Developments and Challenges of TVET in Kenya Towards Sustainable Development Goals (SDGs)

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ABSTRACT

Technical and Vocational Education and Training (TVET) has increasingly gained global and national recognition as a vital pathway for skills development, youth employment, poverty reduction, and sustainable development. Anchored in Sustainable Development Goal 4 (SDG 4) of the United Nations 2030 Agenda, this paper examines the developments and challenges of TVET in Kenya between 2015 and 2024, focusing on its contribution to achieving SDG 4 targets. Using a desk review methodology, the study analyzes government policy documents, national economic surveys, and scholarly literature across four key areas: policy and historical evolution, institutional growth, enrolment trends by gender, and financing mechanisms. Findings indicate that Kenya has made considerable progress in expanding the TVET sub-sector through increased public investment and private sector participation. Student enrolment has risen significantly, with notable improvement in female participation, gradually narrowing the gender gap. Government financing through the Higher Education Loans Board (HELB), institutional capitation, and the student-Centered Funding Model has enhanced access and equity for disadvantaged learners. Policy and legislative reforms, including the TVET Act No. 29 of 2013 and the Competency-Based Education and Training (CBET) curriculum, have strengthened the sector's regulatory and curricular framework and improved alignment with labour market demands. However, challenges such as inadequate funding, poor infrastructure, shortage of qualified trainers, curriculum–labour market mismatch, persistent gender disparities, negative societal perceptions, and limited inclusion of learners with disabilities continue to hinder effectiveness. The paper recommends increased equitable funding, stronger industry partnerships, trainer development, gender-responsive interventions, and integration of Education for Sustainable Development (ESD) principles into TVET curricula.

Keywords: TVET, SDG 4, vocational education, Kenya, skills development, gender parity, CBET, sustainable development, youth employment, education policy

INTRODUCTION

Globally, the shift toward lifelong learning has contributed to increased focus on national Technical and Vocational Education and Training (TVET) systems. TVET is widely regarded as empowering trainees with employability skills, attitudes, and knowledge, thereby fostering lifelong learning (Darol, Farida, & Khairani, 2020). Governments invest in TVET because it develops the technical workforce needed to support industrialization, manufacturing, engineering, Information and Communication Technology (ICT), and other technology-oriented sectors critical for national development (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021; Association for the Development of Education in Africa [ADEA], 2020). Among its critical functions are addressing youth unemployment, labour-market skills mismatch, industrialization demands, globalization pressures, and the technological transformation associated with the Fourth Industrial Revolution (4IR). TVET is additionally recognized as a driver of entrepreneurship, poverty reduction, social inclusion, and sustainable economic growth (ADEA, 2020; UNESCO, 2015; United Nations [UN], 2015).

The relationship between TVET and sustainable development predates the current global education agenda. While the Sustainable Development Goals (SDGs) represent the prevailing international framework for education for the 2015–2030 period, this connection has long roots in international conventions. The Bonn Declaration on

Learning for Work, Citizenship and Sustainability (2004) and the Bonn Declaration on Education for Sustainable Development (2009) both emphasized TVET's role in sustainable development. A landmark declaration implementing education for sustainable development through TVET was formally adopted at the Shanghai Conference in China in 2012 (UNESCO, 2012). TVET had also played a critical role in advancing the Education for All (EFA) initiative and the Millennium Development Goals (MDGs), explaining its continued prominence in international agendas (UNESCO, 2012). In the current era, SDG 4—adopted under the 2030 Agenda for Sustainable Development—underscores TVET's role in ensuring inclusive development while simultaneously contributing to nations' economic growth (United Nations General Assembly [UN General Assembly], 2015); ADEA, 2020).

The imperative for TVET reform is further reinforced by growing labour market pressures. With youth unemployment constituting one of the most significant challenges facing both developed and developing economies, focus on TVET has intensified (Todd & Dunbar, 2018). The UNESCO Strategy for TVET (2016–2021) projected that 475 million new jobs needed to be created in the decade following its publication, targeting 70 million unemployed youth and accommodating 40 million new labour market entrants per year (UNESCO, 2016). The International Labour Organization (ILO), UNESCO, and World Bank (2023) further note that workers require continuous skilling and reskilling through lifelong learning to keep pace with rapidly shifting labour-market demands. This has driven a marked shift toward demand-driven TVET systems characterized by modular and competency-based training approaches (Marope, Chakroun, & Holmes, 2015). In Africa, these pressures are compounded by low economic growth, poverty, and structural inequalities (Fofana, Chitiga-Mabugu, & Mabugu, 2023), making rigorous examination of TVET progress particularly urgent.

It is within this global and regional context that Kenya's TVET trajectory demands scholarly attention. This paper presents a desk review examining developments in TVET in Kenya in relation to SDG 4 from 2015 to 2024, as well as the barriers inhibiting progress. Specifically, the study contributes to the body of knowledge by: (a) tracing the policy and historical accounts of TVET development in Kenya; (b) analyzing growth in TVET institutions, enrolment, and financing along gender lines over time; and (c) exploring challenges facing the sector alongside evidence-based solutions to guide future reforms toward effective and equitable TVET provision.

LITERATURE REVIEW

TVET and SDG 4

TVET occupies an increasingly indispensable role in the global sustainable development agenda. SDG 4, adopted under the 2030 Agenda for Sustainable Development, explicitly calls for inclusive and equitable quality education and the promotion of lifelong learning opportunities for all (UN General Assembly, 2015). Within this overarching goal, targets 4.3 and 4.4 are of particular relevance to TVET: target 4.3 mandates equal access for all women and men to affordable and quality technical, vocational, and tertiary education, while target 4.4 requires a substantial increase in the number of youth and adults equipped with relevant technical and vocational skills for employment, decent work, and entrepreneurship (UNESCO, 2021; Mujuri & Kathomi, 2025). Together, these targets position TVET as an essential mechanism for bridging the gap between education systems and labour market demands, thereby contributing to poverty reduction, social inclusion, and economic development.

The growing global emphasis on TVET reflects its multi-dimensional contributions to sustainable development. According to ADEA (2020), governments worldwide have accorded TVET top priority in national education policy agendas owing to its critical role in developing the technical workforce needed to sustain industrialization, manufacturing, engineering, ICT, and other technology-driven sectors. In the context of the 4IR, rapid technological advancement and intensifying globalization have increased the urgency for TVET reforms designed to address skills mismatches, structural unemployment, and workforce competitiveness (ADEA, 2020; UNESCO, 2021). Beyond economic imperatives, TVET is increasingly recognized as a catalyst for entrepreneurship, poverty reduction, social inclusion, and lifelong learning—attributes integral to the transformative vision of the 2030 Agenda (UNESCO, 2015; UN, 2015).

In the Kenyan context, TVET's alignment with SDG 4 is embedded within the country's broader national development framework. Kenya Vision 2030, the government's long-term development blueprint, targets Kenya's

transformation into a newly industrialized, middle-income nation by 2030, anchored on economic, social, and political pillars (Republic of Kenya, 2007). The economic pillar prioritizes human resource development, science, technology, and innovation (STI), and infrastructure expansion as drivers of sustained Gross Domestic Product (GDP) growth at a minimum of 10% per annum (Republic of Kenya, 2007). Sessional Paper No. 14 of 2012 on Reforming Education and Training in Kenya formally recognized TVET as a strategic national priority, underscoring its dual role in human capital formation and in advancing the country's SDG commitments (Republic of Kenya, 2012). Consequently, TVET in Kenya functions simultaneously as an instrument of national economic policy and as a vehicle for achieving global sustainable development aspirations.

Policy and Historical Reforms in TVET

Defining TVET

Diverse conceptualizations and approaches to TVET exist across different educational systems and national contexts. For the purposes of this study, TVET is operationalized in accordance with the definition adopted by UNESCO (2015a):

> *Technical and vocational education and training (TVET) is understood as comprising education, training and skills development relating to a wide range of occupational fields, production, services, and livelihoods. It is also seen as a part of lifelong learning, which can take place at secondary, post-secondary and tertiary levels and include work-based learning and continuing training and professional development which may lead to qualifications. (p. 3)*

This definition frames TVET not merely as a pathway for those unable to access university education, but as a comprehensive, flexible system of skills development spanning educational levels and encompassing both formal and non-formal learning contexts. The UN 2030 Education Agenda reinforces this broader conception by explicitly targeting access to affordable and quality technical, vocational, and tertiary education, emphasizing the development of relevant skills for employment, decent work, and entrepreneurship (UNESCO, 2016). The SDGs further elevate TVET as a driver of inclusive societies, reduced inequalities, and national prosperity (UNESCO, 2016; UN, 2015).

TVET in the Global Landscape

Across the globe, TVET has been leveraged as a strategic tool for national development, though its application and outcomes vary significantly by regional and national context. In the Philippines, TVET has been deployed to support capacity-building programs that empower women and youth in economic participation, while in Cambodia it has served as an instrument for promoting gender equality in education and the labour market (Organisation for Economic Co-operation and Development [OECD], 2018). Singapore has used TVET to facilitate continuous adult upskilling and reskilling in response to rapid technological change and dynamic economic shifts (OECD, 2018). These examples illustrate the versatility of TVET as a policy instrument when adequately resourced and strategically aligned with national development goals.

In contrast, TVET in sub-Saharan Africa has historically suffered from inadequate policy prioritization, systemic underfunding, and persistent negative social perceptions. Research across eight African countries—Angola, Gabon, Liberia, Côte d'Ivoire, Mauritius, Morocco, Rwanda, and Uganda—reveals that TVET is widely regarded as inferior to academic educational pathways, significantly undermining enrolment and institutional quality (ADEA, 2020). The challenges identified include insufficient funding, dilapidated infrastructure and equipment, inadequate facilities for female learners and persons with disabilities, a shortage of qualified trainers, absence of continuous professional development (CPD) for TVET educators, outdated curricula, persistent skills mismatches, and low institutional self-esteem (ADEA, 2020). These structural deficiencies are compounded by weak governance frameworks and limited industry–institution linkages, collectively limiting the transformative potential of TVET across the continent (ILO, UNESCO, & World Bank, 2023).

Historical Evolution of TVET in Kenya: From Colonial Foundations to Independence

The history of vocational education in Kenya is inextricably bound to the colonial experience, which fundamentally shaped both the form and purpose of technical training. Prior to the formal introduction of colonial education, indigenous Kenyan communities practised a system of informal vocational preparation through apprenticeship and community-based skill transmission, with youth trained in craftsmanship, agriculture, and trade by experienced elders and artisans (Ngure, 2022). This indigenous model was deliberately undermined by the colonial education system, designed primarily to serve the administrative and economic interests of the British colonial government (Sifuna & Otiende, 2006).

Early colonial education commissions played a decisive role in shaping the racially stratified character of vocational training. The Fraser Education Commission (1919) and the Phelps-Stokes Commission (1924) advocated for technical and vocational training among African populations not as a means of genuine empowerment, but as a mechanism for producing cheap labour for colonial agricultural production, infrastructure development, and missionary enterprise (Sifuna & Otiende, 2006; Imana, 2020). Acting on the recommendations of the Phelps-Stokes Commission, the Native Industrial Training Depot (NITD) was established in Nairobi, where Indian tradesmen who had arrived in connection with the construction of the Uganda Railway served as trainers (Simiyu, 2009). Vocational training was thus organized along explicit racial lines, reinforcing a colonial hierarchy in which Africans were confined to manual and low-skilled trades—an arrangement that functioned less as an educational system and more as an apparatus of economic subordination (Sifuna & Otiende, 2006).

The racially segregated nature of colonial vocational education provoked African resistance, manifesting in the establishment of independent African schools combining academic and practical subjects (Sifuna & Otiende, 2006). Nevertheless, colonial authorities continued to entrench vocational training through subsequent policy frameworks, including the Beecher Report (1949) and the Binns Report (1952), both of which promoted practical subjects such as agriculture and carpentry primarily to sustain the supply of labour for European settlers and missionary institutions (Ngure, 2022).

Post-Independence Reforms and the Structural Transformation of TVET

Post-independence governments strategically retained and reoriented technical and vocational education as a tool for national development—a recognition of its indispensable role in building the human capital necessary for an independent nation. The Ominde Commission (1964), the first post-independence education review body, recommended the expansion of technical education within secondary school curricula (Republic of Kenya, 1964). The Ndegwa Commission (1971) subsequently emphasized strengthening technical and vocational subjects within secondary schools to enhance practical skills development in line with national workforce requirements (Republic of Kenya, 1971).

The most consequential structural reform of the post-independence era came with the Mackay Commission (1981), which recommended replacing the 7-4-2-3 education system with the 8-4-4 system. Widely criticized for excessive emphasis on academic achievement at the expense of practical skills, the 7-4-2-3 system was replaced by one that mandated all secondary schools to offer at least one technical and one vocational subject alongside conventional academic disciplines, explicitly aiming to equip learners with competencies for self-reliance and self-employment (Kamunge, 1988; Republic of Kenya, 1984).

The 8-4-4 system generated significant challenges, including financial burdens on parents and inadequate responses to evolving labour market demands. These limitations drove further reforms, most significantly the introduction of the Competency-Based Curriculum (CBC) under the 2-6-3-3-3 system of education. The CBC emphasizes competency-based learning designed to equip learners with relevant knowledge, practical skills, and societal values from an early stage (Kenya Institute of Curriculum Development [KICD], 2017). Within this framework, TVET is integrated progressively across all educational levels: at the primary level, learners engage with Environmental Activities and Science and Technology; at the Junior Secondary level, they acquire foundational vocational knowledge, skills, and attitudes; and at the Senior Secondary level, learners may elect one of three pathways—Arts and Sports Science, Social Sciences, or the Science, Technology, Engineering, and Mathematics (STEM) pathway—the last of which explicitly embeds technical and vocational competencies

(KICD, 2017). This progressive integration represents a paradigm shift positioning TVET as an integral component of Kenya's education system.

Contemporary Legislative and Policy Reforms (2010–2024)

The contemporary landscape of TVET policy in Kenya has been shaped by a convergence of constitutional provisions, legislative enactments, and national planning frameworks. The Constitution of Kenya (2010) elevated education to the status of a fundamental right, creating a constitutional imperative for expanding TVET access and quality across all population groups. Building on this foundation, Sessional Paper No. 14 of 2012 provided a comprehensive policy framework identifying TVET as a strategic pillar of Vision 2030, targeting a 20% increase in TVET enrolment by 2023 (Republic of Kenya, 2012; Mujuri & Kathomi, 2025). The enactment of the TVET Act No. 29 of 2013 subsequently transformed the institutional architecture of the sub-sector, establishing the TVET Authority (TVETA) to regulate and coordinate provision, the Curriculum Development, Assessment, and Certification Council (CDACC) to oversee curriculum and qualifications, and the Kenya National Qualifications Authority (KNQA) to manage the national qualifications framework (Mujuri & Kathomi, 2025; TVETA, 2022). Together, these institutions form the regulatory ecosystem designed to ensure access, equity, quality, and relevance across all TVET providers (TVETA, 2022).

A further milestone in Kenya's TVET policy reform trajectory was the shift from the traditional TVET curriculum to the Competency-Based Education and Training (CBET) framework, implemented under the authority of the TVET Act (Republic of Kenya, 2018b). The CBET curriculum represents a deliberate effort to align TVET training with practical labour market demands, establishing a direct connection between skills acquired in training institutions and competencies required by industry (Republic of Kenya, 2018a; Tirus, 2019). Additionally, the incorporation of TVET into the centralized admissions system has broadened access pathways and enhanced the visibility and legitimacy of TVET as an educational choice. Notwithstanding these reforms, the extent to which CBET implementation has effectively bridged the skills gap and improved labour market outcomes remains an area requiring deeper empirical investigation (Osawa et al., 2023).

PROGRESS MADE IN TVET EDUCATION IN KENYA

Growth of TVET Institutions

The expansion of TVET institutions in Kenya constitutes one of the most visible indicators of the government's commitment to widening access to technical and vocational education in line with SDG 4. Notable and sustained institutional growth did not occur until after 2016, coinciding with the operationalization of the SDGs framework (Republic of Kenya, 2018). The constitutional guarantee of education as a fundamental right (Constitution of Kenya, 2010), the enactment of the TVET Act No. 29 of 2013, and the provisions of Sessional Paper No. 14 of 2012 collectively created an enabling policy environment for this expansion (Republic of Kenya, 2012; TVETA, 2022). For the purposes of this study, TVET institutions are defined broadly to include the full spectrum of providers involved in technical and vocational training, encompassing Vocational Training Centres (VTCs), Youth Polytechnics, Technical and Vocational Colleges, Institutes of Technology, National Polytechnics, and universities offering technical programmes.

Table 1 presents data on the number and growth of TVET institutions in Kenya from 2015 to 2024, as reported in successive Economic Surveys published by the Kenya National Bureau of Statistics (KNBS).

Table 1 Number and Growth of TVET Institutions in Kenya, 2015–2024

Institution Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Public Youth Polytechnics	816	816	—	—	—	—	—	—	—	—
Private Youth Polytechnics	—	29	—	—	—	—	—	—	—	—
Public Technical & Vocational Colleges	55	62	91	101	191	230	255	277	309	302

Institution Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Private Technical & Vocational Colleges	—	382	627	628	742	820	885	973	1,048	1,235
National Polytechnics	3	11	11	11	11	12	12	12	11	30
Polytechnic University Colleges	—	—	—	—	2	2	2	—	—	—
Public Vocational Training Centres	—	—	899	982	1,149	1,156	1,031	1,051	1,120	1,070
Private Vocational Training Centres	—	—	47	47	47	83	88	88	88	118
TOTAL	**874**	**1,300**	**1,675**	**1,769**	**2,142**	**2,303**	**2,399**	**2,401**	**2,576**	**2,755**

Note. Data sourced from Kenya National Bureau of Statistics, Economic Surveys (2015–2024). Dashes (—) indicate data not separately reported for the given year.

As illustrated in Table 1, the total number of TVET institutions grew from 874 in 2015 to 2,755 in 2024, representing a growth rate of approximately 215%—more than tripling institutional capacity at the onset of the SDGs period. This expansion was driven primarily by the proliferation of private Technical and Vocational Colleges, which increased from 382 in 2016 to 1,235 in 2024, and the growth of Public Vocational Training Centres, which rose from 899 in 2017 to 1,070 in 2024. The significant increase in private sector participation reflects both growing demand for TVET and market responsiveness that the public sector alone has been unable to meet. The government had earlier projected that every constituency would have at least one Vocational Training Centre by 2030 (Ministry of Education, 2018), and available data suggest meaningful progress toward this target. Critically, while growth in the number of institutions is a positive indicator of expanded access, it does not in itself guarantee quality or equity of provision—concerns addressed in Section 4 of this paper.

Enrolments in TVET Institutions

SDG 4 targets not only the quantitative expansion of TVET access, but also the elimination of gender disparities and other forms of inequality in educational participation. Targets 4.3 and 4.4 specifically call for equal access to quality technical and vocational education for all women and men, and for a substantial increase in the number of youth and adults equipped with relevant vocational skills for employment and entrepreneurship (UN General Assembly, 2015). The Constitution of Kenya (2010) further entrenches this principle by guaranteeing education and training as a right for every citizen irrespective of gender, socioeconomic status, or disability. Against this normative backdrop, enrolment trends in TVET institutions serve as a critical empirical indicator of the extent to which Kenya is translating its policy commitments into tangible outcomes.

Table 2 presents enrolment data disaggregated by gender for all TVET institutions in Kenya from 2015 to 2024.

Table 2 Enrolments in TVET Institutions by Gender, 2015–2024

Category	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Male	92,309	113,963	149,496	202,479	246,486	258,084	287,508	302,810	347,335	377,467
Female	61,005	88,593	117,869	157,373	184,112	193,121	216,190	259,689	295,391	332,418
Difference	31,304	25,370	31,627	45,106	62,374	64,963	71,318	43,121	51,944	45,049
% Gender Gap	20%	13%	12%	13%	14%	14%	14%	8%	8%	6%
TOTAL	**153,314**	**202,556**	**267,365**	**359,852**	**430,598**	**451,205**	**503,698**	**562,499**	**642,726**	**709,885**

Note. Data sourced from Kenya National Bureau of Statistics, Economic Surveys (2015–2024).

The enrolment data in Table 2 reveal a consistent and substantial upward trajectory in TVET participation across the decade under review. Total enrolment grew from 153,314 in 2015 to 709,885 in 2024, representing an increase of approximately 363%—a remarkable achievement reflecting the cumulative impact of institutional expansion,

government capitation, student loan schemes, curriculum reform, and enhanced public awareness of TVET's economic value. This growth occurred for both male and female students, with female enrolment rising from 61,005 in 2015 to 332,418 in 2024, representing more than a fivefold increase over the period.

Notwithstanding this progress, persistent gender disparities in enrolment remain a significant concern. In 2015, the gender gap stood at 20 percentage points, with males constituting approximately 60% of total enrolment and females approximately 40%. By 2024, the gap had narrowed to approximately 6 percentage points, reflecting a meaningful improvement in gender parity consistent with the trajectory reported by the Kenya Institute of Public Policy Research and Analysis (KIPPRA, 2023), which documented the Gender Parity Index (GPI) for TVET enrolment increasing from 0.76 in 2018 to 0.86 by 2022, partly attributable to targeted interventions under the National Policy on Gender and Development (2019). Despite this positive trend, the gender gap persists—a finding corroborated by Nyongesa and Makokha (2021), whose study on the influence of TVET on graduates' employability in Kenya identified enduring disparities along gender lines. The World Bank (2022) further reports that approximately 32.67% of female youth in Kenya are Not in Education, Employment, or Training (NEET), underscoring structural barriers that continue to impede female participation. Addressing these disparities is not merely an equity imperative; it is a prerequisite for the realization of SDG targets 4.3, 4.4, and 4.5, all of which prioritize gender equality in education and training.

Furthermore, while total enrolment figures are encouraging, their scale relative to Kenya's overall youth population remains limited. As Mugo (2018) observes, the proportion of the youth cohort enrolled in TVET is substantially lower than those pursuing university education, indicating that the sub-sector has yet to achieve the volume and visibility commensurate with its strategic importance. Scaling enrolment to meet Vision 2030 and SDG 4 targets will therefore require not only continued investment in institutional expansion and financial support mechanisms, but also sustained efforts to shift public perception and improve gender inclusivity.

Financing of TVET Institutions

Adequate and equitable financing is a foundational prerequisite for the effective delivery of TVET, given that technical programmes are inherently more resource-intensive than general academic education. The cost of equipping and running one technical institution has been estimated as equivalent to that of three general education schools, making TVET disproportionately expensive relative to available public resources (Kerre, 1996, as cited in Othoo et al., 2022). In recognition of this challenge, the Government of Kenya has progressively strengthened financing mechanisms for the TVET sub-sector as part of its commitment to SDG 4. Key among these is the student loan scheme administered by the Higher Education Loans Board (HELB), which was extended to TVET trainees—a significant departure from the historical exclusion of TVET students from government financial support. Table 3 presents data on HELB loan awards to TVET students from the 2014/2015 to 2024/2025 financial years.

Table 3 HELB Loan Awards to TVET Students, Financial Years 2014/2015–2024/2025 (KSh. Millions)

Academic Year	Male (KSh. M)	Female (KSh. M)	Total (KSh. M)
2014/2015	88.8	48.2	137.0
2015/2016	224.9	134.4	359.3
2016/2017	573.3	309.6	883.0
2017/2018	692.6	636.8	1,329.4
2018/2019	806.1	759.0	1,565.2
2019/2020	2,196.7	1,885.8	4,082.5
2020/2021	2,131.7	1,850.7	3,982.4
2021/2022	2,083.9	1,784.6	3,868.5
2022/2023	2,072.3	1,739.7	3,812.0

Academic Year	Male (KSh. M)	Female (KSh. M)	Total (KSh. M)
2023/2024	3,804.6	2,730.8	6,535.4
2024/2025	**6,023.1**	**4,435.8**	**10,458.9**

Note. Data sourced from Higher Education Loans Board (HELB) and Kenya National Bureau of Statistics, Economic Surveys.

As illustrated in Table 3, total HELB loan disbursements to TVET students grew exponentially from KSh. 137 million in the 2014/2015 financial year to KSh. 10,458.9 million in 2024/2025—an increase of approximately 7,534%, reflecting both the dramatic expansion of eligible student numbers and the government's escalating financial commitment to the sub-sector. Loans disbursed to male students grew from KSh. 88.8 million to KSh. 6,023.1 million over the same period, while female loan awards grew from KSh. 48.2 million to KSh. 4,435.8 million, with the gender financing gap narrowing progressively over the decade. The introduction of the student-Centred Funding Model (SCFM) in May 2023 further strengthened equity in TVET financing by calibrating support to students' levels of financial need, thereby improving access for disadvantaged populations (Higher Education Fund [HEF], 2023). In addition to loan schemes, direct government capitation to public TVET institutions has played a critical role in sustaining enrolment growth and institutional viability (Macharia & Ondabu, 2025).

Despite these financing gains, significant inequities in resource allocation persist. Research reveals a tendency toward disproportionate concentration of financial resources in elite technical universities and higher-level TVET institutions, at the expense of lower-tier vocational training centres that serve the majority of economically vulnerable learners (Malechwanzi, 2019). Erima (2021) further cautions that the upgrading of National Polytechnics to university status—while expanding access to higher education—risks redirecting funding away from specialized technical training, potentially diluting the sector's vocational mission. The Republic of Kenya's Education Sector Report (2022/2023) identified a funding gap of KSh. 197 billion in the education budget for the 2023/2024 financial year, underscoring the structural underfunding that continues to constrain the quality and reach of TVET provision (Republic of Kenya, 2022). Addressing these financing inequities requires a deliberate rebalancing of resource allocation across all TVET institutional tiers, underpinned by transparent, evidence-based funding models that prioritize equity and labour market alignment.

OBSTACLES INHIBITING TVET PROGRESS AND SUGGESTED SOLUTIONS

Despite considerable progress documented in the preceding sections, the TVET sub-sector in Kenya continues to confront a complex array of structural, institutional, and socio-cultural obstacles that undermine its capacity to fully achieve the ambitions of SDG 4 and Vision 2030. These challenges are multidimensional and interconnected, collectively limiting access, quality, relevance, and equity in TVET provision.

Inadequate and Inequitable Funding

Insufficient public financing remains perhaps the most pervasive and debilitating challenge confronting Kenya's TVET sub-sector. TVET institutions face inadequate physical infrastructure and equipment to support the delivery of the CBET curriculum, a deficit directly attributable to chronic underfunding (Ministry of Education, 2018). The National Education Sector Strategic Plan (NESSP) acknowledges a KSh. 197 billion funding gap in the education sector for 2023/2024 (Republic of Kenya, 2022). Research in the Nyanza region confirms that funding inadequacies have produced internal inefficiencies within TVET institutions, impairing their capacity to deliver market-driven, competency-based training (Othoo et al., 2022). Compounding this challenge is the structural skewing of public investment toward higher-level TVET institutions, which neglects vocational training centres and technical institutes serving the majority of learners at lower tiers (Malechwanzi, 2019).

Scholars recommend a multi-pronged strategy that includes increasing the overall budget allocation to TVET, adopting equitable per-capita funding formulae across all institutional tiers, and strengthening public-private partnership (PPP) models to mobilize industry investment in TVET infrastructure, equipment, and curriculum development (Malechwanzi, 2019; Karemu & George, 2014). International development finance institutions and

bilateral donors should also be engaged to supplement government funding, particularly for institutions in marginalized and underserved regions (ILO, 2023).

Inadequate Infrastructure, Equipment, and Technology

Many TVET institutions in Kenya are characterized by dilapidated and outdated physical infrastructure, obsolete training equipment, and limited integration of modern technology—conditions that fundamentally compromise training quality and relevance (Sifuna, 2020; Karemu & George, 2014; Malechwanzi, 2019). The Ministry of Education (2018) explicitly identifies the non-alignment of physical resources with the CBET curriculum as a critical barrier to effective vocational training. Inadequate infrastructure for learners with disabilities remains a persistent concern, contravening both the constitutional right to education and the inclusion imperatives of SDG 4.5 (Murgor et al., 2014). In 2023, the ILO undertook targeted upgrading of facilities in several TVET institutions in marginalized Kenyan regions, donating modern industrial equipment aligned with prevailing industry standards—an intervention illustrating the transformative potential of well-targeted investment, but also underscoring the extent of the infrastructure deficit that government resources alone have been unable to address (ILO, 2023).

Recommended solutions include systematic infrastructure audits and capital investment plans for all public TVET institutions, with priority given to institutions serving marginalized communities. Institutions should be equipped with modern, industry-standard technology and tools, and all facilities should be retrofitted to be fully accessible to persons with disabilities (Murgor et al., 2014). The integration of ICT into TVET delivery—including online and blended learning platforms—offers an additional avenue for improving training quality and expanding access in remote areas (Republic of Kenya, 2022).

Shortage of Qualified TVET Trainers and Inadequate Professional Development

The quality of TVET education is critically dependent on the competence and pedagogical skills of its trainers. Yet Kenya's TVET sub-sector is characterized by a significant shortage of qualified personnel, compounded by the absence of systematic in-service training and Continuing Professional Development (CPD) opportunities for existing trainers (Malechwanzi, 2019; ADEA, 2020). The transition to the CBET curriculum has further exposed trainer preparedness gaps; Osawa et al. (2023) and Akala (2021) confirm that CBET implementation has found many trainers ill-prepared and inadequately supported to shift from teacher-centred to competency-based pedagogical approaches. The risk of curriculum theory–practice misalignment is amplified when trainers lack direct exposure to contemporary industry practices and technology, resulting in graduates whose skills do not meet employer expectations (Mochere & Aluko, 2018).

Scholars recommend that the government institutionalize mandatory and sustained CPD programmes for all TVET trainers, incorporating regular industry attachments, exposure to emerging technologies, and competency-based pedagogical training (Karemu & George, 2014; Mochere & Aluko, 2018). Pre-service TVET teacher education should also be reformed to embed CBET methodologies from the outset, reducing reliance on costly post-qualification retraining (Akala, 2021). Competitive remuneration and career advancement pathways for TVET trainers are additionally essential to attract and retain talented professionals in the sector.

Curriculum Relevance, Skills Mismatch, and Mode of Delivery

A persistent criticism of Kenya's TVET system is the disconnect between the skills imparted by training institutions and those demanded by industry and the broader labour market. The Ministry of Education (2018) acknowledges the non-alignment of existing curricula with both the CBET framework and the sectoral priorities of Vision 2030 as a critical challenge. Research consistently documents an over-reliance on theoretical, classroom-based instruction at the expense of practical, hands-on training—a mode of delivery fundamentally inconsistent with the competency-based philosophy underpinning current curriculum reform (Mochere & Aluko, 2018; Othoo et al., 2022). Weak linkages between TVET institutions and industry further limit opportunities for practical training, industrial attachments, and curriculum alignment with real-time labour market signals. Additionally, the upgrading of National Polytechnics to university status has in several instances led to a rebranding toward general academic education, eroding the specialized technical focus that originally distinguished these institutions (Erima, 2021).

Addressing curriculum-related challenges requires deepening industry partnerships through formal institutional frameworks that ensure employers play an active role in curriculum design, review, and validation (Mujuri & Kathomi, 2025). TVET institutions should increase the proportion of time dedicated to practical, work-based learning, including structured industrial attachment programmes and employer-sponsored apprenticeships. Erima (2021) further argues for the integration of Education for Sustainable Development (ESD) principles into TVET curricula, to cultivate learners who are not only technically competent but also environmentally aware, ethically grounded, and socially responsible—qualities integral to the broader sustainability vision of the SDGs.

Negative Social Perceptions and Stigmatization of TVET

One of the most deeply entrenched obstacles to TVET development in Kenya—and across Africa more broadly—is the negative social perception of vocational and technical education as an inferior pathway, suitable only for those who have failed to access the academic mainstream (ADEA, 2020; Mochere & Aluko, 2018). This perception, which has colonial antecedents rooted in the racially hierarchical conception of vocational training as an instrument of social control (Sifuna & Otiende, 2006), continues to deter capable learners from choosing TVET, discourage parental support, and limit employer confidence in TVET graduates. Research by Nyongesa and Makokha (2021) confirms that social stigmatization directly affects TVET enrolment patterns and undermines graduates' self-efficacy and career prospects.

Overcoming this deeply rooted challenge requires sustained, multi-stakeholder advocacy and communication campaigns that highlight the economic returns to TVET, celebrate successful TVET graduates, and promote the sector's contribution to national development (Mochere & Aluko, 2018). Integrating TVET into the mainstream national qualifications' framework—thereby establishing clear and credible pathways from vocational training to higher education and professional certification—is a critical structural intervention for enhancing the status and attractiveness of TVET (Kenya National Qualifications Authority [KNQA], 2023). Government leadership in publicly championing TVET as a valued and prestigious educational choice will be essential in shifting cultural attitudes over the medium to long term.

CONCLUSION

This study has demonstrated that TVET occupies a central and strategically indispensable position in Kenya's pursuit of SDG 4 and the broader socioeconomic transformation envisioned under Vision 2030. Over the period from 2015 to 2024, Kenya undertook substantial policy and structural reforms aimed at strengthening the TVET sub-sector, expanding institutional infrastructure, increasing enrolment, and aligning training with labour market demands. The growth of TVET institutions from 874 to 2,755, the expansion of total enrolment from 153,314 to 709,885, the exponential increase in HELB loan disbursements from KSh. 137 million to KSh. 10,458.9 million, and the introduction of the CBET curriculum collectively reflect the government's growing commitment to TVET as a vehicle for inclusive, sustainable national development.

The study further establishes that Kenya's TVET trajectory has been shaped by a complex historical inheritance—from the racially exploitative vocational training of the colonial era through successive post-independence reforms to the current competency-based paradigm. Each phase of reform has incrementally shifted TVET from a marginalized pathway toward a recognized component of the national education system, reflecting a growing appreciation of TVET's potential to enhance productivity, innovation, entrepreneurship, and social inclusion.

Nevertheless, persistent and multifaceted challenges continue to undermine the effectiveness and equity of TVET in Kenya. Inadequate and inequitably distributed financing, dilapidated infrastructure, a shortage of qualified trainers, curriculum–labour market misalignment, gender disparities in enrolment, negative societal perceptions, and inadequate provision for learners with disabilities collectively constitute a formidable barrier to the realization of SDG 4 targets. While Kenya has made commendable strides in expanding and reforming the TVET sector, decisive and sustained interventions across financing, infrastructure, trainer capacity, curriculum relevance, gender inclusion, and public perception are essential if the sub-sector is to fulfil its transformative potential. Embedding ESD principles within TVET frameworks—thereby cultivating technically skilled, environmentally conscious, and socially responsible graduates—will be critical in positioning TVET as a genuine driver of sustainable, inclusive, and equitable development in Kenya and beyond.

RECOMMENDATIONS

On the basis of the findings and conclusions of this study, the following recommendations are advanced for the attention of policymakers, TVET practitioners, and development partners:

1. The Kenyan government should increase and equitably redistribute TVET funding across all levels. Allocations must be based on the true costs of competency-based training, actively prioritizing institutions in marginalized and underserved communities.
2. Relevant stakeholders, including the Ministry of Education, TVETA, and industry bodies, must strengthen partnerships between TVET institutions and the private sector. They should formalize structured employer engagement in curriculum design, practical training, and industrial attachments. This collaborative approach will facilitate graduate employment and ensure TVET programs consistently align with dynamic labour market demands.
3. The government should institutionalize mandatory Continuous Professional Development (CPD) frameworks for all TVET educators. This framework must incorporate regular industry placements, competency-based pedagogical training, and exposure to emerging technologies. Additionally, the state should ensure competitive remuneration and clear career progression pathways to attract and retain qualified staff.
4. The Ministry of Education and TVET regulatory agencies must implement targeted interventions to eliminate access barriers related to gender, region, and disability. These interventions should include gender-responsive bursary schemes, accessible infrastructure, and inclusive admissions policies. Crucially, these actions must align with the National Policy for TVET (2023) and SDG targets 4.3 and 4.5.
5. TVET institutions should fully integrate CBET approaches and ESD principles into all programs. This will cultivate technically proficient, innovative, and ethically grounded graduates. Ultimately, these learners will be environmentally aware and equipped for lifelong learning in a rapidly changing work environment.
6. Policymakers must ensure that upgrading national polytechnics to universities does not erode their technical vocational mission. Dedicated policy safeguards should be established to guarantee continued higher-level technical training. This protects educational pathways for learners who do not qualify for conventional university admission.

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