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Trends in Programmes and Enrolment Patterns in Technical and Vocational Education and Training in East Africa

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ABSTRACT

East Africa recently has witnessed a substantial transformation in Technical and Vocational Education and Training (TVET) programmes and enrolment patterns across the region. This study explored the trends in developing programmes and enrolments in TVET across East Africa, specifically within the transportation, manufacturing, and renewable energy sectors. The study used a positivism research philosophy and a quantitative approach. Furthermore, the study used a descriptive research design from which data were collected from Ethiopia, Kenya, and Tanzania in 9 institutions among 17 regional flagship institutions, implementing the East Africa Skills for Transformation and Regional Integration Project (EASTRIP). The data were collected through documentary review of enrolment databases of the surveyed TVET institutions. The collected data were analysed using descriptive statistics, especially cross-tabulation with frequencies and percentages. The findings reveal that the trends in enrolment varied from one institution to another and from one specific sector to another (from one specific programme to another). In the transportation sector, the National Institute of Transport in Tanzania reported steady growth in enrolments linked to government investments in infrastructure. Conversely, Kombocha TVET Polytechnic in Ethiopia noted a decline in enrolments despite expansion in its programmes. In the manufacturing sector, Dar es Salaam Institute of Technology-Mwanza Campus developed programmes consistently, and the enrolment increased steadily. The renewable energy sector in Arusha Technical College experienced an increase in enrolments in long-term programmes. These findings carry several policy implications, such as harmonisation of TVET qualifications, alignment with labour market demands, strengthening industry partnerships, enhancing trainer competency and addressing implementation gaps noted from the submitted trends and patterns.

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1.0 Introduction

Technical and Vocational Education and Training (TVET) has long been recognised as a key driver of economic growth and sustainable development (Ogur, 2023). TVET programmes aim to enable and expand the acquisition of skills needed to meet the changing needs of the industry and economy (UNESCO -UNEVOC, 2016). TVET programmes are designed to provide individuals with skills that meet the demands of the labour market, enabling them to secure employment and contribute to their country's economy (World Bank (2023)).

In recent years, there has been a shift towards developing both long-term and short-term TVET programs to meet diverse needs. According to the World Bank (2020), TVET institutions need to offer both short-term and long-term programmes to accommodate diverse learner profiles and regional workforce demands. A report by the African Development Bank (2019) emphasised short-term courses as rapid solutions to immediate skill shortages, such as upskilling workers in emerging sectors like renewable energy. Long-term TVET programmes lay a foundation for advanced technical competencies and leadership roles, supporting broader economic transformation. A report by GTZ/GIZ (2008) on reforming TVET in developing countries underscores the necessity of developing flexible training programmes that can be scaled up or down depending on labour market trends.

In East Africa, TVET is seen as crucial for developing skills, enhancing productivity, and stimulating economic growth (World Bank, 2023). In East Africa, countries such as Tanzania, Kenya, and Ethiopia have developed a focus on TVET as a critical strategy for addressing unemployment, alleviating poverty, and bridging skills gaps. The Tanzania Development Vision for 2021-2025 strongly emphasises industrialisation and infrastructure projects, viewing TVET as pivotal for supplying the skilled labour required to meet these expansion goals (United Republic of Tanzania, 2021). It envisions aligning TVET programmes with emerging transportation and renewable energy sectors to ensure relevance. Kenya Vision 2030 stresses human capital development by bridging skills gaps in key sectors such as agro-processing and manufacturing through TVET (Government of the United Republic of Kenya, 2007). In 2018, Kenya experienced a policy change that brought greater focus to TVET, attracting a larger budget allocation (Erima, 2021). Through strategic investments in TVET, Kenya seeks to reduce youth unemployment and boost industrial growth. Ethiopia's Growth and Transformation Strategy through 2025 underscores TVET as a catalyst for shifting from an agriculture-based economy to industry and services (Federal Democratic Republic of Ethiopia, 2015).

The TVET programmes have shown increasing recognition, enhancing skills development and addressing youth unemployment in East Africa (African Union, 2018; AfDB, 2019; UNESCO, 2020; World Bank, 2021). However, several challenges are faced by the trends and enrolment in TVET programmes. These challenges include negative perceptions and stigma about TVET, inadequate funding and infrastructure for TVET, limited industry linkages and irrelevant curricula, a shortage of qualified instructors, gender disparities and inclusion barriers, and policy and governance issues (UNESCO, 2020; African Union, 2018; ILO, 2020; UNESCO-UNEVOC, 2020; EAC, 2018).

In collaboration with international organisations and the private sector, the governments of Tanzania, Kenya, and Ethiopia have implemented various projects to expand TVET institutions, improve programme quality, and increase access to these programmes. In October 2018, the World Bank approved the East African Skills for Transformation and Regional Integration Project (EASTRIP) with the East African countries of Ethiopia, Kenya, and Tanzania as beneficiaries. The project's development objective is to increase access, improve the quality of TVET programs in selected regional flagship TVET institutes, and support regional integration in East Africa.

In EASTRIP, TVET institutes were nominated by their governments based on national and regional priorities, along with the sector focus desired by each participating country. Some of the key sectors included transportation, manufacturing, energy,

infrastructure, and ICT. The implementation of the project involved developing demand-driven long-term and short-term programmes that were either accredited by TVET accreditation bodies or certified by industries, as well as increasing student enrolment in programmes designed to meet the skills needs of priority sectors for each selected TVET institution.

Even though a lot of money has been put into TVET in East Africa, there hasn't been much research on how many students are enrolling in specific TVET programs, especially in important areas like transportation, renewable energy, and textiles and garments technology, after the EASTRIP project aimed to improve access and quality of TVET programs in key institutes and support regional cooperation in East Africa. Researching the trends in programmes and enrolment patterns in TVET in East Africa is significant to evaluate the impact of the EASTRIP invested by the World Bank. The increasing importance of these sectors for the region's economic development necessitates a thorough analysis of how TVET programmes are equipping individuals for the labour market. Long-term programmes offer comprehensive training designed to meet the demand for skilled workers in high-growth industries, while short-term programmes provide flexible and targeted training solutions to address immediate skills gaps.

Therefore, this study explored sector-specific TVET enrolment patterns in East Africa, with a focus on long-term and short-term programmes in the transportation, renewable energy, and manufacturing sectors from 2022 to 2024. It analysed the development of long-term and short-term programs and compared enrolment patterns at selected TVET institutions across Tanzania, Kenya, and Ethiopia.

2.0 Materials and Methods

2.1 Research Philosophy

This study used positivism's research philosophy. It allowed a structured and scientific way of collecting objective data through quantitative methods. The given data identified patterns with generalisable findings, making the study more reliable and verifiable.

2.2 Research Approach

This study used a quantitative approach to collect objective and measurable data which were statistically analysed. The given approach resulted in the identification of patterns and trends of programmes and enrolment for generalisable conclusions.

2.3 Research Design

This study used an exploratory research design associated with a case study research design. It specifically used cross-sectional case study designs, i.e., more than one case study but different case studies. These cases are different TVET institutions and different programmes in East Africa under the Project of EASTRIP. The designs were used in this study to gain an in-depth understanding of the trends of programmes and patterns of enrolment following EASTRIP investment. They further helped to provide rich empirical data through sources of evidence of documents and enrolment databases from the studied TVET institutions.

2.4 Unit of Analysis, Sample Size and Sampling Techniques

The units of analysis for this study were 9 TVET institutions purposely selected among 17 Regional Flagship TVET Institutes selected for implementing the EASTRIP. The study focused on sectors of transportation, renewable energy, and manufacturing. These sectors were selected due to the presence of TVET institutions specialising in them in all three countries. In each sector, one institution was purposely selected from each country. In the transportation sector, the National Institute of Transportation was selected in Tanzania, Kombocha TVET Polytechnic College in Ethiopia, and Kenya Coast National Polytechnic in Kenya. In the manufacturing sector, Dar es Salaam Institute of Technology (DIT) – Mwanza Campus in Tanzania was selected, Hawassa TVET Polytechnic College in Ethiopia, and Kisumu National Polytechnic in Kenya. In the renewable energy sector, the Arusha Technical College in Tanzania was selected, along with General Wingate

Polytechnic College in Ethiopia and KenGen Geothermal Training Centre in Kenya. Generally, the study was based on TVET sectorial enrolment patterns across Tanzania, Kenya, and Ethiopia. Therefore, this study explored sector-specific TVET enrolment patterns in East Africa, with a focus on long-term and short-term programmes in the transportation, renewable energy, and manufacturing sectors from 2022 to 2024. It analysed the development of long-term and short-term programmes and compared enrolment patterns in selected TVET institutions across Tanzania, Kenya, and Ethiopia.

2.5 Data Collection

The data of this study were secondary data from the enrolment database of the studied TVET institutions. The given data was collected through the documentary review/analysis method. The method was used because it facilitated systematic collection and evaluation of existing data regarding the trends of programmes and enrolment patterns. In other words, it ensured identifying gaps in current knowledge on the TVET programmes and enrolment patterns in East Africa. Specifically, the study used data collected from institutional enrolment databases. The study focused on data that were submitted by the TVET institutions to the Inter-University Council of East Africa (IUCEA) as a Regional Facilitation Unit (RFU) of EASTRIP after being verified by PricewaterhouseCoopers Limited as independent verifiers. The verification of the number of programmes developed and students enrolled by independent verifiers increased the validity of the data.

2.6 Data Analysis

The collected data were cross-tabulated to compare programme development and enrolment trends across different years (2022, 2023, and 2024) and between the three countries. The cross-tabulation analysis was done using descriptive statistics with the aid of IBM SPSS version 26. The results from cross-tabulation were presented using charts with frequencies.

2.7 Ethical Considerations

There are various techniques used to ensure ethical considerations in this study. These techniques include informed consent, confidentiality and anonymity, avoidance of harm, ethical approval, and integrity and objectivity. Through informed consent, the studied TVET institutions were fully informed about the nature and purpose of carrying out this study. After informing them, they were requested to voluntarily agree to participate in the study. In addition, through confidentiality and anonymity, the personal data collected from the databases were kept confidential and anonymised for protection of their identities. Moreover, the ethical consideration was ensured through avoidance of harm. In this technique, the researchers avoided psychological, social, or economic harm to the participants who dealt with databases. Moreover, the ethical considerations were ensured through ethical approval. In so doing, the researchers in advance sought official permission and approval from the TVET institutions, especially allowing their databases to be used. Finally, integrity and objectivity were used to ensure ethical consideration in this study, where the researchers reported data honestly by avoiding manipulation of findings and disclosed any conflicts of interest, avoiding plagiarism, and ensured transparency and trustworthiness of the study throughout.

3.0 Results and Discussions

3.1 Trends of TVET Programme Development and Enrolment in the Transportation Sector

This study analysed the trends in programme development and enrolment in transportation sector across TVET institutions in Tanzania, Kenya and Ethiopia. The results indicate that at Kombocha TVET Polytechnic, the number of long-term programmes steadily increased by 350% from 4 in 2022 to 14 in 2024, while the number of students enrolled in long-term programmes declined by 66.3% from 205 in 2022 to 69 in 2024. In contrast, the number of short-term programmes remained constant at 5 over the years, while students' enrolment in short-term programmes

increased by 123.8% from 42 in 2022 to 94 in 2024. At the National Institute of Transport, long-term programmes grew steadily by 41.7% from 12 in 2022 to 17 in 2024, while long-term enrolment consistently grew from 7879 in 2022 to 10082 in 2024. The number of short-term programmes slightly increased by 22.2% from 9 in 2022 to 11 in 2023 and 2024, while short-term enrolment remained relatively stable, with a slight decrease from 3339 in 2022 to 4004 in 2024. At Kenya Coast National Polytechnic, long-term programmes grew by 100% from 3 in 2022 to 6 in 2024, while long-term enrolment rose by 300% from 165 in 2022 to 662 in 2024. Short-term programmes increased from 4 in 2022 to 5 in 2023, while short-term enrolment increased steadily by 31.8% from 85 in 2022 to 112 in 2024, as illustrated in Figure 1 and Figure 2 below. The National Institute of Transport in Tanzania significantly surpasses other institutions in enrolment numbers, indicating a high demand for a skilled workforce in transport sectors linked with government investments in railway, marine, and air transportation. This indicates stronger alignment with national development plans and clear employment opportunities in railway, marine, and air transportation. This supports the view by Kingombe (2012) that TVET institutions thrive when closely linked to national infrastructure priorities. The presence of substantial government-backed projects, such as the standard gauge railway in Tanzania, further explains the rising enrolment trends in transportation programmes. The surge in enrolment at Kenya Coast National Polytechnic reflects a response to the increasing demand stemming from port-related activities in Mombasa. Conversely, the decline in enrolment at Kombocha TVET Polytechnic in Ethiopia, despite growth in programmes, could reflect a temporary mismatch between programme expansion and actual labour market demand. One institutional factor contributing to this mismatch may be limited engagement with industry stakeholders during programme development. As highlighted by Afeti and Adubra (2012), TVET institutions in many African countries design and implement programmes without adequate input from employers, resulting in curricula that do not reflect current labour market needs. Additionally, the absence of a labour market information system in Ethiopia may limit Kombocha's capacity to assess and respond to real-time employment trends. Adams et al. (2013) emphasise the importance of LMIS in shaping responsive and demand-driven TVET programmes. Conversely, Kombocha's situation reflects earlier findings by Atchoarena and Delluc (2002), highlighting that many TVET institutions in sub-Saharan Africa struggle to align training outcomes with evolving labour market needs due to limited autonomy, resource constraints, and bureaucratic rigidity. To address these issues, the institution should enhance industry collaboration, improve labour market analysis, and invest in awareness campaigns to boost programme visibility and value.

Figure 1

Trends of TVET Programmes Development in the Transportation Sector from 2022 to 2024

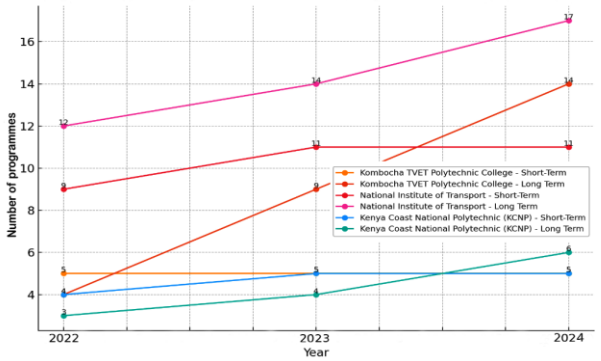
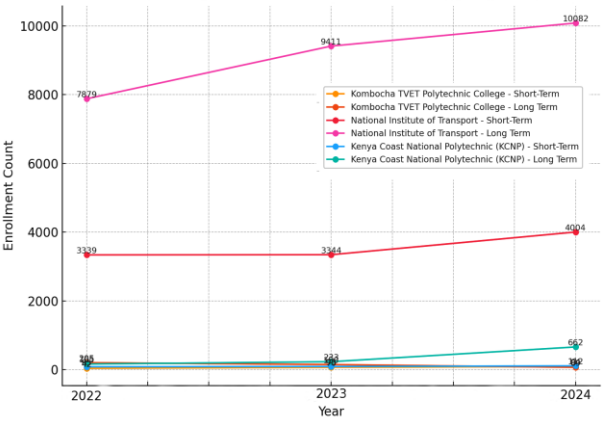


Figure 2

Trends of TVET Enrolment in the Transportation Sector from 2022 to 2024



3.2 Trends of TVET Programme Development and Enrolment in the Manufacturing Sector

The results indicate that at the DIT Mwanza Campus in Tanzania, the number of long-term programs increased significantly, by 133%, from 3 in 2022 to 7 in 2023 and 2024. Similarly, long-term enrolment increased steadily by 36%, from 171 in 2022 to 233 in 2024. Meanwhile, the number of short-term programmes increased by 33.3% from 6 to 8 in 2023 and 2024, with short-term enrolment peaking at 830 in 2023 and before declining by 33.3% to 558 in 2024. At Hawassa TVET Polytechnic, the number of long-term programmes increased significantly from 2022 and 2023 to 8 in 2023, while long-term enrolment peaked at 704 in 2023 and declined by 69.6% to 214 in 2024. The number of short-term programmes remained constant at 10 over the three years, with short-term enrolment peaking at 1470 in 2023 and declining by 90.4% to 141 in 2024. At Kisumu National Polytechnic in Kenya, the number of long-term programmes remained constant at 17 over the three years, with long-term enrolment reaching a peak of 467 in 2023 and declining by 60.4% to 185 in 2024. Similarly, the number of short-term programmes remained constant at 17 over the years, with short-term enrolment peaking at 148 in 2023 and then declining by 91.8% to 12 in 2024, as illustrated in Figure 3 and Figure 4, respectively. Generally, the results reveal fluctuations in enrolment trends, indicating possible changes in demand or institutional factors that may be influencing these enrolment figures. These findings align with earlier research indicating that TVET enrolment is significantly affected by economic fluctuations, government funding, student perceptions, and the effectiveness of institutions (Oketch, 2007; Atchoarena& Delluc, 2002). A drop in enrolment may signal a loss of confidence in programme quality, a growing preference for university education, or poor marketing and career guidance at institutions. Declining enrolment may indicate inadequate facilities, staff, or industry connections, which can make programmes less appealing (UNESCO-UNEVOC, 2013). Without industry attachments and recognised training, students might seek other options. These findings highlight the importance of ongoing labour market monitoring, adapting curricula, and enhancing collaboration between TVET institutions and industries.

Figure 3

Trends of TVET Programme Development in the Manufacturing Sector from 2022 to 2024

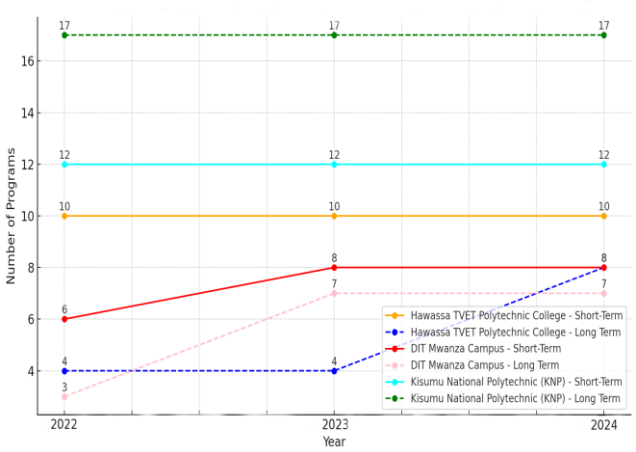
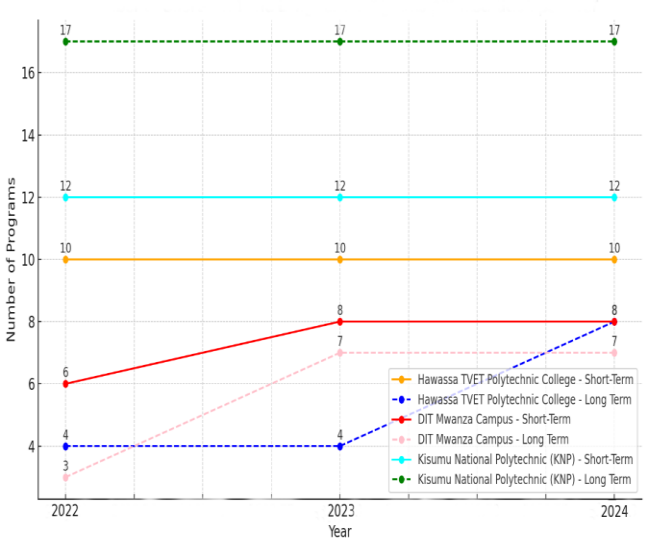


Figure 4

Trends of TVET Programme Development in the Manufacturing Sector from 2022 to 2024



3.3 Trends of TVET Programme Development and Enrolment in the Energy Sector

The results indicate that at Arusha Technical College, long-term programmes showed a gradual increase by 9.1% from 11 in 2022 to 12 in 2023 and remained constant in 2024. Meanwhile, long-term enrolment increased by 22.8% from 607 in

2022 to 746 in 2024. The number of short-term programmes remained constant at 15 across all three years, while short-term enrolment increased from 37 in 2022 to 283 in 2023, before dropping to 34 in 2024. At General Wingate Polytechnic College, long-term programmes increased by 33.3% from 12 in 2022 to 16 in 2024, with long-term enrolment peaking at 1428 in 2023 but experiencing a significant decline of 82.3% to 252 in 2024. The short-term programmes remained constant at 6 over the three years, with short-term enrolment peaking at 543 in 2023 but dropping sharply by 89.5% to 57 in 2024. At KenGen Geothermal Training Centre, the number of long-term programmes remained steady at 17 throughout the three years, with long-term enrolment starting at zero in 2022 and 2023, then rising to 169 in 2024. This aligns with the International Renewable Energy Agency (IRENA), 2020 findings, highlighting that unstable government investment and financing in Africa's renewable energy sector hinder long-term planning and reduce student engagement. Correspondingly, the number of short-term programmes increased significantly by 340% from 5 in 2022 to 22 in 2023 and remained constant in 2024. Short-term enrolment dropped by 34.0% from 97 in 2022 to 64 in 2023 but rose sharply to 209 in 2024, as illustrated in Figure 5 and Figure 6. The findings align with the United Nations Environment Programme (UNEP, 2021), which highlights policy instability, limited industry engagement, and low public awareness as major obstacles to expanding renewable energy skills in sub-Saharan Africa. Fluctuations in student enrolment for energy training are often driven by changing government or donor priorities rather than real labour market demands. However, studies by Fuso Nerini et al. (2018) and Eberhard et al. (2017) highlight that African TVET institutions face challenges in incorporating renewable energy into their curricula due to insufficient equipment, a lack of qualified trainers, and ambiguous accreditation standards, undermining the appeal and credibility of these programs.

These findings imply a need to strengthen institutional capacity by investing in infrastructure, staff training, and modern equipment to sustain renewable energy training programmes and attract students. Also, stronger industry engagement, development of long-term renewable energy skills development strategies, and career guidance.

Figure 5

Trends of TVET Programme Development in the Energy Sector from 2022 to 2024

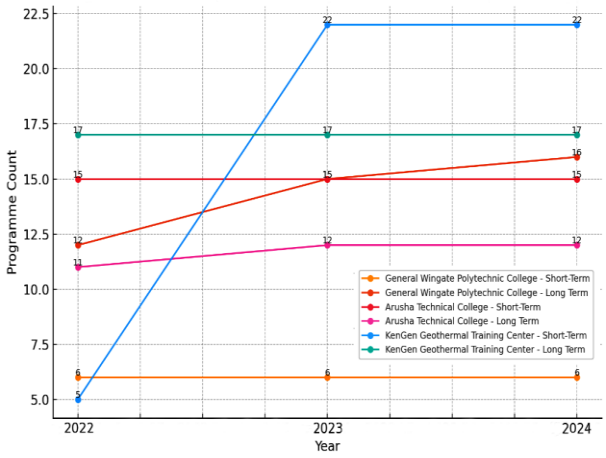
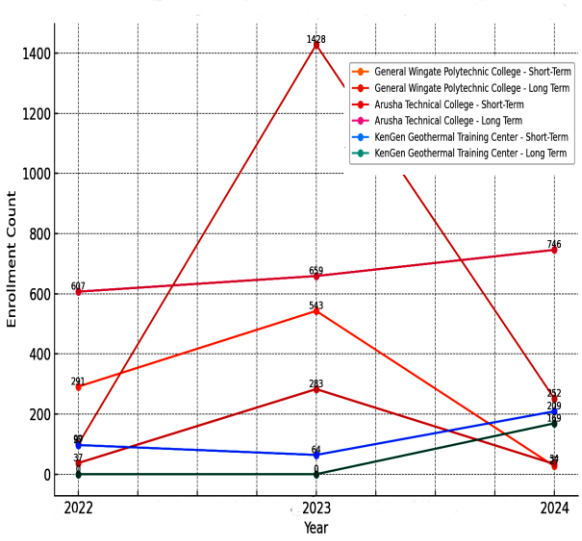


Figure 6

Trends of TVET Enrolment in the Energy Sector from 2022 to 2024



4.0 Conclusion

The findings indicate notable trends and fluctuations in TVET programme development and enrolment in the transportation, manufacturing, and renewable energy sectors across different

TVET institutions in East Africa. Transport sector TVET in Tanzania and Kenya showed consistent growth in both programme development and enrolment, driven by infrastructure investments such as railways, ports, and air transport. In contrast, Kombocha TVET Polytechnic in Ethiopia expanded its programmes but saw a decline in long-term enrolment, suggesting a misalignment with labour market needs. Similarly, in the manufacturing sector, institutions such as DIT Mwanza Campus and Hawassa TVET Polytechnic have observed growth in programme offerings, accompanied by volatile enrolment trends. This variability underscores the impact of market dynamics, policy shifts, and institutional capabilities. Furthermore, the renewable energy sector, as exemplified by the Arusha Technical College, General Wingate Polytechnic College and KenGen Geothermal Training Centre, has also experienced pronounced fluctuations in enrolment figures, which can be attributed to the sector's emerging status, irregular policy support, and inconsistent funding.

5.0 Recommendations

Based on these findings, it is recommended that TVET institutions align programme development with the needs of the labour market to ensure relevance and increase enrolment. Governments and policymakers should foster stronger collaborations between TVET institutions and industries to better anticipate workforce needs, particularly in sectors experiencing rapid growth, such as transportation and renewable energy. TVET institutions should conduct regular evaluations of long-term and short-term programmes to identify discrepancies and inform necessary adjustments in curriculum and training focus. Enhanced policy support, consistent funding, and public-private partnerships are essential to strengthen TVET systems and sustain growth in these critical sectors. Finally, targeted awareness campaigns and incentives to attract students to under-enrolled programmes can help bridge gaps in demand and supply, fostering a more robust TVET ecosystem in East Africa.

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8.0 Declaration of Conflicting Interests

The authors declare no conflict of interest.

9.0 References

Adams, A. V., de Silva, S. J., & Razmara, S. (2013). *Improving skills development in the informal sector: Strategies for Sub-Saharan Africa*. World Bank Publications. https://doi.org/10.1596/978-0-8213-9968-2

Afeti, G., & Adubra, A. (2012). *Lifelong technical and vocational skills development for sustainable socioeconomic growth in Africa*. African Union Commission.

African Development Bank. (2019). *Creating decent jobs: Strategies, policies, and instruments (Policy Research Document 2)*. African Development Bank.

Atchoarena, D., & Delluc, A. (2002). *Revisiting technical and vocational education in Sub-Saharan Africa: An update on trends, innovations and challenges*. International Institute for Educational Planning (UNESCO).

Erima, G. E. (2021). Placing greater emphasis on vocational education in Kenya. *Open Science Journal, 6* (2). https://doi.org/10.23954/osj.v6i2.2080

Federal Democratic Republic of Ethiopia. (2015). *Growth and Transformation Plan II (GTP II)*.

Ministry of Finance and Economic Development.

Fuso Nerini, F., Broad, O., Mentis, D., Welsch, M., Bazilian, M., & Howells, M. (2018). A cost comparison of technology approaches for improving access to electricity services. *Energy, 170*, 1-14. https://doi.org/10.1016/j.energy.2018.08.222

Government of the Republic of Kenya. (2007). *Kenya Vision 2030*. Government Printer.

GTZ/GIZ. (2008). *Reforming TVET: The challenge for developing countries*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

International Renewable Energy Agency (IRENA). (2020). *Renewable energy and jobs: Annual review 2020*. IRENA.

Kingombe, C. (2012). *Lessons for developing countries from experience with technical and vocational education and training* (IGC Working Paper, February 2012). International Growth Centre.

Ogur, E. O. (2023). TVET, economy and sustainable development. *International Journal of Vocational and Technical Education, 15*(2), 12-17. https://doi.org/10.5897/IJVTE2022.0315

Oketch, M. O. (2007). To vocationalise or not to vocationalise? Perspectives on current trends and issues in technical and vocational education and training (TVET) in Africa. *International Journal of Educational Development, 27*(2), 220-234. https://doi.org/10.1016/j.ijedudev.2006.07.004

UNESCO-UNEVOC. (2013). *Technical and vocational education and training (TVET) and skills development for poverty reduction and sustainable development*. UNESCO.

UNESCO-UNEVOC. (2016). *World TVET Database Tanzania*. http://www.unevoc.unesco.org/

United Nations Environment Programme (UNEP). (2021). *Green skills and innovation for inclusive and sustainable growth in Africa*. UNEP.

United Republic of Tanzania. (2021). *Tanzania Development Vision 2021–2025*. Ministry of Finance and Planning.

World Bank. (2020). *Skills development in emerging economies: Strategies for growth, equity, and quality*. World Bank.

World Bank. (2023). *Improve technical and vocational education and training (TVET) to meet skills and labour mismatch*. World Bank.