term sustainability.

3.1.6. Income-Generating Activities

Income-generating activities (IGAs) emerged as another important source of financing. This finding supports observations by King and Palmer (2010) that entrepreneurial approaches are increasingly being adopted by TVET institutions to supplement traditional funding sources.

Production units, commercial farms, consultancies, workshops, and hospitality services not only generate revenue but also provide authentic learning environments for trainees. This convergence between training and production aligns with contemporary approaches emphasizing experiential learning and entrepreneurship development (UNESCO-UNEVOC, 2023).

However, respondents indicated that revenues generated through IGAs are generally insufficient to finance major capital investments. Similar findings have been reported by Johanson and Adams (2004), who noted that

although IGAs improve institutional autonomy, they rarely substitute for substantial government investment. The implication is that IGAs should be viewed as complementary rather than primary financing mechanisms.

3.1.7. CDF and County Government Support

Although cited less frequently, CDF and County Government support contribute significantly to infrastructure development, bursaries, and localized skills development initiatives. These findings are consistent with the decentralization objectives embodied in Kenya's Constitution (Government of Kenya, 2010), which encourage local participation in development planning and resource allocation.

The support enhances equity by targeting marginalized communities and addressing regional disparities in access to training opportunities. However, the findings reveal substantial variability across counties and constituencies. This observation agrees with studies on decentralized financing that highlight disparities arising from differences in local economic capacity, political priorities, and administrative effectiveness (SID, 2010).

3.1.8. Public–Private Partnerships and Industry Collaboration

Although not among the highest cited sources, public-private partnerships (PPPs) and industry collaboration emerged as strategically important mechanisms for enhancing TVET quality. This finding strongly converges with international literature emphasizing industry participation as a defining characteristic of successful TVET systems (King & Palmer, 2010; OECD, 2021; UNESCO-UNEVOC, 2023).

Industry partnerships provide equipment, internships, apprenticeships, trainer attachments, and opportunities for curriculum review. Such collaboration strengthens labour-market relevance and graduate employability while reducing the mismatch between training outcomes and employer expectations. However, respondents noted that partnerships remain unevenly distributed across institutions and regions, with urban institutions often benefiting more than rural counterparts. This disparity suggests the need for deliberate policy interventions to expand industry engagement across the entire TVET sector.

Overall, the findings demonstrate that financing of public TVET institutions in Kenya is increasingly diversified but remains heavily dependent on government support. The convergence of multiple financing mechanisms contributes positively to institutional sustainability and educational quality. Nevertheless, persistent challenges related to funding adequacy, predictability, equity, and sustainability suggest the need for a blended financing model that combines public investment, student financial aid, industry participation, donor support, and entrepreneurial income generation. Such an approach would enhance financial resilience while improving the quality, relevance, and competitiveness of TVET education and training in Kenya.

3.2. Status of Resources and Financing in Public TVET Institutions

The findings presented in Figure 2 indicate that internally generated financial resources in public TVET institutions are primarily directed toward instructional infrastructure, digital technologies, and practical training facilities. This allocation pattern reflects institutional efforts to strengthen teaching and learning environments while responding to the growing demands of Competency-Based Education and Training (CBET). The results further suggest that institutional managers prioritize resources that have a direct impact on instructional delivery, skills acquisition, and graduate employability.

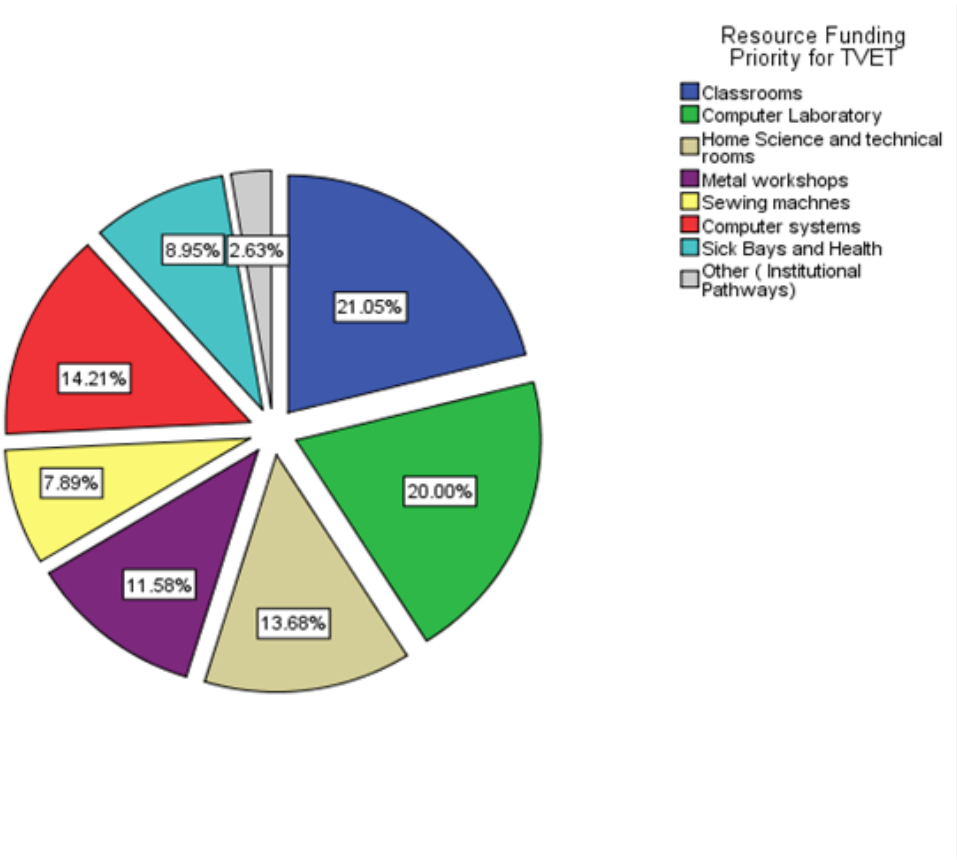

Figure 2 : Resource Allocation

Classrooms and Computer Laboratories The findings revealed that classrooms and computer laboratories accounted for more than 40% of internally generated resource allocations, making them the highest-funded categories. This finding is consistent with UNESCO (2021), UNESCO-UNEVOC (2023), and the World Bank (2022), which emphasize that quality TVET systems require adequate physical infrastructure and digital learning environments capable of supporting contemporary teaching and learning processes. Similarly, TVETA (2023) identifies modernization of learning spaces and digital infrastructure as critical requirements for successful implementation of competency-based training in Kenya.

The prioritization of classrooms suggests that institutions continue to face increasing enrolments and therefore require expanded instructional space to accommodate growing student populations. This finding confirms observations by Abagi and Ogachi (2014), who reported that the expansion of TVET enrolment in Kenya has exerted considerable pressure on physical facilities and institutional resources.

The substantial investment in computer laboratories reflects the increasing importance of digital skills and technology-enhanced learning within the modern labour market. This finding aligns with UNESCO Institute for Statistics (2023), which argues that digital literacy has become a foundational competency across virtually all occupational sectors. However, the findings diverge slightly from studies conducted by Johanson and Adams (2004) in several Sub-Saharan African countries, where investment in traditional workshop facilities often outweighed expenditure on ICT infrastructure. The current findings may therefore signify an important shift toward digitalization and Industry 4.0 preparedness within Kenya's TVET sector.

The implication is that investments in classrooms and computer laboratories enhance learner access, improve instructional effectiveness, support blended learning approaches, and strengthen graduate readiness for increasingly digital workplaces.

Computer Systems and Digital Technologies Computer systems emerged as the third-highest funding priority, accounting for 14.2% of internal resource allocations. This finding further reinforces the strategic importance attached to digital transformation within TVET institutions. According to OECD (2021), digital competence is no longer an optional skill but a fundamental requirement for workforce participation in contemporary economies. Similarly, UNESCO-UNEVOC (2023) emphasizes that TVET institutions must continuously upgrade digital infrastructure to prepare learners for technologically driven workplaces.

The finding converges with the growing body of literature indicating that digital technologies enhance learning flexibility, access to information, simulation-based training, and assessment efficiency (World Bank, 2018; UNESCO, 2021). In Kenya, the implementation of CBET has intensified the need for digital assessment systems, online learning resources, and technology-supported instruction (TVETA, 2023).

However, some studies have reported persistent disparities in access to digital resources across institutions, particularly between urban and rural settings (KIPPRA, 2021). While the present findings indicate substantial investment in computer systems, they do not necessarily imply equitable distribution across all TVET institutions. Consequently, policy interventions may be required to ensure that digital transformation benefits all learners irrespective of geographical location.

Home Science Facilities Home science facilities accounted for 13.68% of internally generated funding allocations, making them one of the most highly prioritized practical training resources. This finding reflects the continued importance of programmes related to hospitality management, food production, nutrition, institutional management, and community development. The finding supports observations by King and Palmer (2010), who noted that vocational programmes linked to service industries often require substantial investment in specialized equipment and training facilities.

The allocation to home science facilities also aligns with labour market trends showing increasing demand for skills in hospitality, catering, tourism, and related service sectors. According to the International Labour Organization (2023), service-sector occupations continue to generate significant employment opportunities, particularly for youth and women.

Nevertheless, some scholars argue that TVET financing has traditionally favoured engineering and industrial programmes at the expense of service-oriented disciplines (McGrath, 2012). The present findings therefore suggest a broader and more inclusive approach to resource allocation that recognizes the contribution of diverse occupational sectors to economic development.

The implication is that well-equipped home science facilities contribute to practical skills acquisition, entrepreneurship development, and enhanced employability in service-based industries.

Metal Workshops and Technical Training Facilities Metal workshops received 11.58% of resource allocations, reflecting their central role in technical and engineering education. This finding is strongly supported by Human Capital Theory, which emphasizes investment in productive skills that contribute directly to industrial growth and economic development (Becker, 1993; Schultz, 1961).

The findings concur with UNESCO (2016) and African Development Bank (2022), which identify engineering, manufacturing, and construction programmes as critical drivers of industrialization and economic transformation. Similarly, Kenya Vision 2030 recognizes technical and engineering skills as essential for supporting infrastructure development, manufacturing expansion, and technological innovation (Republic of Kenya, 2007).

Unlike conventional academic programmes, technical disciplines require expensive machinery, tools, consumable materials, and workshop maintenance. Consequently, the allocation of resources to metal workshops reflects institutional efforts to provide authentic practical learning experiences that align with industry requirements.

However, several studies have documented persistent challenges relating to obsolete equipment and inadequate workshop facilities in many African TVET institutions (Johanson & Adams, 2004; UNESCO-UNEVOC, 2022). Therefore, while the observed funding allocations are encouraging, sustained investment remains necessary to ensure that workshop facilities keep pace with technological developments in industry.

Sick Bays and Student Welfare Facilities The findings indicate that sick bays accounted for 8.95% of internal resource allocations. Although health facilities may not be directly associated with technical training, their

importance in supporting educational quality should not be underestimated. UNESCO (2021) emphasizes that learner well-being, health, and safety constitute important dimensions of quality education.

The allocation of resources toward sick bays demonstrates institutional recognition of the relationship between student welfare and academic performance. Similar findings have been reported by the World Bank (2018), which found that supportive learning environments contribute significantly to student retention, completion rates, and overall educational outcomes.

The implication is that investments in student welfare facilities help create safe and conducive learning environments, thereby supporting participation, persistence, and successful completion of training programmes.

Sewing Machines and Vocational Skills Development Sewing machines accounted for 7.89% of institutional funding allocations, reflecting continued support for vocational programmes in garment making, fashion design, textile technology, and creative industries. This finding is consistent with African Union (2018) and ILO (2023) reports that identify micro-enterprise development, creative industries, and self-employment as important avenues for addressing youth unemployment.

The allocation also aligns with the growing emphasis on entrepreneurship and enterprise development within TVET systems. According to UNESCO-UNEVOC (2023), vocational programmes that promote self-employment and small-scale enterprise creation are increasingly important in developing economies where formal employment opportunities remain limited.

However, some researchers have argued that vocational programmes often receive lower investment compared to engineering and technology-based disciplines (McGrath, 2012). The present findings therefore demonstrate recognition of the economic significance of creative and vocational industries within Kenya's skills development agenda.

3.3. Overall Challenges and Implications for Quality Education and Training

The findings of this study reveal that financing remains the most critical determinant of the quality, relevance, accessibility, and sustainability of Technical and Vocational Education and Training (TVET) in Kenya. While the sector has experienced significant expansion in enrolment, institutional infrastructure, and programme diversification following recent reforms, the capacity of TVET institutions to deliver quality education continues to be constrained by persistent financing challenges. The findings demonstrate that although government capitation remains the principal source of funding, many institutions continue to experience inadequate allocations, delayed disbursement of funds, overreliance on a limited number of revenue streams, and significant disparities in resource availability across institutions.

These findings are consistent with previous studies which have shown that TVET programmes are inherently more resource-intensive than general academic education because they require specialized workshops, laboratories, consumable training materials, industrial attachments, modern equipment, and continuous technological upgrading (Johanson & Adams, 2004; UNESCO, 2016; World Bank, 2022). Consequently, the quality of training provided by TVET institutions is closely linked to the adequacy and predictability of financing. Institutions with stable and diversified funding mechanisms are more likely to maintain modern training facilities, procure industry-standard equipment, recruit and retain qualified trainers, and effectively implement Competency-Based Education and Training (CBET) programmes (TVETA, 2023; UNESCO-UNEVOC, 2023).

The findings further support Human Capital Theory, which posits that investment in education and skills development enhances productivity, employability, innovation, and economic growth (Schultz, 1961; Becker, 1993). Adequately financed institutions create environments that facilitate effective skills acquisition, practical learning, entrepreneurship development, and innovation. Such institutions are better positioned to establish strong linkages with industry, provide quality industrial attachments, and produce graduates whose competencies are aligned with labour market requirements. Similar observations have been made by the OECD (2021) and the International Labour Organization (2023), which emphasize that high-quality TVET systems are essential for addressing youth unemployment, skills mismatches, and labour market transitions in modern economies.

The findings also lend support to Resource Dependency Theory (Pfeffer & Salancik, 1978), which explains how institutions rely on external actors for critical resources necessary for organizational effectiveness. The dependence of Kenyan TVET institutions on government funding, student fees, donor support, and external partnerships highlights the importance of diversified financing strategies. Excessive dependence on a single source of funding increases institutional vulnerability to policy shifts, fiscal constraints, delayed disbursements,

and economic downturns. Similar concerns have been reported across many African countries, where financial instability often undermines the sustainability of TVET reforms and compromises educational quality (McGrath, 2012; African Development Bank, 2022).

A particularly significant finding of this study is the existence of resource inequalities across institutions. While some institutions have benefited from substantial government investments, donor-funded projects, and industry partnerships, others continue to operate with inadequate infrastructure, obsolete equipment, and limited opportunities for practical training. This finding concurs with the observations of Abagi and Ogachi (2014), KIPPRA (2021), and UNESCO (2021), who argue that disparities in educational financing frequently translate into inequalities in educational opportunities, learner outcomes, and employability prospects. Such disparities undermine the principles of equity and inclusivity that underpin Kenya's education and development policies.

Furthermore, the study established that inadequate financing negatively affects trainer development and retention. The success of CBET depends heavily on the availability of competent trainers capable of delivering industry-responsive instruction and conducting competency-based assessments. However, financial limitations often restrict opportunities for trainer upskilling, industrial exposure, and continuous professional development. Similar concerns have been raised by UNESCO-UNEVOC (2023) and the World Bank (2022), which identify trainer quality as one of the most important determinants of TVET effectiveness globally.

Overall, the evidence suggests that financing challenges have direct implications for educational quality, graduate competence, labour market responsiveness, and national economic competitiveness. Inadequate financing weakens the capacity of institutions to provide authentic practical experiences, maintain modern technologies, and deliver industry-relevant training. Consequently, graduates may enter the labour market with limited competencies, thereby contributing to skills mismatches and reducing the effectiveness of TVET as a vehicle for socio-economic transformation.

4.0. Conclusion and Actionable Recommendations

4..1 Conclusions

This study set out to examine the financing mechanisms of public TVET institutions and their implications for the quality of education and training in Kenya. The findings reveal that although public TVET institutions rely on multiple financing sources—including government capitation, student fees, HELB support, donor funding, income-generating activities, county government support, and industry partnerships—government financing remains the dominant funding mechanism. While these financing arrangements have facilitated expansion of access and improvements in training infrastructure, persistent challenges relating to funding adequacy, predictability, sustainability, and equity continue to constrain the realization of quality TVET education.

The study concludes that financing is not merely an administrative function but a strategic enabler of quality education and training. The effectiveness of TVET institutions in producing competent, innovative, and employable graduates depends largely on their ability to access and sustain adequate financial resources. Institutions that benefit from diversified and predictable funding are more capable of maintaining modern workshops and laboratories, integrating digital technologies, supporting trainer professional development, fostering innovation, and strengthening industry linkages. Conversely, institutions characterized by chronic financial constraints are more likely to experience deficiencies in infrastructure, instructional resources, and training quality.

The study further concludes that achieving Kenya's aspirations under Vision 2030, the Technical and Vocational Education and Training Act (2013), the Competency-Based Education and Training framework, the African Union Continental Education Strategy for Africa (CESA), and Sustainable Development Goal 4 on quality education will require a fundamental shift toward sustainable and diversified TVET financing. A blended financing model that strategically combines government investment, student financial aid, industry contributions, donor support, public-private partnerships, county government initiatives, and institutional income-generating activities offers the most viable pathway toward financial sustainability.

Ultimately, strengthening financing mechanisms in public TVET institutions is not only an educational imperative but also a national development priority. Sustainable financing will enhance educational quality, promote equitable access, improve graduate employability, support industrialization, and contribute significantly to Kenya's long-term economic transformation and global competitiveness.

4.2 Actionable Recommendations

The findings of this study suggest that strengthening the quality, relevance, and sustainability of public TVET institutions in Kenya requires targeted interventions aligned with the three study objectives.

First, regarding financing mechanisms, the Government should progressively increase and ring-fence funding for TVET institutions while ensuring timely disbursement of capitation and development funds. To reduce overreliance on public financing, institutions should adopt diversified financing models that integrate government support, HELB financing, development partner assistance, public-private partnerships (PPPs), industry contributions, alumni support, and institutional income-generating activities. Expanding HELB loans and bursaries, particularly for students from disadvantaged backgrounds, would further promote access and equity.

Second, concerning the status of educational and training resources, priority should be given to modernizing workshops, laboratories, computer centres, and digital learning infrastructure to support effective implementation of Competency-Based Education and Training (CBET). Institutions should establish regular equipment maintenance and replacement programmes, invest in emerging technologies, and strengthen trainer capacity through continuous professional development, industrial attachments, and digital skills training. Shared resource centres among neighbouring institutions could also improve efficiency and optimize the utilization of costly training equipment.

Third, in addressing financing-related challenges and their implications for quality, TVET institutions should strengthen governance, accountability, and financial management systems to ensure efficient utilization of resources. Performance-based financing mechanisms linked to enrolment, completion rates, certification outcomes, innovation, and graduate employability should be introduced to enhance institutional effectiveness. Furthermore, stronger collaboration between TVET institutions and industry is necessary to expand apprenticeships, work-based learning opportunities, curriculum relevance, and graduate employability.

Strategic Recommendation Overall, Kenya should adopt a blended and sustainable TVET financing framework that combines public investment, student financial aid, industry participation, donor support, and institutional entrepreneurship. Such a financing model would enhance financial sustainability, improve educational quality, expand equitable access, strengthen labour-market responsiveness, and position TVET as a key driver of industrialization, employment creation, and national competitiveness under Vision 2030 and the Sustainable Development Goals.

Declaration of Conflict of Interest

The authors declare that they have no competing financial interests, personal relationships, or institutional affiliations that could have influenced the design, execution, analysis, interpretation, or reporting of this study. No external organization or funding agency had any role in the collection, analysis, interpretation of data, writing of the manuscript, or decision to publish the findings. The authors take full responsibility for the content and conclusions presented in this article.

Limitations of the Study

Several limitations should be considered when interpreting the findings of this study. First, the study focused exclusively on public TVET institutions in Kenya; consequently, the findings may not fully capture financing practices and quality outcomes within private TVET institutions, which operate under different governance, funding, and accountability frameworks.

Second, data were largely obtained through self-reports from principals, Board of Management members, and Quality Assurance and Standards Officers (QUASOs). Although these respondents were well positioned to provide information on institutional financing and resource utilization, self-reported data may be subject to recall errors, personal perceptions, and social desirability bias. To enhance credibility, questionnaire data were triangulated with key informant interviews and documentary analysis.

Third, the descriptive survey design enabled the study to examine prevailing financing mechanisms and their perceived implications for educational quality but did not establish causal relationships between financing variables and training outcomes. Future studies employing longitudinal, quasi-experimental, or mixed-methods approaches could provide stronger evidence on the causal effects of financing on institutional performance and learner outcomes.

Fourth, the study was conducted during a period of ongoing reforms in Kenya's TVET sector, including the implementation of Competency-Based Education and Training (CBET) and expanded government investment. Changes in policy priorities and economic conditions may influence the applicability of the findings over time.

Despite these limitations, the study provides valuable empirical evidence on financing mechanisms and their implications for the quality of education and training in public TVET institutions, offering useful insights for policymakers, institutional managers, and development partners seeking to strengthen the sustainability and effectiveness of the TVET sector.

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Biography of Corresponding Author

Professor John Aluko Orodho holds a Bed (Science) from the University of Nairobi and a Med (TVET Curriculum) and PhD (Science Curriculum) from Kenyatta University, Kenya. Orodho is a career teacher, having taught physics and Mathematics in secondary school (6 years), and 4 years at a polytechnic. He has also taught educational research and statistics, and supervised over 200 postgraduate students for 38 years at the university. Additionally, Orodho has completed several research projects and disseminated the findings in international conferences and published in several peer-reviewed journals. Orodho has published over 200 publications comprising 165 articles in refereed journals, 5 books, 3 book chapters, 24 conference proceedings, and 05 conference abstracts. and secured more than Ksh. 1billion in research and development grants

Professor John Aluko Orodho is the co-Chairman of Kenyatta University Competency-Based Education and Training (CBET) Committee and Chairman of CBDEX at Kenyatta University. . He is a life member of the Third World Studies, a member of several professional bodies, and a peer reviewer for many internationally indexed journals. He is a mentor, academic advisor, and supervisor to several undergraduate and graduate students within the Eastern African Region and beyond.

As of June 2026, Professor John Orodho is ranked 176,412th globally, 1,959th in Africa, 72nd in Kenya, and 3rd at Kenyatta University by the AD Scientific Index. Combined with 11,769 citations, an H-index of 39, and an i10-index of 100, these rankings position him among Kenya's leading education scholars and among the most influential researchers on the African continent, reflecting a sustained record of scholarly productivity, citation impact, and academic leadership. https://adscientificindex.com/scientist/john-orodho/100306/.

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