ACET African Center for Economic Transformation

AFRICA EDUCATION WATCH

In partnership with mastercard foundation

Building TVET Systems for Economic Transformation in Africa:

GHANA COUNTRY REPORT

COUNTRY REPORT

The Ghana Country Report is part of the Building TVET Systems for Economic Transformation in Africa study, jointly implemented by ACET and think tanks in six African countries: Côte d'Ivoire, Ethiopia, Ghana, Niger, Rwanda, and Uganda. The study builds on earlier work by ACET in partnership with the Mastercard Foundation on secondary education in Africa and focuses on how national TVET systems can better respond to changing labor market demands and drive inclusive economic transformation. The objective of the study is to identify and map the key challenges facing the TVET sector across the six countries and to highlight promising practices and actionable policy recommendations. The country reports informed the study's synthesis report, available to read and download at acetforafrica.org/TVET.

Launched with support from YOTA Youth Opportunity & Transformation in Africa

AN AGENCY UNDER THE MINISTRY OF EDUCATION REPUBLIC OF GHANA

Contents

List of Figures

List of Tables

Abbreviations

4IR	Fourth Industrial Revolution
AI	artificial intelligence
CBT	competency-based training
CSOs	civil society organizations
CTVET	Commission for Technical and Vocational Education and Training
DPs	development partners
ESP	Education Strategic Plan
GHC	Ghana cedi
GTVETS	Ghana Technical and Vocational Education and Training Service
ICT	information and communication technology
IT	information technology
MCP	master craftsperson
MoE	Ministry of Education
OECD	Organization of Economic Co-operation and Development
PWDs	persons with disabilities
SSBs	Sector Skills Bodies
STEM	science, technology, engineering, and mathematics
TVET	technical and vocational education and training
TVIs	technical and vocational institutes

Acknowledgements

This report was developed as part of the *Building TVET Systems for Economic Transformation* project, undertaken by the **African Center for Economic Transformation (ACET)** in partnership with the **Mastercard Foundation**. The study was conducted by a team led by **Mona Iddrisu**, Head of Youth Employment and Skills (YES) at ACET, with research coordination and technical support from **Habtamu Edjigu,** Economist, Youth Employment and Skills (YES) at ACET.

ACET is deeply grateful to its national research partner in Ghana, **Africa Education Watch**, led by **Kofi Asare**, who led the development of the country background paper. The team's leadership, data collection, analysis, and national insights enriched the depth and relevance of this country study.

We extend our sincere gratitude to **Jason Thompson**, **Nora Mara Honora**, **Glen Darby**, and **Sharmaine Oddoye** for their editorial and design contributions throughout the development process. We also extend our appreciation to **Dr. Emmanuel Owusu-Sekyere**, Director of Research, Policy & Programs at ACET, and **Dr. Edward K. Brown**, Senior Director of Research, Policy and Programs at ACET, for their strategic guidance and review throughout the process.

We are also particularly appreciative of our external reviewer **Dr. George Afeti** (Technical & Vocational Skills Expert) — for their careful critique, suggestions, and support during the peer review process. Their input significantly enhanced the rigor of this report.

Finally, we thank the participants who attended the validation workshop on TVET and youth employment in Ghana, whose perspectives, experiences, and feedback helped shape the findings, conclusions, and recommendations presented here.

Disclaimer

This research was produced through the Inclusive Economic Transformation Research partnership between the African Center for Economic Transformation (ACET) and the Mastercard Foundation. The Inclusive Economic Transformation Research program is a five-year initiative (August 2023 – August 2028), designed to support inclusive growth, youth employment, and poverty reduction across Africa. The findings, interpretations, and conclusions expressed in this report are those of the authors and do not necessarily reflect the views of the Mastercard Foundation, its staff, or its Board of Directors.

Executive Summary

Approximately 35 percent of Ghana's population is between the ages of 15 and 35 years, according to the 2021 Ghana Statistical Service Population and Housing Census. Additionally, the proportion of the population ages 35 and younger is estimated at about 70 percent, indicating a youthful population in relation to the subregion. Along with a majority youth population, Ghana has high unemployment, rising from 11.3 percent in the last quarter of 2022 to 14.7 percent in the third quarter of 2023 (GSS, 2023).

Providing the needed skills and attributes for creativity and optimal job performance in the emerging economy will require an effective technical and vocational education and training (TVET) system that is relevant to the Fourth Industrial Revolution, green responsive, and focused on gender equality and social inclusion. Consequently, the government of Ghana has been reforming its TVET system with the aim of revolutionizing TVET delivery to produce a critical mass of highly skilled workers who have the capacity to support industry and contribute to sustainable development. Investments in infrastructure and training facilities in TVET institutions have also helped to absorb the growing number of learners and expand the scope of training programs.

Notwithstanding these efforts, TVET in Ghana faces challenges that hinder progress. This study was commissioned to assess the progress of TVET in Ghana, evaluating the challenges and opportunities within the system and its alignment with industry and national development goals. The study employed a mixed-method approach, integrating qualitative and quantitative data collected from 168 respondents, including TVET administrators, facilitators, policymakers, regulatory agency representatives, industry representatives, students, apprentices, parents, and development partners. It gathered data through interviews, focus group discussions, and surveys, and analyzed the data using Nvivo for qualitative insights and IBM SPSS for quantitative trends.

Key findings

Challenges of Ghana's TVET sector. Ghana's TVET sector faces various challenges, including inadequate funding, limited practical training, outdated training equipment, poor digital infrastructure, and weak science, technology, engineering, and mathematics (STEM) skills. TVET funding, the biggest challenge in the sector, remains low, averaging just 1.9 percent of total education expenditure in 2022, far below recommended benchmarks. Limited investment in digital infrastructure and STEM education—coupled with obsolete training facilities and equipment, and limited access to practical training—exacerbates the skills gap, making it difficult for TVET graduates to meet industry expectations.

Industry readiness and alignment with labor market needs. Although critical for equipping youth with employable skills, Ghana's TVET system faces weak links with industry. Many institutions operate with outdated curricula and minimal private sector involvement in training design. Less than 30 percent of TVET institutions receive labor market information from the government, leading to a disconnect between training programs and industry demand. Work-based learning and competency-based training initiatives remain underdeveloped, limiting

graduate employability. The private sector has weak involvement in curriculum design and training assessment because of the lack of incentives and structured partnerships

Extent of digitalization in TVET. Digitalization is essential for modern workforce readiness, yet TVET institutions in Ghana have low levels of technology integration. Only 20 percent of TVET students feel adequately equipped with digital skills, and most informal sector TVET trainers and master craftspersons report minimal digitalization in their training methods. Challenges such as limited access to digital devices, unreliable internet connectivity, and high data costs hinder progress in incorporating technology-mediated learning into TVET programs.

Green skills and sustainability in TVET. The shift to sustainable industrial practices has created a rise in the demand for green skills; yet Ghana's TVET system remains largely unprepared for this transition. Only 25.6 percent of formal TVET students have any awareness of green skills, and most master craftspersons and their apprentices lack knowledge in areas like renewable energy, waste management, and climate-responsive agriculture. Despite some progress in policy adoption for green skills integration, implementation largely targets public TVET institutions and remains limited and inconsistent.

Private sector involvement in TVET. A well-coordinated private sector engagement strategy is essential for strengthening TVET, but study findings indicate that the lack of incentives discourages private sector participation. Only about 46 percent of TVET heads and policymakers or regulators believe that TVET has effective collaboration with industry. Furthermore, all private sector respondents cite the absence of tax incentives as a barrier to investing in TVET.

Gender disparities in TVET. Although female enrollment in TVET has increased, gender disparities persist. Men account for over 73 percent of TVET enrollments, highlighting significant barriers to female participation in technical fields. Cultural norms, lack of female role models in STEM fields, and limited incentives for women to pursue TVET careers contribute to this gender gap.

Recommendations

Effectively addressing the funding challenges in Ghana's TVET sector requires a substantial increase in budgetary allocations, with at least 5 percent of total education expenditure dedicated to TVET. Establishing a dedicated TVET fund with contributions from government, the private sector, and development partners can help bridge the funding gap. Additionally, a shift to results-based financing models can ensure efficient use of resources. Additionally, TVET institutions should receive support to establish production units as income-generating ventures, offering services to local communities and reinvesting proceeds into training enhancement. This model enables practical student engagement while fostering institutional financial independence. A sectoral approach could be explored, with key industries like construction contributing to a pooled fund for financing TVET aligned to national skill needs.

Making TVET more responsive to labor market demands requires strengthening industry collaboration. It requires the creation of structured public-private partnerships that facilitate

industry participation in curriculum development, training assessment, and job placements. The government should introduce tax incentives to encourage businesses to invest in TVET apprenticeships, internships, and training infrastructure.

Enhanced digital skills integration in TVET institutions is essential for preparing students for the Fourth Industrial Revolution. The government should prioritize information and communication technology infrastructure development in TVET institutions, ensure access to affordable digital tools, and incorporate technology-driven learning methodologies. Improving the quality of digital education will also require training instructors in modern digital pedagogies.

Effective green skills training is necessary to align with global trends in sustainability. TVET institutions should embed renewable energy, sustainable agriculture, and circular economy practices into their curricula. The government should partner with international organizations and private sector entities to provide funding and technical support for green TVET programs.

Promoting gender equality and inclusivity in TVET requires targeted interventions. Programs should introduce scholarships and mentorship programs to increase female enrollment in STEM-based TVET programs. TVET institutions should adopt gender-responsive policies that create a welcoming learning environment for women in technical fields. The government and the private sector should also implement policies to ensure gender equity in hiring TVET graduates. Beyond enrollment, ensuring that female TVET graduates thrive in nontraditional sectors will require workplace readiness support and industry sensitization on gender-inclusive practices.

Additionally, a strategic and inclusive approach is critical for increasing the participation of persons with disabilities in TVET. Rather than blanket exclusions, breaking down the value chains within various trades can help identify roles suited to different disability types and levels, enabling targeted capacity building and skill development. This approach promotes meaningful integration, shifts the focus to ability-based placement, and enhances both the inclusivity and economic empowerment potential of TVET for persons with disabilities.

Changing public perceptions of TVET is vital to improving its attractiveness. Nationwide advocacy campaigns, such as My TVET, should be scaled up to reduce stigma and increase enrollment. Career guidance centers should be established in TVET institutions to provide students with job placement support and entrepreneurial training.

Conclusion

Ghana's TVET system is at a critical crossroads, requiring urgent reforms to enhance industry alignment, digitalization, green skills training, and funding sustainability. Although government-led initiatives have achieved some progress, persistent gaps in financing, governance, and infrastructure hinder comprehensive transformation. A multistakeholder approach, leveraging public and private partnerships, will be key to unlocking TVET's potential for contributing to economic growth. Implementing the recommendations outlined in this report will help position Ghana's TVET graduates for high-demand, future-ready careers, ensuring sustainable employment and national economic development.

1. Introduction: TVET Overview

1.1. Background

The United Nations estimates that the world's population will reach 8.5 billion by 2030 and 9.7 billion by 2050, with more than half of the growth expected to occur in Africa (United Nations 2015). Africa boasts the youngest population in the world, with over 60 percent of its people under the age of 25, a demographic trend also reflected in Ghana (World Economic Forum 2023). Nearly 420 million people are between the ages of 15 and 35 years, with the continent's rapidly growing youth population expected to reach over 830 million by 2050 (AfDB 2016).

Youth unemployment represents one of the region's most significant challenges, as evidenced in Ghana. According to the International Labour Organization, more than one in every four young people in Africa (that is, about 72 million) is not in employment, education, or training, with women accounting for two-thirds of that number (Karkee and O'Higgins, 2023). The African Development Bank affirms that, of Africa's almost 420 million youth ages 15 to 35, a third are unemployed and discouraged, another third are vulnerably employed, and only one in six is in waged employment. Youth unemployment is double that of adults (AUDA-NEPAD 2021), with the situation ascribed to the disequilibrium between the demand for jobs and supply. Every year, about 10 million to 12 million young people scramble for the 3.1 million jobs created, leaving most youth with no stable economic opportunities (UNECA 2019).

Africa, and particularly Ghana, has a youthful population with immense potential to drive the continent's economic growth. Provided with the relevant skills and competencies through quality and equitable education and training, this demographic can play a significant role in achieving the 2030 Agenda. This agenda aligns closely with Sustainable Development Goal 4, which focuses on ensuring "equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university."[1] Furthermore, it seeks a "substantial increase in the number of youth and adults with relevant skills, encompassing technical and vocational skills, for employment, decent jobs, and entrepreneurship."

Stakeholders increasingly recognize technical and vocational education and training (TVET) as a key strategy to equip young people with the skills necessary for the emerging economy, particularly in the context of the Fourth Industrial Revolution (4IR). UNESCO (2020) defines TVET as education focused on the technology and skills needed for various sectors, imparting not only technical skills but also essential competencies to fully engage in the economy. Acknowledging TVET's potential to combat youth unemployment, the African Union formulated a Continental TVET Strategy, emphasizing TVET as a practical pathway for youth to acquire employable skills and contribute to economic development (AUC 2016).

The evolving demographic landscape of Africa necessitates a heightened focus on training needs and resources, coupled with shifts in labor market requirements, gender disparities, and

[1] United Nations Department of Economic and Social Affairs, "Goal 4: Targets and Indicators," https://sdgs.un.org/goals/goal4#targets_and_indicators.

urbanization challenges that TVET policies must address. Key obstacles hindering the effective deployment of TVET in Africa include a shortage of qualified teachers, insufficient funding, lack of digital infrastructure, and inadequate practical experience, discussed in turn in the following paragraphs.

Shortage of qualified teachers. A major barrier to quality TVET in Africa is the limited number of instructors equipped with the necessary technical expertise, industry experience, and pedagogical skills. Institutions for training TVET lecturers are scarce, and existing facilities often lack essential resources and up-to-date equipment (AfDB, 2020). As highlighted by UNESCO (2020), approximately 70 percent of TVET trainers lack current industry experience, demonstrating limited industry involvement in TVET training. Even as many African nations reform their curricula through a competency-based training (CBT) approach, instructors' insufficient familiarity with modern teaching methodologies hampers the effectiveness of these programs (South African Department of Higher Education and Training, 2021).

Insufficient funding. Many African countries grapple with inadequate funding for TVET, a crucial tool for delivering skills and competencies required in the emerging economy in alignment with Sustainable Development Goal 4 (AfDB, 2020). Ensuring that TVET remains sustainable, equitable, and inclusive will require increased and sustained financial commitment. Unfortunately, because of its higher associated costs for infrastructure, materials, and equipment, TVET often receives less funding than general education, resulting in a scarcity of resources dedicated to this sector (World Bank 2021).

Lack of digital infrastructure. In the post-COVID-19 world, demand for digital skills has intensified, making it imperative for TVET to incorporate modern pedagogy and digital training. Many traditional trades now require foundational digital competencies, yet insufficient internet coverage and poor digital infrastructure hinder progress. UNESCO (2022a) emphasizes that, although digitalization is essential for contemporary professional skills, many African nations face a significant technological gap and a lack of qualified personnel.

Inadequate practical experiences. Effective TVET requires instructors with both trade qualifications and relevant industry experience. Many teachers, however, lack the practical skills and knowledge necessary to deliver valuable learning experiences. Research indicates that industry experience is not a formal requirement for secondary-level TVET teachers in many countries, further widening the gap between academic training and real-world demands (UNESCO, 2020). A 2021 study in South Africa revealed that one in five TVET lecturers lacks both basic qualifications and essential workplace skills (South African Department of Higher Education and Training, 2021).

African governments, particularly the government of Ghana, have a critical opportunity to leverage TVET to enhance socioeconomic conditions by equipping youth with skills aligned to 4IR demands. This opportunity includes integrating digitalization and sustainable practices into various careers. As more jobs evolve, TVET can serve as a viable and lucrative career path for youth in fields such as information technology, manufacturing, agriculture, and natural

resources. By doing so, it has the potential to strengthen African economies, create well-paying jobs in both formal and informal sectors, reduce poverty and conflict, and promote regional stability and development.

1.2. Objectives and approach

Main objective. This study aims to map out the main challenges that hamper the transformation of Ghana's TVET system into a fit-for-purpose one that promotes economic transformation and a future-facing economy.

Analytical framework. With Ghana's rapidly growing youthful population and high youth unemployment—65 percent among individuals ages 15 to 24 (UNDP, 2024)—raising concerns of a risk of increased crimes, conflict, and political instability, the government of Ghana faces a crucial task. It must develop this critical demographic by equipping individuals with skills and competencies through education and training to contribute to the industrialization agenda. TVET is highly recommended as having the potential to translate this demographic asset into an economic and social dividend.

Although Ghana has systems for TVET delivery, they may not be 4IR compliant, responsive to gender equality and social inclusion goals, or green and fit for the emerging economy. These concerns raise the question of whether Ghana's TVET systems can produce the human resources needed to effectively and efficiently participate in the future workplace. Ghana's government, in partnership with relevant stakeholders, needs to conduct a review of TVET systems, map out challenges, and explore strategies to transform these systems and make them fit-for-purpose to promote economic transformation and a future-facing economy.

Methodology. The study adopted a mixed-methods approach to gain in-depth information on the subject matter, reach a wider audience, and ensure a diverse and representative sample. Overall, the study used purposive, convenience, and snowball sampling techniques to select 168 respondents: heads of government agencies (specifically the TVET Directorate, Commission for Technical and Vocational Education and Training [CTVET], and Ghana TVET Service [GTVETS]), heads of technical and vocational institutions (TVIs), TVET instructors, master craftspersons (MCPs), students, apprentices, parents, civil society organizations (CSOs), development partners (DPs), sector skills bodies, and private sector actors. Data collection took place through in-person one-on-one interviews and phone interviews (key informant interviews), and through focus group discussions using semistructured questionnaires. Thematic analysis of the qualitative data used the Nvivo analysis software, and the quantitative analysis used IBM SPSS software. Appendix A provides details on the methodology. Table 1 presents a summary of the number of respondents by stakeholder category.

Table 1. List of respondents sampled for the study

1.3. Focus of the study

The study concerns itself with the responsiveness of Ghana's public and private sector TVET systems. It looks at how equipped they are to contribute to economic transformation and to the skills needs of the 4IR and emerging green economy. Delving into the key challenges and policy and technical reforms required to position TVET to provide 4IR-relevant and green skills for Ghanaian youth, the study explores the following five overarching questions:

Stakeholder group	Number of interviews
Teachers	10
Students	90
Sector skills bodies	5
Policy and regulatory stakeholders *(TVET Directorate, GTVETS, and CTVET)*	3
MCPs	5
Heads of TVIs	10
CSOs	3
Apprentices	5
TVET sector trade associations *(private sector/employers)*	5
Parents	30
TVET teacher training institution	1
DP	1
Total	**168**

1. What is TVET, and why is it important in the African context?
2. What is the state of TVET in Ghana—that is, has it reached its potential, what are the challenges, and how are they being addressed?
3. What are the attributes of an effective TVET system that supports economic transformation and young people's transition into dignified and fulfilling jobs?
4. Who are the key stakeholders, especially in the private sector, and what policy changes and priorities are needed to transform Ghana's current TVET system?
5. What actions should be taken and by whom to address the challenges hindering transformation of Ghana's TVET system?

1.4. Structure of this report

This report consists of five parts. Part 1, this introduction, presents a broad overview of TVET, its importance in the African context, and the key regional factors at play. Part 2 presents the state of TVET in Ghana, whether it has reached its potential, what obstacles it faces, and how they are being addressed. Part 3 outlines the attributes of an effective TVET system and discusses how it can support economic transformation and young people's transition into employment. Part 4 reviews the roles of key stakeholders, particularly the private sector; changes at the policy level; and priorities needed to transform Ghana's TVET system. Part 5 proffers actionable recommendations.

2. Context: The State of TVET in Ghana

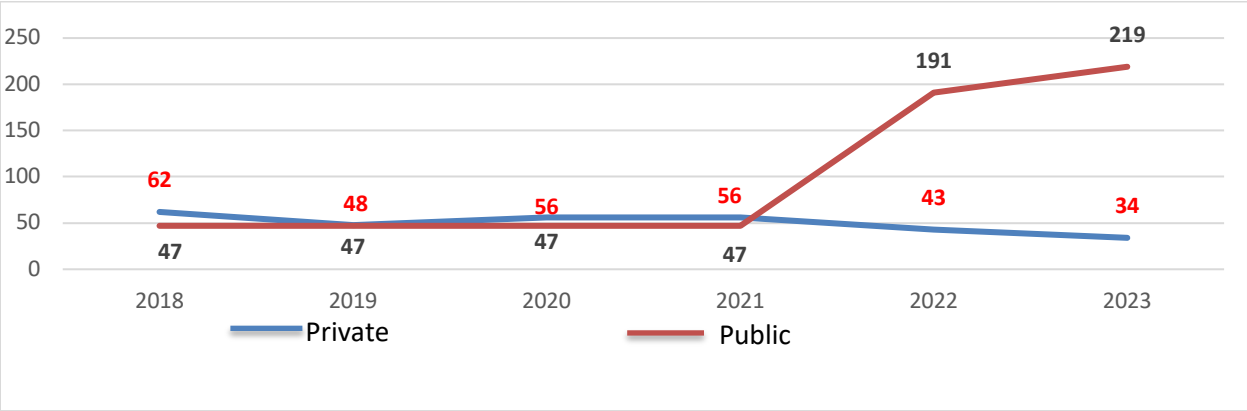
2.1. Background

Since 2006, the government of Ghana has been reforming its TVET system with the aim of revolutionizing TVET delivery to produce a critical mass of highly skilled workers who have the capacity to support industry and contribute to sustainable development (Africa Education Watch, 2020). Notable reform strategies include the adoption of a National TVET Qualification Framework to formalize the TVET landscape and ensure standardization, the introduction of a CBT curriculum to strengthen the industry relevance of TVET skills and learners, and the establishment of a TVET teacher training institution (the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development).

Before 2020, public TVIs in Ghana operated under about 19 ministries and agencies but were later harmonized under the Ministry of Education (MoE). GTVETS was then established in 2020 to manage all public TVIs, whereas the regulation of both public and private TVIs remains under CTVET.

Figure 1 illustrates trends in the number of public and private TVET schools in Ghana from 2018 to 2023. Although the number of private TVET institutions initially fluctuated, peaking at 62 schools in 2018 before declining to 34 schools in 2023, the number of public TVET schools remained stable at 47 until 2021, experiencing a sharp increase to 191 in 2022 and 219 in 2023. This rapid expansion of public TVET schools reflects Ghana's efforts to enhance technical and vocational education accessibility, particularly through government interventions such as the free TVET policy and institutional retooling. The decline in private TVET institutions suggests potential challenges in sustainability, regulation, or competition with government-funded institutions (MoE and CTVET, 2023).

Figure 1. Number of public and private TVET schools, 2018–23

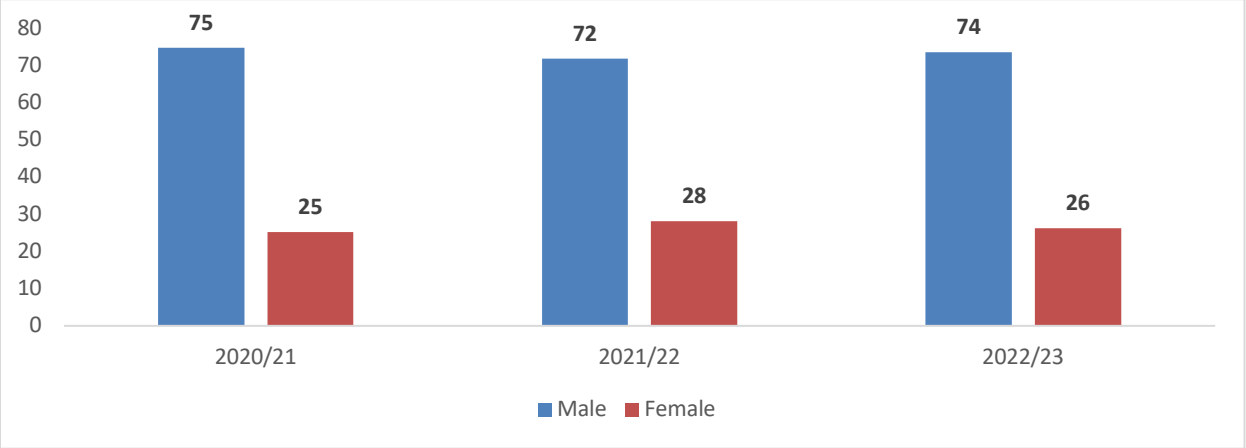


Source: MoE and CTVET, 2023.

Between the 2020/21 and 2022/23 academic years, Ghana's TVET institutions experienced a 64.8 percent increase in student enrollment, from 32,407 to 50,049. Male enrollment rose from 24,233 in 2020/21 to 36,871 in 2022/23, and female enrollment grew from 8,174 to 13,178 over

the same period. Despite this growth, a significant gender disparity persists, with men consistently representing over 70 percent of the TVET student population each year. In 2020/21, men accounted for 75 percent of enrollments (MoE and CTVET, 2021); in 2022/23, they accounted for 74 percent (figure 2). These numbers underscore the underrepresentation of women in TVET programs, highlighting the need for targeted interventions to promote gender parity in technical and vocational education (MoE and CTVET 2023).

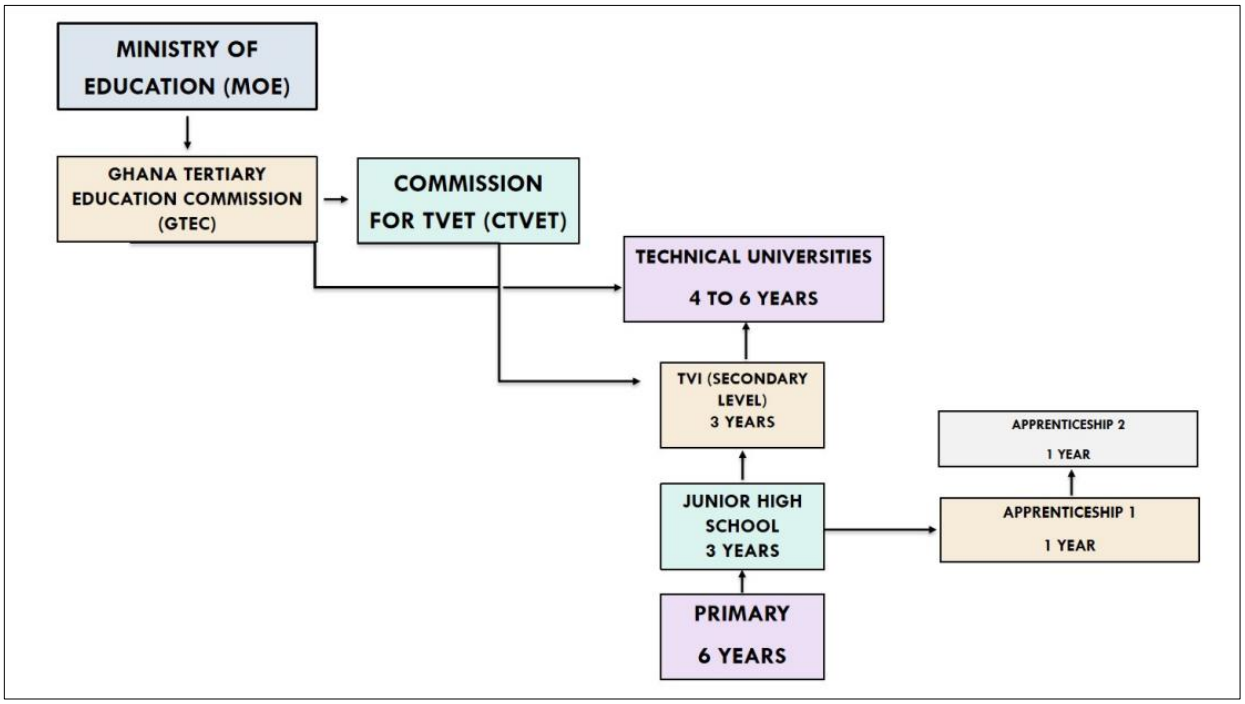
Figure 2. TVET enrollment, by gender, 2020/21–2022/23 (%)



Source: MoE and CTVET, 2023.

In Ghana, formal TVET commences at the secondary level. After completing six years of primary education and three years of junior high school, students can opt to enroll in TVIs for three years of specialized training. Following completion, graduates may either enter the workforce or pursue further studies at technical universities, which offer advanced technical and vocational training programs lasting between four and six years. Additionally, the system incorporates structured apprenticeship programs for those who do not transition directly from junior high school to TVIs, offering practical, hands-on skills in various trades over a period of one to two years. The MoE regulates the sector through the Ghana Tertiary Education Commission and CTVET, which oversee policy implementation and institutional standards (figure 3).

Figure 3. Ghana's TVET pathway



Source: Authors' construction.

2.2. National TVET policy

Successive governments have consistently developed policies aimed at enhancing the delivery of TVET. Over the years, these policies have undergone numerous reforms to ensure they meet the evolving needs of the country. The process to develop the current TVET policy began in April 1997, focused on reviewing and updating the existing framework established by the Ghana Junior Secondary School Reform of 1987 to tackle the challenges facing the TVET system (MOEYS and MMDE, 2004; Osei, 2004).

By May 2004, the country had developed a draft national TVET policy framework, which it officially adopted in 2006. This framework aimed to integrate various forms of TVET into a unified, demand-driven system, overseen by the Council for Technical and Vocational Education and Training (COTVET), now known as CTVET. This regulatory body was tasked with streamlining the processes for delivery, evaluation, assessment, and certification within the TVET landscape (MOEYS and MMDE, 2004). The 2004 TVET policy has undergone periodic reviews to maintain its relevance, with a new draft policy finalized by the MoE awaiting cabinet approval.

When asked about the presence of a national TVET policy, implementation strategy, or action plan, policy and regulatory actors[2] confirmed that Ghana has a TVET policy and a strategy to leverage the potential of TVET for the country's economic transformation agenda. They reported

[2] For the purpose of this report, "policy and regulatory actors" refer specifically to representatives from the MoE (TVET Directorate), CTVET, and GTVETS.

that the MoE's TVET Directorate, CTVET, and GTVETS are mandated to drive this agenda. Most heads of TVIs interviewed also validated this assertion, indicating their awareness of a national TVET policy and strategy.

Despite the critical importance of having a TVET policy and strategy, achieving policy objectives hinges on effective implementation. Survey results indicate the presence of gaps hindering the successful implementation of Ghana's TVET policy and strategy. These gaps, according to heads of TVIs, relate to lack of funding, difficulty in alignment with accreditation requirements, and limited collaboration with industry partners.

Policy and regulatory actors confirmed the policy implementation bottlenecks, citing poor coordination and a lack of 4IR responsiveness of the 2004 TVET policy as the main hindrances. To bridge these gaps, they proffered proposals such as establishing a dedicated fund to finance TVET policy implementation; exploring alternative resource mobilization strategies; streamlining qualification, recognition, and accreditation systems; and enhancing collaboration with industry.

In spite of the challenges hindering the successful implementation of Ghana's TVET policy and strategy, policy and regulatory actors noted ongoing initiatives and programs to strengthen TVET delivery. These efforts include the adoption and implementation of the Institutional Green Plan, measures to monitor and evaluate the quality of training offered by various institutions, pre-service and in-service TVET teaching staff training, and introduction of foundational skills catch-up programs.

In contrast, heads of TVIs reported the ineffectiveness of several key interventions designed to improve TVET delivery. These interventions include coordination mechanisms for TVET funding, incentives to boost private sector involvement, digitalization of the TVET curriculum, and mechanisms to assess the quality of apprenticeships across institutions. Notably, according to some heads of TVIs, only those measures aimed at increasing awareness of TVET and addressing its poor perception and stigma have been significantly effective in their implementation.

Gender responsiveness of TVET policy

Ensuring gender responsiveness of TVET systems requires integrating gender issues into policies, strategies, budgeting, and monitoring and evaluation processes. According to policy and regulatory actors, although Ghana's national TVET policy acknowledges gender inequality in enrollment, it lacks specific objectives to promote equal access and participation for both women and men. Despite this lack, initiatives to enhance female participation are currently being implemented, albeit with support and funding from DPs because no dedicated budget allocation exists for gender initiatives.

These efforts are coordinated by GTVETS's Diversity and Inclusive Education Unit, the TVET agency responsible for promoting equal access for all individuals, particularly focusing on women and persons with disabilities. However, policy and regulatory actors pointed out the lack of any established mechanisms for monitoring and evaluating the implementation of gender- and

inclusion-related policies and strategies, apart from some occasional field monitoring conducted by regional officers of the diversity and inclusive education units at TVET institutions.

2.3. TVET alignment with national development plans

Ghana has committed to strengthening TVET through various policies, laws, and strategic initiatives. The Five-Year Strategic Plan for TVET Transformation (2018–2022) introduced key interventions to reposition TVET as an attractive career option while promoting equity, sustainable financing, quality assurance, and environmental sustainability. Notable initiatives include the My TVET campaign to enhance public perception, the Ghana TVET Voucher Project to improve access to skills upgrading for MCPs, and the Ghana Jobs and Skills Project to support job creation. To drive systemic change, the country also implemented structural reforms, such as establishing the TVET Commission and TVET Service, appointing a Deputy Minister for TVET, and establishing the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development to train TVET educators (MoE and CTVET, 2023).

Ghana developed the Strategic Plan for TVET Transformation (2023–2027) to operationalize the TVET component of the Education Strategic Plan, or ESP (2018–2030), with a draft TVET policy currently awaiting cabinet approval (CTVET, 2023b). The ESP (2018–2030) itself aligns with the National Development Plan—Vision 2057, ensuring coherence between TVET policies and Ghana's broader development agenda.

Although no formal mechanism exists to measure the degree of alignment between Ghana's TVET strategy and national development plans, available literature suggests a strong policy link. The formulation of the ESP (2018–2030) as an extension of the National Development Plan—Vision 2057, and the development of the Strategic Plan for TVET Transformation (2023–2027) as an implementation framework, demonstrate alignment. This alignment was further affirmed by policy and regulatory actors interviewed in the study.

Among heads of TVIs, however, perceptions of the alignment of Ghana's TVET system with the National Development Plan varied. Whereas some heads of TVIs indicated that their programs reflect national industrial development priorities and the economic transformation agenda, others held differing views. Those who reported alignment cited industry consultations and labor market data analysis as key determinants for identifying and prioritizing programs that contribute to economic transformation. Others indicated that their program offerings were shaped by skills gap assessments, emerging technology trends, government policy documents, and economic plans.

Among TVIs that reported alignment, some engaged in frequent collaboration with industry stakeholders, government agencies, and other relevant partners to ensure that training programs meet labor market demands. Others, however, had limited engagement, restricting their ability to fully integrate industry-driven skills training into their curricula.

Despite progress in aligning TVET with national development priorities, challenges persist, particularly at the TVI level. Strengthening collaboration between TVET institutions, industry, and government agencies remains critical to ensuring that TVET effectively contributes to Ghana's industrial and economic transformation agenda.

2.4. Informal sector involvement in the national TVET system

The informal TVET sector is the dominant training provider in Ghana and thus a key stakeholder in the economic transformation agenda, requiring government reforms for integration into the national TVET system. Although Ghana adopted the TVET policy in 2006, aiming to bridge the gap between the formal and informal sectors, the challenge of detachment remains. Survey results reveal that several years of policy implementation have not addressed the disconnect between these sectors. Only a small proportion of TVI heads reported having mechanisms to facilitate knowledge sharing between the formal and informal sectors. Some heads indicated that graduates who enter the workforce act as a link between the two sectors, yet integration remains limited.

A key objective of the CTVET-administered National TVET Qualifications Framework is to ensure harmonized standards of practice in trades and professions.[3] This objective requires close collaboration and effective channels for information and knowledge sharing between the formal and informal TVET sectors, which implies the need for adequate resources provision to equip informal sector learners with the skills and competencies to compete effectively with formal TVET learners for certification. All of these efforts must be anchored in government-led initiatives to integrate the sectors. Whereas policy and regulatory actors asserted that strategies exist to unify TVET delivery in both sectors, most TVI heads did not know of any existing initiatives that integrate the informal sector into the formal TVET system in Ghana.

Nevertheless, a few heads of TVIs acknowledged the existence of initiatives to integrate the sectors. These initiatives include CBT (which involves the participation of MCPs to address industry needs and skills training gaps), the Recognition of Prior Learning (which provides opportunities for individuals, particularly those in the informal sector, to receive formal certification for their skills), and the National TVET Qualifications Framework. Although these initiatives suggest progress, several challenges hinder their full implementation, notably, a lack of monitoring and evaluation, and delays in the Recognition of Prior Learning process, with certificates taking over a year to be issued to those assessed, according to TVI heads. These challenges highlight the gaps that need to be addressed for effective integration.

Gender responsiveness of access to and opportunities in the informal TVET sector

Using the 2020 pre-tertiary TVET female enrollment number as a baseline paints an impressive 62 percent increase by 2023. Even with that increase, however, women constituted only 16.3 percent of enrolled TVET students in 2023, indicating the existence of barriers that create and

[3] CTVET, CTVET National TVET Qualifications Framework, https://ctvet.gov.gh/qualifications-framework/.

reinforce gender gaps. In Ghana, gendering of technical and vocational trades and professions reflects socio-cultural norms and definitions regarding the expected behavior of men and women. Consequently, women dominate trades and vocations deemed feminine, such as catering, fashion and garment making, and cosmetology, whereas men dominate in building and construction, and electrical and electronics, all considered masculine.

Government interventions such as the My TVET campaign and the free TVET policy have improved access and participation for women, but these efforts have largely focused on formal TVET within public TVIs. Consequently, women continue to face significant challenges in accessing and participating in the informal TVET sector, particularly in male-dominated trades. TVI heads highlighted that women and girls encounter gender stereotypes and expectations that limit their opportunities. They also pointed out that affordability remains a major barrier to female participation in informal TVET and that the work environment is often unfriendly to women, further hindering their involvement in the sector.

2.5. Major TVET challenges in Ghana

Following the reorganization and realignment of TVET under the MoE in 2020, the government of Ghana has invested in infrastructure and training facilities in TVET institutions to revamp and modernize TVET so it can absorb the growing number of learners and expand the scope of training programs (MoE, 2024). As facilities are upgraded, the capacity of learners and instructors is also being built to respond to industry needs and equip them with the relevant skills needed to use modern tools to teach (CTVET, 2021). These upgrades, however, have largely been project-based and limited in scope. Although the upgrades have all yielded some positive dividends, the challenges of Ghana's TVET sector are far from over, requiring sustained efforts at the policy, regulatory, management, industry, and school levels to bring TVET delivery in Ghana up to speed with the emerging economy and beyond.

As illustrated in table 2, both teachers and heads (70 percent) pointed to insufficient funding as a persistent issue limiting TVET growth. The most pressing challenge identified by parents (87 percent) was limited practical training and apprenticeships. A significant proportion of student respondents (85 percent) cited outdated equipment as a critical barrier to effective TVET learning, with 80 percent of students and heads highlighting poor digital infrastructure as a major challenge and 70 percent of students citing weak foundational skills in STEM and a teacher shortage as major concerns. In addition, 70 percent of teachers and TVI heads noted outdated curriculum and equipment as a key challenge.

Overall, stakeholders identified the following top five challenges confronting Ghana's TVET sector: inadequate funding, limited practical training and apprenticeships, outdated equipment, poor digital infrastructure, weak STEM skills, outdated curriculum, and teacher shortage.

Table 2. Challenges of Ghana's TVET sector (%)

Rank	Challenge	Students (n=90)	Parents (n=30)	Teachers and heads (n=20)	Average
1	Inadequate TVET funding	65.56	0	70.00	**45.19**
2	Limited practical training/ apprenticeships	0	86.67	0	**28.89**
3	Outdated equipment	84.44	0	0	**28.15**
4	Poor digital infrastructure	80.00	0	0	**26.67**
5	Weak STEM skills	70.00	0	0	**23.33**
6	Outdated curriculum and equipment	0	70.00	0	**23.33**
7	Teacher shortage	70.00	0	0	**23.33**
8	Limited infrastructure/digital skills training	0	0	60.00	20.00
9	Weak governance and management	0	0	50.00	16.67
10	Weak foundation for STEM learners	0	0	50.00	16.67
11	Negative TVET perception	0	0	40.00	13.33
12	Difficulty acquiring new technology	0	0	40.00	13.33
13	National political priorities	0	0	40.00	13.33
14	Limited quality apprenticeship training	0	0	40.00	13.33

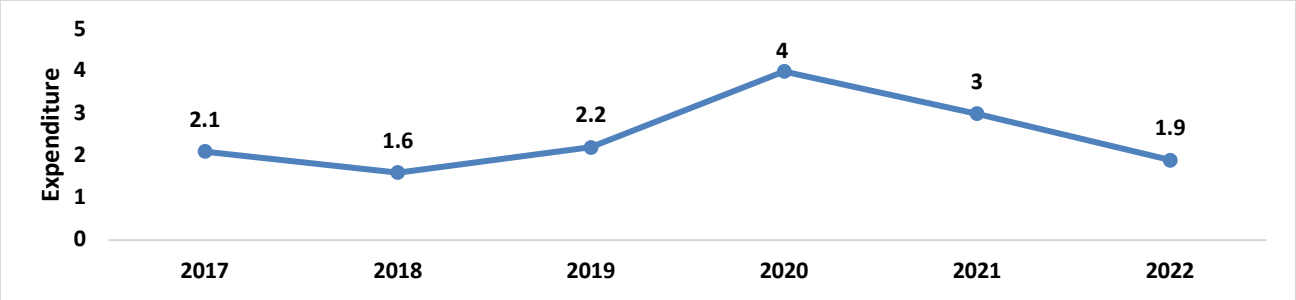
Source: Survey data.

Inadequate TVET funding

Funding constraints ranked as the most significant challenge, particularly among teachers and heads of TVET institutions, reflecting the systemic underinvestment in TVET education. The challenge of underfunding affects multiple aspects of TVET, including infrastructure, teacher capacity, curriculum quality, and student learning materials (Akyeampong et al., 2020). Africa Education Watch (2023) notes that inadequate funding has led to a reliance on outdated training methods, making it difficult for students to gain relevant technical expertise.

The World Bank (2022d) recommends the allocation of at least 20 percent of national education budgets to vocational training to improve sustainability and quality. In Ghana, between 2017 and 2022, the average TVET share of education expenditure stood at 2.4 percent, with the highest (4.0 percent) recorded in 2020 and the lowest (1.6 percent) in 2018. Only 1.9 percent went to TVET in 2022, a woefully inadequate amount considering the capital-intensive nature of TVET (figure 4).

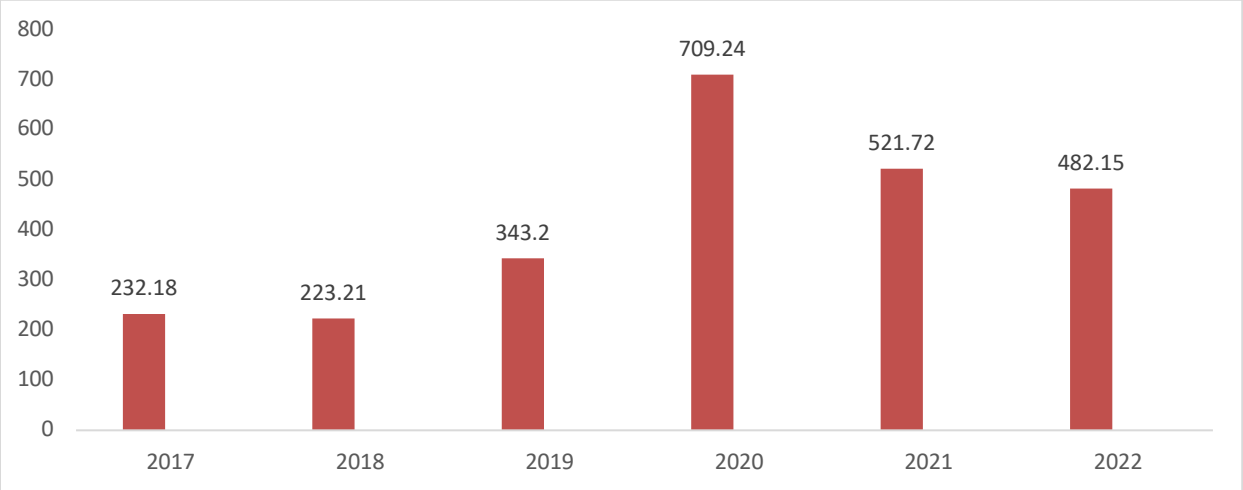
Figure 4. TVET share of education expenditure, Ghana, 2017–22 (%)



Source: Africa Education Watch, 2024.

In nominal terms, TVET expenditure dropped from GHC 709 million in 2020 to GHC 521 million in 2021 and further to GHC 482 million in 2022 (figure 5). Although Ghana has experienced an economic downturn since 2021, over the same period education sector spending increased from GHC 17 billion to GHC 25 billion, raising questions about consistency in financing the TVET agenda.

Figure 5. TVET share of education expenditure (GHC million)



Source: Computation from MoE data.

In Ghana, education expenditure falls under three broad categories: compensation of employees, goods and services, and capital expenditure. A trend analysis of the goods and services category, which includes financing for teaching and learning resources, social intervention programs (for example, free senior high school, TVET, and capitation grants), and management of schools and institutions, indicates that, of the about GHC 20.8 billion spent between 2017 and 2022, only 3.8 percent (GHC 798.7 million) went to TVET; by contrast, 52.8 percent (GHC 11 billion) went to senior high school (table 3). In 2022, only GHC 178.5 million went to TVET and GHC 2.3 billion went to senior high school (Africa Education Watch, 2024). This trend reflects survey findings that TVET in Ghana is inadequately funded.

Consequently, when asked about the greatest potential for government to contribute to improving the TVET sector, policy and regulatory actors responded “funding,” confirming the severity of the funding issue. Addressing this issue necessitates the prioritization of increased

financial allocations for TVET to upgrade facilities, provide modern equipment, and expand training opportunities.

Table 3. Trend in goods and services expenditure, by level of education, 2017–22 (GHC millions)

Level	2017	2018	2019	2020	2021	2022	Total	% Share
Basic	120.52	64.10	206.22	117.13	216.43	322.60	**1,047.00**	**5.0**
Senior high school	1,564.74	1,803.45	2,082.07	1,839.97	1,422.05	2,294.13	**11,006.42**	**52.8**
TVET	125.27	111.98	131.21	126.22	125.48	178.57	**798.73**	**3.8**
SPED	7.70	0.04	9.25	8.95	12.84	4.61	**43.39**	**0.2**
NFED	0.58	0.45	0.50	3.60	0.91	0.87	**6.90**	**0**
Tertiary	907.94	944.85	1,582.14	983.20	991.56	1,742.26	**7,151.95**	**34.3**
Management and subvented	57.38	118.35	214.32	145.10	99.90	170.68	**805.72**	**3.9**
Total	**2,784.11**	**3,043.21**	**4,225.72**	**3,224.19**	**2,869.16**	**4,717.45**	**20,863.84**	**100**

Source: Africa Education Watch, 2024.
Note: NFED = Non-Formal Education Division; SPED = Special Education Division.

Limited practical training and apprenticeship

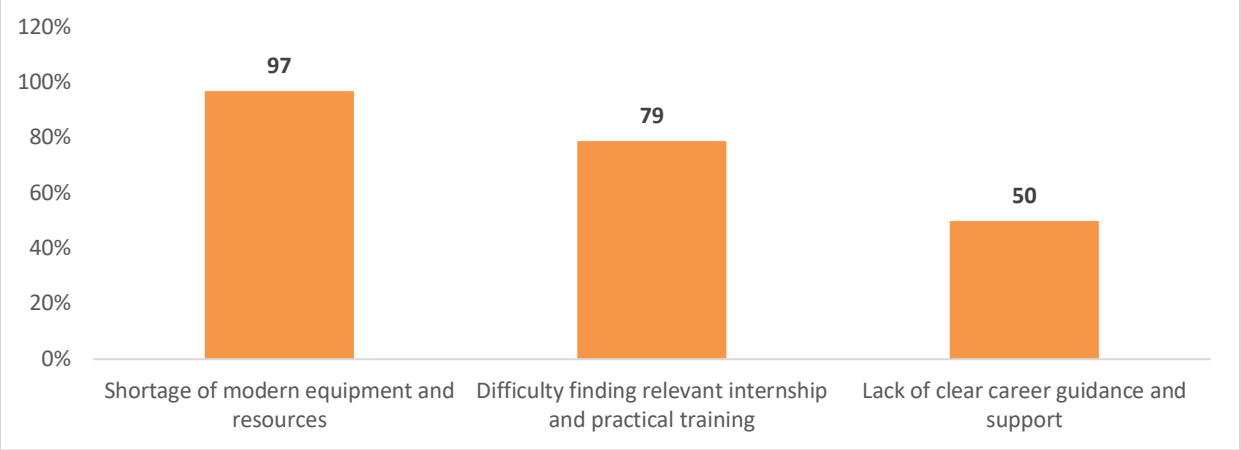
The challenge of limited practical training and apprenticeships reflects widespread concerns about the lack of hands-on learning opportunities and structured apprenticeship programs. Studies by Africa Education Watch (2021) and Anamuah-Mensah (2022a) indicate that many TVET graduates struggle to transition into the workforce because of insufficient workplace exposure during their training.

Apprenticeship plays a critical role in providing skills for many of Ghana's youth who are not in formal education. It is largely operated within the informal TVET sector where learners sign on to be trained by MCPs for two to three years at a fee paid (mostly in bulk) at the commencement of training. Learning usually takes place on the job, with MCPs who are entrepreneurs or artisans delivering training as they render services to their clients. Consequently, the quality of training provided depends on, among other things, the competencies of the MCP; the availability of tools, equipment, and training materials; the ability of the MCP to adapt to trends in the trade; and the frequency of patronage of the MCP's services. Regrettably, MCPs, policy and regulatory actors, and students in this study noted unqualified trainers and/or limited qualified teachers/trainers

as one of the top five TVET challenges affecting the quality of apprenticeship or practical training provided.

Additionally, all policy and regulatory actors ranked "lack of quality apprenticeship or practical training" among the top five challenges confronting Ghana's TVET sector. This challenge results, in part, because of the detachment of informal TVET from the formal sector, coupled with the fragmented nature of the sector, affecting the standardization of training and qualification. Although the poor quality of training exists as a challenge in the formal TVET sector too, there it is more a consequence of the lack of relevant training equipment and resources stemming from underfunding, rather than the unavailability of qualified teachers. This finding is corroborated by 97 percent of TVET students who ranked shortage of modern equipment and resources among the top three challenges they face in school (figure 6).

Figure 6. Top three challenges faced by TVET students (%)



Source: Survey data.

The direct correlation between the quality of training and preparedness of learners for industry explains why most apprentices in this study indicated that they are only somewhat prepared for the future (industry). Strengthening industry-TVET partnerships is essential for providing real-world experience and bridging the gap between theoretical knowledge and practical application (MoE, 2023).

Outdated equipment

Students (84.44 percent) ranked outdated equipment as one of the most critical challenges, reflecting concerns about the obsolete tools and facilities available for training. Akyeampong et al. (2020) assert that many TVET institutions lack modern machinery, making it difficult for students to develop industry-relevant skills. Without up-to-date equipment, students cannot gain hands-on experience with current technologies, reducing their competitiveness in the labor market. This challenge is closely linked to inadequate financing for TVET.

Under the capital expenditure category of Ghana's education sector spending, which also covers the provision of educational equipment, only 9.9 percent of the about GHC 10 billion spent

between 2017 and 2022 went to TVET whereas 39.7 percent went to senior high school (MoE, 2023)—table 4. Additionally, the low percentage of spending on TVET under goods and services (table 3) affects the government's ability to develop infrastructure and fully equip public TVIs with the relevant tools to deliver training effectively. In the informal sector, where training is fee based, the high cost of equipment is passed onto learners, creating access barriers.

The government of Ghana, as part of the Ghana Beyond Aid agenda, is upgrading and retooling workshops in 23 TVIs and refurbishing 44 TVET institutions (MoE, 2023). Regardless, most students (85 percent), apprentices, and CSOs/DPs ranked obsolete/outdated training equipment among the top five challenges. Technological advancement has led to the introduction of innovative tools and equipment to make TVET teaching and learning, as well as work, easy and seamless. To compete effectively in the emerging economy, TVET students must have hands-on experience in the use of modern tools and equipment. Thus, Africa Education Watch (2023) suggests making investments in modern equipment a top policy priority, particularly through public-private partnerships that ensure sustainable funding and industry-driven upgrades.

Table 4. Infrastructure financing, capital expenditure, by level of education, 2017–22 (GHC millions)

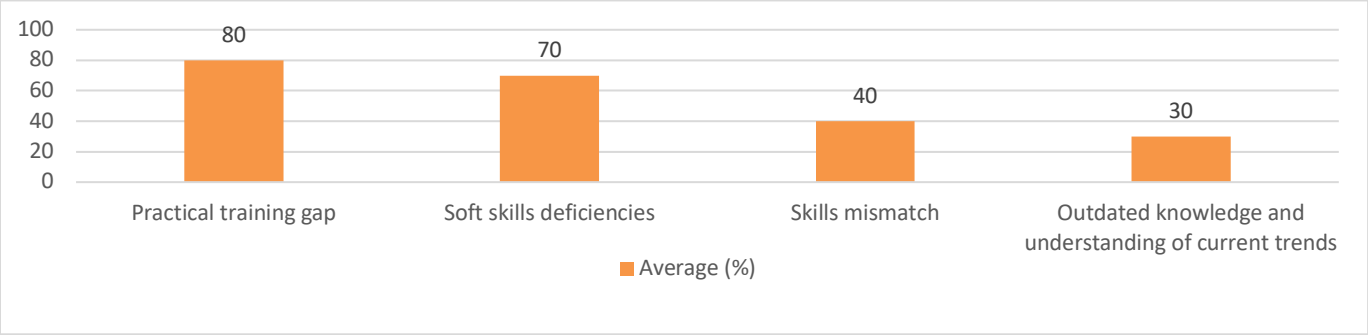
Level	2017	2018	2019	2020	2021	2022	Total	Share of total spending (%)
Basic	118.34	171.95	170.11	223.20	223.21	299.62	1,206.42	12.1
Senior high school	254.41	333.68	430.16	778.98	685.82	1,493.98	3,977.03	**39.7**
TVET	16.75	20.92	109.58	458.94	261.66	126.25	994.10	**9.9**
SPED	0	0	0	0.45	0.19	0	0.65	0
Tertiary	168.64	1,456.43	321.23	530.39	357.65	870.34	3,704.69	37.0
Management and subvented	0.32	44.58	4.85	46.60	1.87	27.88	126.11	1.3
Total capital expenditure	**558.46**	**2,027.56**	**1,035.93**	**2,038.57**	**1,530.41**	**2,818.06**	**10,008.99**	**100**

Source: Africa Education Watch, 2024.

Although survey findings point to a lack of skills in using modern tools because of the unavailability of these tools in TVIs, interviews with private sector actors (employers) and sector skills bodies (SSBs) show some level of preparedness of TVET graduates for industry, with the majority of these stakeholder categories indicating that graduates have only average preparation and require some on-the-job training to adapt. Regarding the preparedness of TVET graduates for changing job requirements and new technology, all SSB stakeholders and most private sector actors found graduates somewhat prepared for changing job requirements and new technology.

The challenge of obsolete training equipment in TVIs implies the absence of modern 4IR-relevant tools, which has a direct impact on the quality of human resources who go through these institutions. The production of graduates who lack skills to operate modern tools and machinery in industry poses a challenge for industry at the entry level, requiring employers to retrain such graduates at an extra cost. Private sector actors and SSBs in this study, who represent industry, indicated the challenges in hiring TVET graduates. These challenges include encountering graduates with practical training gaps, soft skills deficiencies, no industry-relevant skills, and outdated knowledge and understanding of current technology (figure 7).

Figure 7. Challenges in hiring TVET graduates (%)

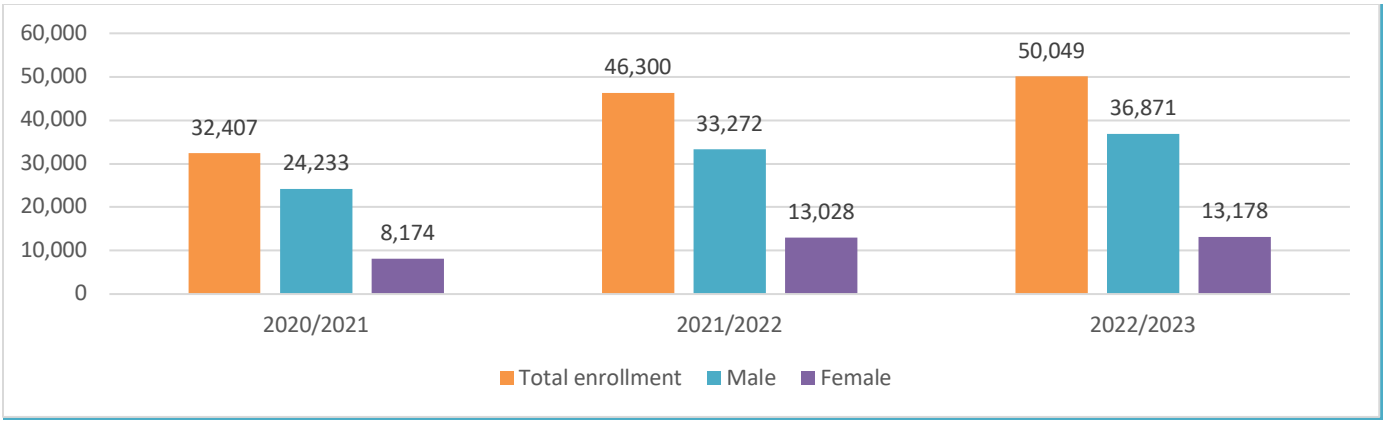


Source: Survey data.

Gender dynamics in skills mismatch. Though female enrollment saw a 59.3 percent increase from 8,174 in 2020/21 to 13,028 in 2021/22, and then a minimal (1.2 percent) increase to 13,178 in 2022/23 (figure 8), TVET training systems do not accommodate the particular needs of women. This lack of gender responsiveness is partly attributable to the continued use of obsolete equipment and tools that require excessive physical exertion, discouraging female participation, especially in male-dominated trades.

Responses from interviews indicate that trades perceived to be for men demonstrate a considerable level of gender bias against hiring women. Similarly, traditionally female-dominated trades discriminate against men. Private sector actors in this study confirmed that some employers recruit TVET graduates on the basis of perceived gender capabilities, and some MCPs interviewed noted that they accept or decline to train apprentices according to their own preconceived gender expectations.

Figure 8. Pretertiary TVET enrollment, Ghana, 2020–23

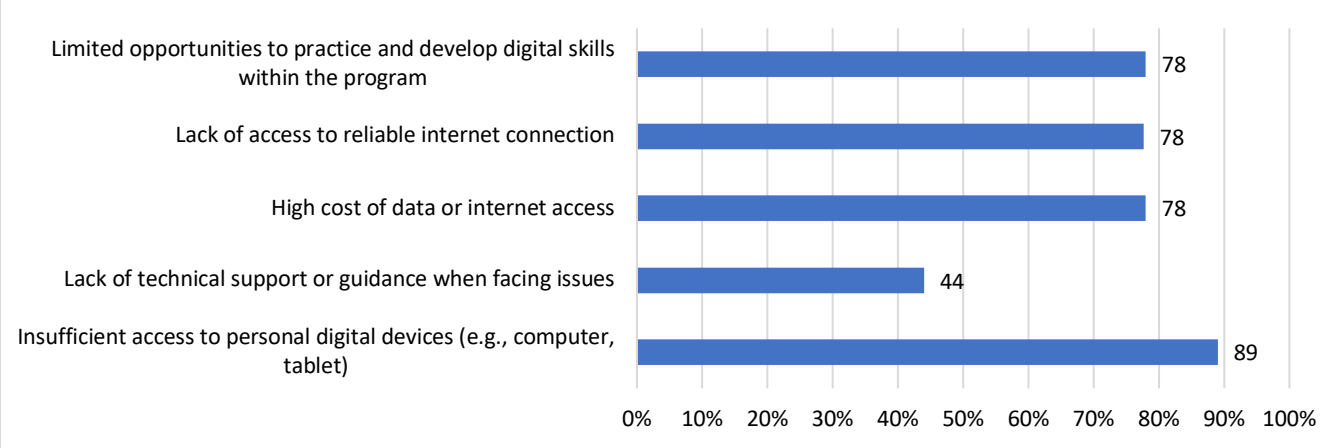


Source: Ghana Education Management Information System, 2023.

Poor digital infrastructure

Digital infrastructure challenges were a major concern for students (80 percent). The survey findings align with findings by MoE (2023), which indicate that most TVET institutions lack adequate internet access, computers, and digital learning resources. Figure 9 shows survey results on the challenges students encounter in using digital tools in their TVET studies. Digital skills are increasingly critical for 4IR employability (World Bank, 2022d), yet many TVET institutions do not integrate information and communication technology (ICT) tools into their training programs.

Figure 9. Challenges faced by students in using digital tools in TVET studies (%)



Source: Survey data.

Over 60 percent of TVET schools in Ghana lack the necessary ICT infrastructure to integrate digital learning into their curriculum (Africa Education Watch, 2023b). This deficiency hinders students from acquiring industry-relevant digital competencies, limiting their employability in an economy increasingly driven by automation and artificial intelligence. The MoE acknowledges this gap and has emphasized the need for a nationwide digital transformation agenda in TVET, but implementation remains slow because of financial constraints and policy fragmentation.

Beyond access to physical ICT infrastructure, inadequate teacher capacity further compounds the problem. Many TVET instructors have limited exposure to modern digital tools, making it difficult to deliver technology-driven training programs. Although digital literacy should be a core component of vocational training, instructors often lack the opportunities needed to upgrade their ICT competencies (Anamuah-Mensah, 2022a). This situation has led to a reliance on traditional, manual teaching methods that fail to align with the needs of industries leveraging digital solutions for manufacturing, engineering, and service delivery. Inadequate ICT integration in TVET not only limits skill acquisition but also reduces student engagement, because digital learning methods have been shown to enhance problem-solving and innovation skills. Without significant investment in digital capacity building for TVET instructors, Ghana risks widening the skills gap between graduates and industry demands.

Internet penetration and affordability further exacerbate the digital infrastructure deficit in Ghana's TVET sector. According to Statista,[4] Ghana has an internet penetration rate of approximately 68 percent, and significant disparities persist between urban and rural areas. High-speed internet remains costly, with the Alliance for Affordable Internet (2014) ranking Ghana among the African countries where broadband access remains relatively expensive compared to income levels. This situation directly affects TVET institutions, many of which struggle to afford reliable internet services necessary for e-learning, virtual simulations, and digital skill development. UNESCO (2022e) highlights that advanced economies increasingly integrate simulation-based training into TVET programs, allowing students to gain hands-on experience in technical fields like engineering, welding, and medical diagnostics without physical machinery. Without reliable internet access, Ghanaian TVET institutions will struggle to adopt such innovations, further widening the skills gap between local graduates and global industry standards.

To address this challenge, Africa Education Watch (2023b) recommends significant investment in ICT infrastructure and training to modernize TVET programs and prepare students for the evolving job market. The government's recent partnership with private sector players, such as the Ghana Skills Development Fund, is a step in the right direction, but more structured interventions are needed. According to UNESCO (2022e), countries that have successfully modernized their TVET systems, such as Germany and Singapore, have done so through sustained public-private collaborations that ensure institutions receive up-to-date digital tools and internet infrastructure. Ghana can adopt a similar approach by leveraging industry partnerships to equip TVET schools with the latest ICT infrastructure while simultaneously training instructors to integrate digital tools into their teaching. Without these interventions, the country's ambition of creating a 21st-century TVET system that produces globally competitive graduates will remain unrealized.

Weak STEM skills

[4] Statista, "Statistics about Internet in Ghana," https://www.statista.com/map/africa/ghana/internet.

Weak STEM skills remain a fundamental challenge within Ghana's TVET system, limiting students' ability to grasp and apply technical knowledge. According to the survey findings, 70 percent of students identified weak STEM competencies as a major impediment to their success in TVET programs. The findings align with the literature, which shows that many students enter TVET institutions with significant deficiencies in STEM (Anamuah-Mensah, 2022b). These foundational weaknesses make it difficult for students to comprehend complex technical concepts, reducing their proficiency in practical applications and innovation, and underscoring the urgency of improving pre-tertiary STEM education to equip students with the necessary analytical and problem-solving skills before transitioning to technical and vocational training (World Bank, 2022c). Similarly, UNESCO (2021a) emphasizes the need for STEM integration in TVET to enhance problem-solving skills and technological adaptability.

Afeti and Adubra (2016) argue that STEM competency is a core driver of technical innovation and economic growth, calling for early interventions in primary and secondary education; however, inadequate preparation in STEM subjects is exacerbated by ineffective teaching methodologies, limited access to modern laboratories, and an overemphasis on rote learning rather than applied knowledge. Consequently, many TVET students struggle with coursework that requires mathematical modeling, engineering principles, and technological proficiency, ultimately affecting their employability and contribution to Ghana's industrialization agenda.

The weak STEM foundation, a challenge identified by 50 percent of TVI heads and teachers in this study (table 2), links to other critical challenges within Ghana's TVET sector, forming a cycle of inefficiencies that hinder overall effectiveness. For instance, poor industry relevance in TVET curricula, noted by 70 percent of parents, is partly attributed to students' inability to grasp STEM-based technical skills, limiting their adaptability to modern industrial demands (Anamuah-Mensah, 2022b).

Additionally, inadequate infrastructure, a challenge identified by 60 percent of TVI heads and teachers (table 2), particularly the lack of well-equipped science and engineering laboratories, compounds the problem by restricting hands-on learning opportunities. In line with the 40 percent of TVI heads and teachers in this study who ranked negative perception of TVET as one of the biggest challenges facing Ghana's TVET sector, the World Bank (2022c) also links weak STEM skills to the perception of TVET as a less desirable educational pathway, because students who struggle with science and mathematics at the basic education level may view TVET as a last resort rather than a viable career option.

The Organization of Economic Co-operation and Development reinforces this position by noting that countries with strong STEM foundations in vocational education tend to experience higher youth employment rates and stronger industrial linkages (OECD, 2020a). Consequently, this perception contributes to the broader challenge of low enrollment and the persistent skills mismatch between TVET graduates and industry needs. Addressing weak STEM competencies, therefore, requires a holistic approach that integrates curriculum reforms, teacher training, investment in STEM-focused infrastructure, and early-stage interventions to strengthen students' foundational skills in science and mathematics.

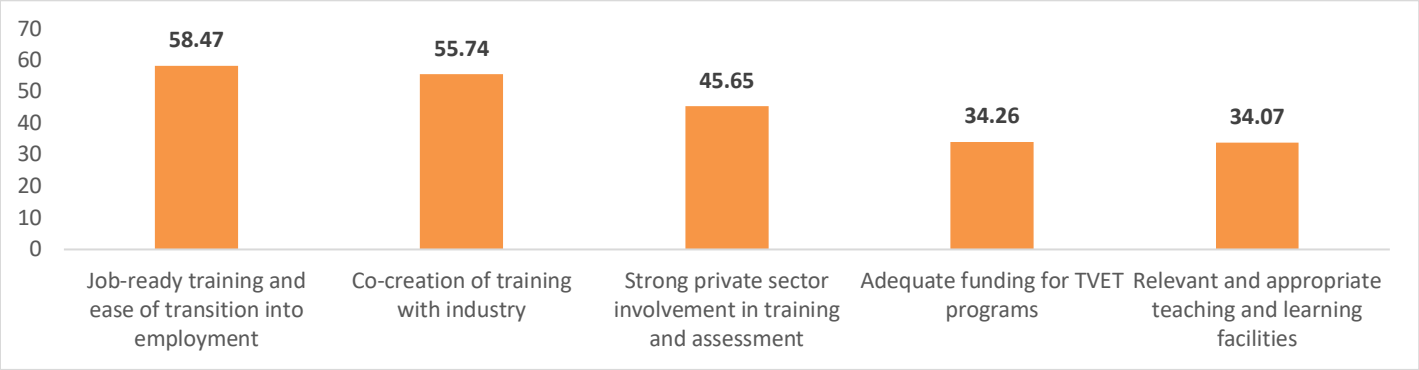
3. Attributes of a Successful TVET System

3.1. Key attributes of a TVET system

The ongoing medium- to long-term reforms in Ghana's TVET sector should culminate in a sustainable and resilient economy with a workforce equipped with 4IR and green skills and competencies, promoting environmentally sustainable workplace practices. This goal requires an effective TVET system that provides, among others, opportunities for job-ready training, ease of transition into employment, market-responsive curricula co-created with industry, a flexible articulation of pathways and progression routes to tertiary education, strong private sector involvement in training, adequate funding, relevant and appropriate facilities, and the availability of online and blended learning platforms to incorporate digital learning into TVET.

Survey results reveal the top five attributes of a TVET system, according to respondents: (1) job-ready training and ease of transition (58.47 percent), (2) co-creation of training programs with industry (55.74 percent), (3) strong private sector participation in training (45.65 percent), (4) adequate funding (34.26 percent), and (5) availability of relevant and appropriate teaching and learning facilities (34.07 percent) (figure 10).

Figure 10. Top five attributes of a TVET system (%)



Source: Survey results.

When disaggregated by stakeholder categories, students (100 percent) overwhelmingly prioritized co-creation of training programs with industry, whereas parents (86.67 percent) ranked job-ready training and ease of transition into employment as the most critical TVET attribute (table 5). Among TVET heads and teachers, 50 percent selected digital technology integration as the most essential attribute. For policy and regulatory actors, CSOs and DPs, apprentices and MCPs, private sector actors, and SSBs as a group, adequate funding emerged as the most selected attribute (37.04 percent).

Table 5. Key attributes of a TVET system, by stakeholder category (%)

Attribute	Students (n=90)	Parents (n=30)	TVI heads and teachers (n=20)	Policy and other stakeholders (n=27)	Average
Job-ready training and ease of transition	88.89	86.67	25.00	33.33	58.47
Co-creation of training programs with industry	100.00	73.33	20.00	29.63	55.74
Strong private sector involvement in training	66.67	70.00	20.00	25.93	45.65
Adequate funding	0.00	70.00	30.00	37.04	34.26
Relevant and appropriate teaching and learning facilities	0.00	86.67	20.00	29.63	34.07
Incorporation of digital technologies	0.00	0.00	50.00	25.93	18.98
Teaching of AI, machine learning, and data analytics	0.00	0.00	35.00	18.52	13.38
Developing critical thinking and problem-solving skills	0.00	0.00	25.00	22.22	11.81
Exposure to new technologies through partnerships	0.00	0.00	25.00	22.22	11.81
Access, equity, and affordability of TVET provision	0.00	0.00	10.00	11.11	5.28

Source: Field data.

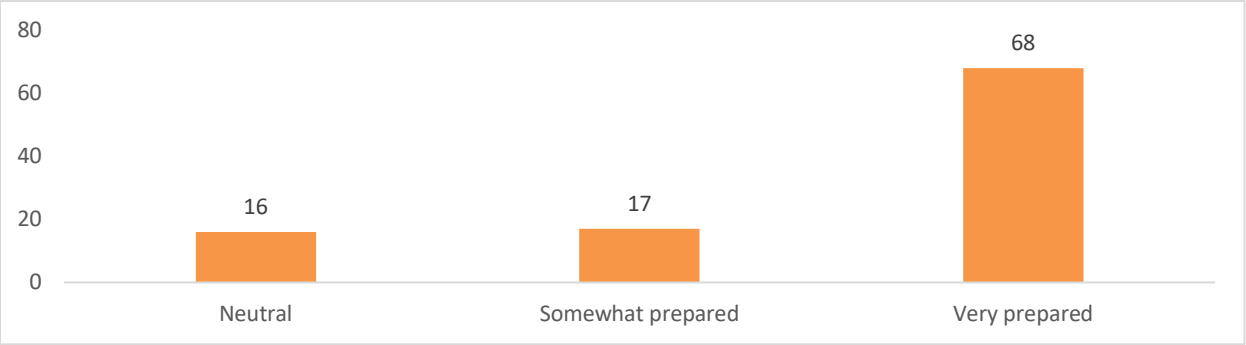
Job-ready training and ease of transition into employment

Job-ready training and ease of transition into employment ranked as the most valued attribute among stakeholders (58.47 percent). The integration of hands-on training, competency-based assessments, and exposure to real-world work environments plays a significant role in ensuring TVET graduates' preparation for the labor market. TVET systems that emphasize job readiness experience lower youth unemployment rates and stronger workforce participation (UNESCO, 2021a).

In Ghana, however, TVET graduates often struggle to transition into employment because of limited practical exposure and inadequate career support services. The importance of structured pathways from training to employment—including internship programs, job placement services, and entrepreneurship training—cannot be overemphasized (World Bank, 2022c). Without these mechanisms, many graduates remain unemployed or underemployed despite completing technical education. Notwithstanding, most TVET learners in this study (68 percent) indicated

their preparedness for industry given the skills currently taught in TVET schools and training centers (figure 11).

Figure 11. Preparedness of TVET learners for industry (%)



Source: Field data.

According to OECD (2020a), countries that have successfully enhanced job readiness in TVET focus on work-integrated learning models that include mandatory industry placements, mentorship programs, and employment-linked skill certifications. Ghana can improve its TVET employment transition by strengthening industry linkages, increasing employer engagement, and enhancing the relevance of training programs to match labor market needs.

Job-ready training and ease of transition into employment interconnect with the other core attributes of a well-functioning TVET system. For instance, the co-creation of training with industry ensures that the skills taught align directly with labor market demands, making it easier for graduates to transition into jobs. Also, strong private sector involvement in training and assessment supports job readiness by allowing industries to evaluate and certify students based on competency, which enhances their credibility in the job market.

Further, adequate funding is essential for job readiness, because institutions require financial resources to maintain modern training programs, facilitate internships, and offer career support services. Additionally, relevant and appropriate teaching and learning facilities play a crucial role in job readiness, because access to modern equipment and well-equipped workshops ensures that students gain hands-on experience before entering the workforce. Without these supporting attributes, job-ready training and smooth employment transition remain difficult to achieve, reinforcing the need for a holistic approach to TVET system development.

Co-creation of training with industry

A robust TVET system is characterized by its ability to align training with industry needs, ensuring that graduates are well-equipped for the labor market. According to the survey findings, co-creation of training with industry (55.74 percent) emerged as a crucial attribute. Employer involvement in curriculum design and training delivery enhances the relevance of TVET, improving graduate employability (Anamuah-Mensah, 2022b). Thus, ensuring job readiness hinges on integrating practical skills with theoretical knowledge (World Bank, 2022c).

Countries such as Germany and Switzerland, which operate dual TVET models incorporating industry partnerships, have recorded higher employment rates among TVET graduates (OECD, 2020a), highlighting the need for establishing strategic benchmarks and adopting best practices. Ghana, however, still faces challenges in ensuring that industry actively co-designs training modules (CTVET, 2021), resulting in persistent skills mismatches between graduates and labor market demand. Enhancing the responsiveness of training programs requires a strengthened collaboration between TVET institutions and industry.

Insights from private sector actors point to systemic bottlenecks hampering collaboration. These bottlenecks include limited information flow between TVET institutions and employers, lack of funding and equipment, and bureaucratic procedures that frustrate effective engagement. Several stakeholders also noted that no enabling policy framework exists to drive industry-TVI partnerships and that the informal sector often feels excluded, especially traditional sectors such as catering.

The lack of structured engagement mechanisms between TVET institutions and employers remains a barrier to effective co-creation. Although some industries offer internships and apprenticeships, these initiatives are often fragmented and not systematically integrated into curricula (Afeti and Adubra, 2016). Strengthening policy frameworks that promote industry-TVET collaboration can address these gaps and improve training outcomes.

Co-creation of TVET training with industry is inherently linked to all the other key attributes of an effective TVET system. By engaging industries in training design, TVET institutions ensure that job-ready training aligns with labor market demands, facilitating a smoother transition into employment. Strong private sector involvement in training and assessment is a natural extension of co-creation, because industries that help design curricula are more likely to participate in competency-based assessments and work-integrated learning.

Additionally, industry collaboration often leads to increased funding opportunities for TVET programs, because private sector stakeholders may co-finance training initiatives, provide equipment, or offer apprenticeships that reduce institutional financial burdens. The relevance and appropriateness of teaching and learning facilities also improve when industries have a say in training design; that is, industry partners can guide investments toward modern equipment and technologies that reflect real-world work environments. Therefore, co-creation of training with industry is not just an attribute but a foundational principle that enhances all other aspects of a successful TVET system.

Strong private sector involvement in training and assessment

Strong private sector involvement in training and assessment further reinforces the importance of industry participation in TVET. Engaging the private sector ensures that training aligns with evolving industry standards and technological advancements. Employers' involvement in the assessment of learners/trainees, through initiatives such as CBT and apprenticeships, enhances the credibility of certification systems. Successful models in other countries show that industry involvement in assessment improves graduate competency and workforce adaptability (World

Bank, 2022c). Establishing strong industry consortia and public-private partnerships can bridge the gap between training institutions and employers, fostering more meaningful participation in skills development.

In Ghana, however, weak industry engagement has contributed to concerns about the relevance of TVET qualifications (Afeti and Adubra, 2016). The lack of structured apprenticeships and limited incentives for private firms to collaborate with TVET institutions have hindered progress in this area. Additionally, because of bureaucratic bottlenecks and outdated curricula, many TVET institutions lack the capacity to engage effectively with industry partners.

Private sector actors interviewed for this study indicated strong willingness to contribute to TVET through structured modalities such as co-designing curricula, participating in sector skills councils, mentoring trainees, and serving as assessors in CBT delivery. However, they identified key barriers including weak institutional collaboration frameworks, lack of communication, and limited recognition, especially for informal sector associations. To sustain engagement, stakeholders proposed incentive mechanisms such as tax relief, co-financing schemes, recognition programs, and insurance for interns. These findings underscore the need for a formalized and enabling public-private partnership model that clearly outlines roles, responsibilities, and mutual benefits in training and assessment.

Adequate funding for TVET programs

Inadequate funding for TVET programs (identified by 34.26 percent of respondents) remains a critical challenge that undermines the quality and sustainability of technical education. World Bank (2022c) highlights that underfunded TVET systems struggle to provide quality training, ultimately reducing graduate employability. Without sufficient financial resources, institutions cannot invest in modern equipment, attract qualified trainers, or develop industry-relevant curricula.

Funding constraints also affect student access to training opportunities, because many prospective TVET students face financial barriers to enrollment (UNESCO, 2021a). Governments and DPs must prioritize increased investment in TVET to ensure equitable access to skills development, particularly for marginalized groups. Public-private partnerships can also serve as a viable funding mechanism to support infrastructure development and program expansion.

Additionally, countries with well-financed TVET systems often introduce innovative funding models such as skills levies, employer contributions, and results-based financing (OECD, 2020a). Implementing these approaches in Ghana could enhance the sustainability and impact of TVET programs while reducing dependence on government funding alone.

Relevant and appropriate teaching and learning facilities

The availability of relevant and appropriate teaching and learning facilities (34.07 percent of respondents) remains a key determinant of TVET quality. Modern infrastructure, including well-equipped workshops and digital learning tools, enhances hands-on training, which is essential for

technical skills acquisition (UNESCO, 2021a). Many TVET institutions in Ghana, however, operate with outdated equipment, limiting students' exposure to contemporary industry practices.

This challenge is closely linked to funding inadequacies, because insufficient investment hampers efforts to upgrade infrastructure. OECD (2020a) suggests that countries with well-equipped TVET institutions report higher productivity levels, with graduates better prepared to meet industry demands. Without modern teaching tools, students may struggle to apply theoretical knowledge in real-world contexts, diminishing the effectiveness of TVET training.

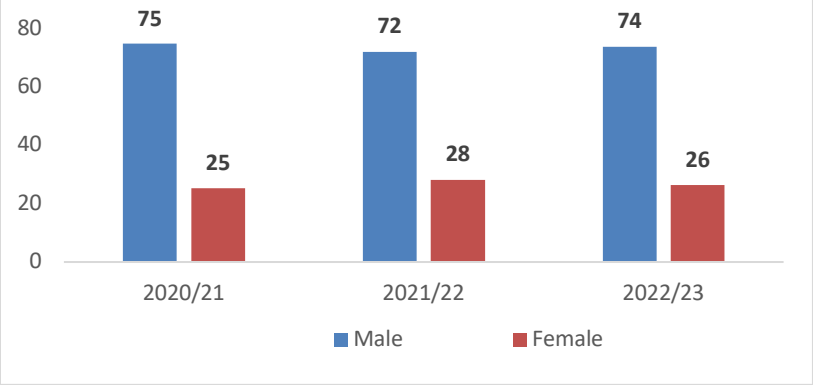
Addressing these gaps requires a holistic approach that integrates industry collaboration, increased funding, and policy reforms to enhance TVET infrastructure and curriculum relevance. Ultimately, a fit-for-purpose TVET system must ensure that students receive training that not only aligns with industry but also receives adequate resources to facilitate effective learning.

Survey results on attributes of a TVET system reveal the quality, cost, and access challenges embedded in public, private, formal, and informal TVET delivery systems in Ghana. Although the introduction of free TVET in public TVIs has significantly removed the cost barrier, it has exacerbated the quality issues because of the government's inefficient funding of TVET, particularly at the secondary level. By contrast, private TVIs (both formal and informal) and training centers pass on to the learner a greater proportion of costs, including the cost of facilities, equipment, materials, and practical work, posing access challenges to learners who cannot afford it. Relatedly, responses from nonformal/informal sector TVET providers highlight the issues (lack of integration with the formal sector, limited access to funding, poor quality of training, etc.) these providers face because of the sector's detachment from the formal sector.

Gender responsiveness of TVET systems

Over 50 percent of Ghana's population is female, with near gender parity achieved at the secondary level, that is, 0.99 by 2021 (MoE, 2022). However, female enrollment in TVET in the 2022/23 academic year was just 26 percent compared to 74 percent male enrollment (MoE and CTVET, 2023b)—figure 12. Supporting each attribute of a TVET system requires mechanisms that are integrated to address challenges arising from pre-existing gender inequalities, ensuring the gender responsiveness of these systems.

Figure 12. TVET enrollment, by gender, 2020/21–2022/23 (%)



Source: Ghana Education Management Information System, 2023.

A key consideration must be to promote female participation and gender neutrality in pedagogical practices and overall classroom and school management while identifying and addressing issues of gender inequity. These issues include gendered grouping for group projects and gender equality in assigning roles and responsibilities for men and women regarding class assignments and projects while ensuring the gender responsiveness of the curriculum. In industry, making the workplace environment, training-employment transition pathways, and employment policies, among others, gender responsive can address participation deficits.

Despite improved female participation in TVET, with girls and women venturing into male-dominated trades, survey findings reveal the existence of a significant level of gender disparity in access to TVET. Respondents attributed the gender gap in access to negative socio-cultural norms.

Contrary to the assertion that gender is a determinant of participation in TVET, most parents (96.7 percent) revealed that gender was not a consideration in choosing TVET for their wards. Fourteen percent of parents believed that, although both men and women can pursue TVET courses, some trades including construction and agriculture are the preserve of men because they involve the use of excessive physical strength. Importantly, however, increasing automation and digitalization in these trades is making work less physical.

3.2. Availability of skills anticipation or forecasting mechanisms

An efficient TVET system requires a robust skills anticipation mechanism to align training with labor market demands, thereby minimizing skills mismatches. In 2020, the MoE, through CTVET, launched a skills gap analysis and audit to assess and address the skills needs of industry. The report highlighted the limited collaboration between TVIs and industry in co-designing curricula and training programs (CTVET, 2021). A follow-up skills gap analysis in 2022 revealed that 75 percent of TVI curricula were outdated (CTVET, 2023a), prompting reforms to modernize TVET training (CTVET, 2024).

Although recognized as skills forecasting tools, these reports primarily diagnose existing gaps rather than predict future labor market needs. That is, they lack forward-looking projections on Ghana's future workforce requirements, underscoring the need for the government to develop a more effective and predictive skills forecasting mechanism that integrates real-time labor market data and enhances information-sharing among TVET stakeholders, particularly training providers and the public.

Further, SSBs, which bring together representatives from academia and industry, facilitate industry input into CTVET's program accreditation processes. Although crucial for knowledge sharing, they cannot project long-term labor market trends, limiting their effectiveness as skills anticipation entities. Additionally, the absence of a structured framework for data exchange

between SSBs and training providers weakens the TVET system's responsiveness to industry needs.

In response to the persistent skills mismatch, Ghana developed the Ghana Labor Market Information System to improve job-market alignment. The system serves as a platform on which job seekers create profiles showcasing their skills, qualifications, and job preferences to potential employers. It also provides employment data and insights on in-demand skills and job trends. Although useful for CTVET's curriculum reviews, the Ghana Labor Market Information System falls short as a predictive tool, with insights based on current rather than future labor market trends.

Survey results indicate a limited but growing awareness of skills anticipation and forecasting mechanisms within the TVET policy ecosystem. Stakeholder insights affirm that, although institutions like CTVET have undertaken occasional analyses of labor market trends and skills gaps, such exercises are neither regular nor widely disseminated. Respondents from key agencies, including GTVETS, pointed to the near absence of an institutionalized labor market information system, with some expressing unfamiliarity with any ongoing forecasting efforts.

The use of labor market data to inform training design, curriculum updates, and policy decisions remains sporadic, according to the findings. When assessments are conducted, their findings are not consistently integrated into program development or shared with implementers. The lack of a structured process for relaying industry skills needs to training institutions further limits the practical application of any forecasting data that exists.

Respondents advocated for a more structured and continuous approach to skills forecasting as part of the new TVET policy under development. Recommendations included creating formal feedback loops between industry and training institutions and institutionalizing a national skills observatory to track market trends. Respondents emphasized the need to ensure that skills data collection informs real-time curriculum updates and resource allocation, especially in emerging areas like green jobs and digital trades.

3.3. Challenges in adapting to evolving labor market demands and 4IR skills

The government of Ghana, with the help of the European Union and the German government, has been transforming TVET to respond to evolving labor market needs and align with the emerging economy through the European Union–Ghana Pact for Skills: Support for the Transformation of TVET System project (GIZ, 2023). Notwithstanding this project, the government of Ghana's efforts to make TVET systems 4IR compliant face challenges.

Among the many challenges, teachers and heads of TVIs most frequently selected the absence of a labor market information or skills forecasting system in the country (50 percent), highlighting the difficulty institutions face in aligning training with industry demands because of a lack of reliable data on evolving skill requirements. Next came the low competency of TVET training on required skills or qualifications (35 percent), suggesting that training programs may not

adequately equip students with the necessary skills demanded by employers, leading to a skills mismatch in the labor market.

Thirty percent of heads and teachers reported the low capacity of TVET institutions to adjust training in line with changing skill needs. This low capacity indicates that institutions may struggle to remain responsive to industry shifts because of outdated curricula, inadequate funding, or limited engagement with private sector stakeholders. Twenty percent of heads and teachers identified inadequate information technology (IT) facilities, technology-mediated learning, and digital infrastructure, underscoring the challenge of integrating modern technological tools into training programs. The lack of digital resources limits TVET institutions' ability to deliver contemporary, technology-driven vocational training.

Low commitment to reform among policymakers, TVET institutions, and other stakeholders, also selected by 20 percent of heads and teachers, indicates an institutional inertia that hinders TVET sector advancements. Without strong reform initiatives, efforts to enhance TVET relevance, funding, and industry alignment remain stagnant. Notably, no respondents selected low participation of private sector entities in reform processes, the shortage of TVET teaching staff with required skills or qualifications, or negative attitudes toward new technologies and resistance to change among TVET teaching staff. The lack of responses suggests that, although these might be systemic issues, teachers and heads of TVIs did not prioritize them as top concerns (table 6).

Table 6. Challenges hampering TVET adaptation to evolving labor market skill needs (%)

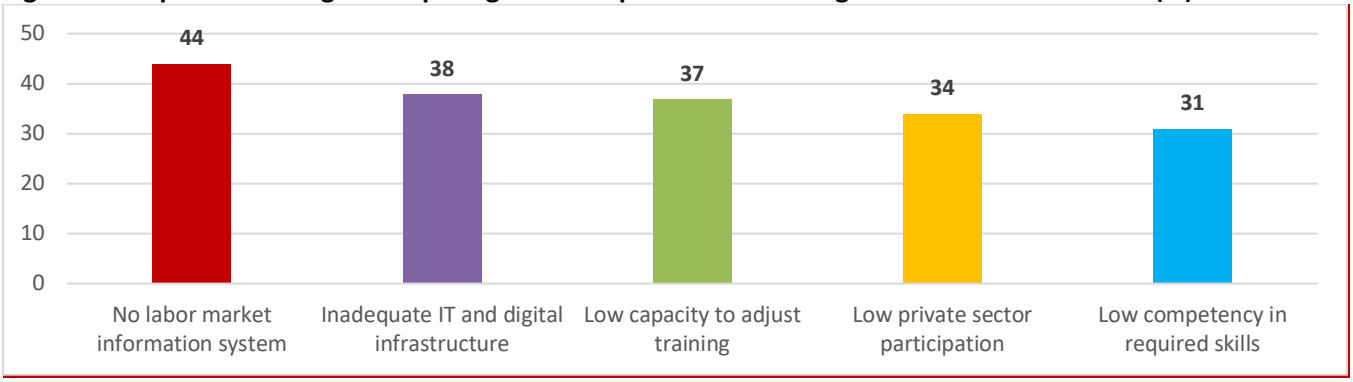
Type of challenge	Average, all stakeholders	Average, teachers and TVI heads)
Absence of labor market information or skill forecasting system in the country	**44**	50
Inadequate IT facilities, technology-mediated learning, and digital infrastructure	**38**	20
Low capacity of TVET institutions to adjust training in line with changing skill needs.	**37**	30
Low participation of private sector entities to engage in reform processes	**34**	0
Low competency of TVET training on required skills or qualifications	**31**	35
Low commitment to reform among policymakers, TVET institutions, and other stakeholders	28	20
Preference of employers to use unskilled or semiskilled labor for low-paying jobs and expatriates for skilled tasks	22	20
Shortage of TVET teaching staff with required skills or qualifications	13	0

Lack of knowledge regarding the skills and competencies required for entrepreneurship, digitalization, or education for sustainable development	13	10
Negative attitude toward new technologies or resistance to change among TVET teaching staff	6	0

Source: Field data.
Note: Table shows responses from TVI heads (10), teachers (10), CSOs and DPs (4), MCPs (5), and policy and regulatory stakeholders (3). Total sample = 32.

Among the top five challenges hampering TVET adaptation to evolving labor market skill needs, overall, stakeholders identified the absence of a labor market information or skill forecasting system (44 percent) as the most problematic (figure 13). Inadequate IT facilities, technology-mediated learning, and digital infrastructure ranked second (38 percent). The low capacity of TVET institutions to adjust training in line with changing skill needs (37 percent) ranked third, followed by low participation of private sector entities in reform processes (34 percent) and the low competency of TVET training on required skills or qualifications (31 percent).

Figure 13. Top five challenges hampering TVET adaptation to evolving labor market skill needs (%)



Source: Field data.
Note: Table shows responses from TVI heads (10), teachers (10), CSOs and DPs (4), MCPs (5), and policy and regulatory stakeholders (3). Total sample = 32.

Absence of a labor market information or skill forecasting system in the country

Aligning TVET training with industry needs requires an effective labor market information system. Ghana's TVET sector faces significant hurdles because of the lack of a centralized, data-driven approach to skill forecasting. An effective labor market data collection enables policymakers to tailor training programs to meet current and emerging workforce demands (World Bank 2022c). The absence of such a system results in a persistent skills mismatch, with TVET graduates lacking the competencies needed by industries. UNESCO (2021a) underscores the importance of skills forecasting for ensuring that TVET systems are demand-driven rather than supply-oriented. Without real-time labor market data, TVET institutions rely on outdated curricula that do not reflect industry needs, as indicated by 70 percent of parents in this study (table 2).

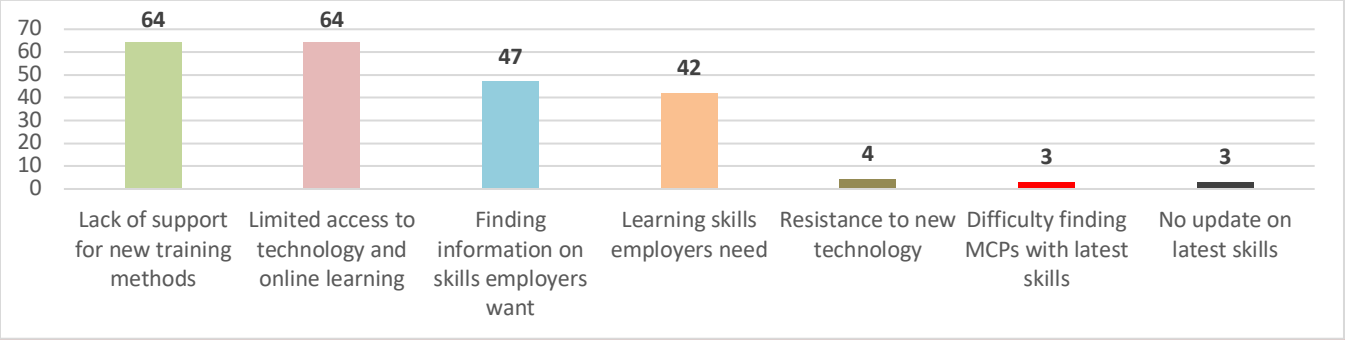
A strong labor market information system would also support career guidance, enabling students to make informed decisions about vocational training based on employment trends, a critical

step in their professional development. Countries such as Germany and the Republic of Korea have successfully integrated labor market information systems into their TVET reforms, leading to improved job placement rates for graduates (OECD, 2020a). To bridge this gap in Ghana, investments in data collection, industry research, and public-private partnerships are essential.

The high ranking of the absence of a labor market information or skills forecasting system among the challenges in adapting to evolving labor market demand further supports claims by private sector stakeholders about their lack of collaboration with TVIs. The private sector, and for that matter employers, have access to information on the skills requirements of industry. As such, TVIs recognize the private sector as a key partner, with whom TVIs must establish and maintain close and regular engagements for cross-learning and information sharing.

The lack of engagement creates difficulties for TVET learners in acquiring 4IR skills. These difficulties include the lack of support for training methods, difficulty in finding information on the skills employers need, resistance to new technologies, the difficulty in finding MCPs with the latest skills, learning skills employer want, and limited access to technology and online learning platforms (figure 14).

Figure 14. Challenges TVET learners face in acquiring 4IR skills (%)



Source: Field data.

Inadequate IT facilities, technology-mediated learning, and digital infrastructure

Modern TVET systems increasingly rely on digital tools to enhance training effectiveness. However, 38 percent of stakeholders reported inadequate IT infrastructure as a key challenge. This response indicates a significant digital divide in Ghana's TVET institutions, notwithstanding that digital transformation in TVET is crucial for preparing students for technology-driven industries (Anamuah-Mensah, 2022b). Many institutions lack access to internet connectivity, modern computer labs, and digital learning platforms, reducing the effectiveness of blended and online learning approaches, according to the MoE. Considering that digital skills are becoming essential for all technical careers, UNESCO (2021c) emphasizes that investing in IT infrastructure is a necessity rather than a luxury.

The COVID-19 pandemic highlighted the need for robust digital learning platforms in vocational education. Countries with strong digital TVET frameworks, such as Finland and Singapore, transitioned smoothly to remote learning, ensuring continuity in training (OECD, 2020a). Within

the same period in Ghana, TVET providers used digital platforms to engage over 10,000 TVET learners (MoE and CTVET, 2021). However, compared to general education, TVET delivery was less resilient (Langthaler and Bazafkan 2020) because some instructors and learners lacked the digital skills required for effective digital TVET teaching and learning, especially within the virtual system. Ghana should consider targeted investment in ICT resources, teacher training in digital pedagogy, and policies that prioritize technology adoption in TVET institutions.

The challenge of inadequate IT facilities, technology-mediated learning, and digital infrastructure highlights the funding constraints in TVET, especially in the informal sector. This challenge, coupled with the impact of the lack of standardized training and certification, leads to poor-quality training in the sector. MCPs in this study expressed their inability to effectively address the challenges they face in the sector because of funding constraints. They recommended that the government provide funding support, capacity building for trainers, and scholarships for apprenticeship to help improve the informal TVET sector and make it responsive to the evolving nature of work.

Among teachers interviewed, however, some have adopted various strategies to overcome the challenges of adapting to the evolving demands of the labor market and 4IR. Their efforts to stay relevant include upskilling through peer learning on knowledge of new techniques, technology, design trends, or curriculum content that they may find challenging. Others take short courses with well-resourced private TVET centers to improve their knowledge and skills in their trade area. Some instructors also take the opportunity to learn from industry on Workplace Experience Learning visits with their students as well as by participating in workshops organized by GTVETS.

Low capacity of TVET institutions to adjust training in line with changing skill needs

The dynamic nature of the global economy requires TVET institutions to be adaptable. However, 37 percent of stakeholders noted that Ghana's TVET system struggles to align with evolving industry trends. This difficulty is largely due to bureaucratic inefficiencies, lack of industry partnerships, and slow curriculum reform processes (World Bank, 2022c).

Flexible TVET systems, such as Germany's dual training model, incorporate continuous feedback from industry stakeholders, ensuring that training remains relevant (OECD, 2020a). Because of Ghana's rigidity in adjusting training programs, graduates receive training in skills that may no longer be in demand (Afeti and Adubra, 2016). Improving the capacity of TVIs to adjust to the changing needs of industry will require a systematic review of TVET policies, coupled with improved collaboration with industry experts and enhanced teacher training programs. Strengthening institutional capacity will ensure that TVET training remains responsive to technological advancements and labor market shifts.

Low participation of private sector entities in TVET system reform processes

The low participation of private sector entities in TVET system reform processes remains a critical barrier to developing a demand-driven technical education system, as indicated by 34 percent of stakeholder respondents. Private sector engagement is essential for ensuring that TVET curricula align with industry needs, fostering a skilled workforce that meets labor market demands. In

many developing economies, including Ghana, private sector actors are often disengaged from the policymaking and curriculum development processes, highlighting the persistent detachment between the formal and informal TVET sectors. According to ILO (2020b), successful TVET systems require strong employer involvement to identify emerging skills gaps, inform curriculum design, and provide work-based learning opportunities. Without active private sector participation, TVET institutions risk producing graduates with outdated skills, exacerbating youth unemployment and reducing economic competitiveness.

A key factor contributing to low private sector engagement is the absence of structured incentives and clear collaboration frameworks. Many businesses perceive TVET reform as a government responsibility and lack motivation to invest time and resources into shaping training programs (AfDB, 2019b). Furthermore, weak public-private coordination mechanisms and bureaucratic hurdles discourage industries from actively engaging with TVET institutions. In contrast, countries with robust TVET ecosystems, such as Germany and Switzerland, have established industry-led sector skills councils that bridge the gap between training providers and employers, ensuring continuous feedback and alignment with labor market needs (OECD, 2020a). Implementing similar mechanisms in Ghana could enhance industry participation and improve TVET outcomes.

Limited awareness among private sector entities about the benefits of TVET engagement also hinders their participation in reform processes. Many businesses underestimate the potential of TVET to supply them with a highly skilled workforce, opting instead to invest in in-house training or hire expatriates for technical roles (UNESCO, 2021c). In countries like Korea, sustained awareness campaigns and industry forums have successfully encouraged businesses to take an active role in TVET governance. Ghana could benefit from similar strategies by promoting the advantages of employer-led training models, work-based learning initiatives, and tax incentives for companies that support TVET partnerships.

Low competency of TVET training on required skills and/or qualifications

The persistent challenge of low competency in TVET training on required skills and qualifications remains a major concern for workforce readiness in Ghana. TVET programs are expected to equip graduates with practical, industry-relevant skills; however, gaps in training quality continue to produce graduates who struggle to meet employer expectations. Most private sector actors interviewed in this study asserted that TVET graduates require additional on-the-job training to acquire necessary practical skills. Notably, TVET systems that fail to integrate CBT and modern pedagogical approaches contribute to skills mismatches and limited job prospects for graduates (UNESCO, 2021c). The absence of structured work-based learning and weak alignment with labor market needs further worsens this issue.

One of the primary factors behind the low competency of TVET training is the outdated curriculum used by many institutions. This is the case in several African countries, where TVET curricula remain disconnected from technological advancements and industrial innovations (AfDB, 2019b). As industries evolve with automation, digitalization, and new manufacturing techniques, graduates from traditional TVET programs struggle to adapt. In contrast, TVET

systems in countries like Germany and Singapore incorporate continuous curriculum updates driven by industry input, ensuring graduates are equipped with skills that match labor market needs (UNESCO, 2021c).

Another contributing factor is the shortage of qualified TVET instructors with industry experience. ILO (2020b) notes that many vocational trainers lack exposure to modern workplace environments, making it difficult for them to deliver CBT effectively. Without strong industry-educator partnerships and regular capacity-building programs, TVET instructors remain disconnected from evolving skill demands. Strengthening teacher training through industry involvement and continuous professional development programs could significantly improve the competency of TVET graduates.

Addressing this challenge requires a multifaceted approach, including curriculum modernization, investment in teacher training, and the adoption of competency-based education models. World Bank (2022c) recommends that TVET institutions enhance collaboration with industries through apprenticeships, dual training models, and internship programs that allow students to gain real-world experience. Additionally, accreditation bodies must enforce strict quality assurance mechanisms to ensure that training institutions meet national and international competency standards. By prioritizing these reforms, Ghana can build a TVET system that produces highly skilled graduates capable of driving economic growth and innovation.

Gendered evolving demands of labor market

The evolving demands of the labor market continue to reflect deeply rooted gender biases, particularly in emerging fields driven by 4IR. Survey findings indicate that certain skill sets relevant to 4IR are promoted along gendered lines, reinforcing traditional notions of male- and female-dominated professions. For instance, fields such as coding, robotics, and artificial intelligence (AI) are often perceived as more suitable for men, and digital marketing more appropriate for women. This situation is attributed to long-standing stereotypes that associate technical and engineering-related roles with men while relegating women to less technical, communication-oriented jobs (UNESCO, 2021b).

Moreover, the underrepresentation of women in STEM education further limits their participation in high-demand technical fields, creating a cycle in which men have a significant advantage in securing jobs in these domains (World Bank, 2022a). Such gender-based job segregation affects not only individual career choices but also national economic development by restricting the full participation of women in high-growth industries (ILO, 2020a). However, some respondents in this study argue that modernization and shifts in workplace dynamics are gradually neutralizing these gender disparities. The increasing use of technology and digital tools across various industries has led to a diversification of roles, making job opportunities more inclusive regardless of gender (OECD, 2021). Countries that have implemented gender-responsive education policies and workforce strategies, such as Canada and Finland, have seen significant improvements in gender parity within STEM and technical fields (AfDB, 2019a).

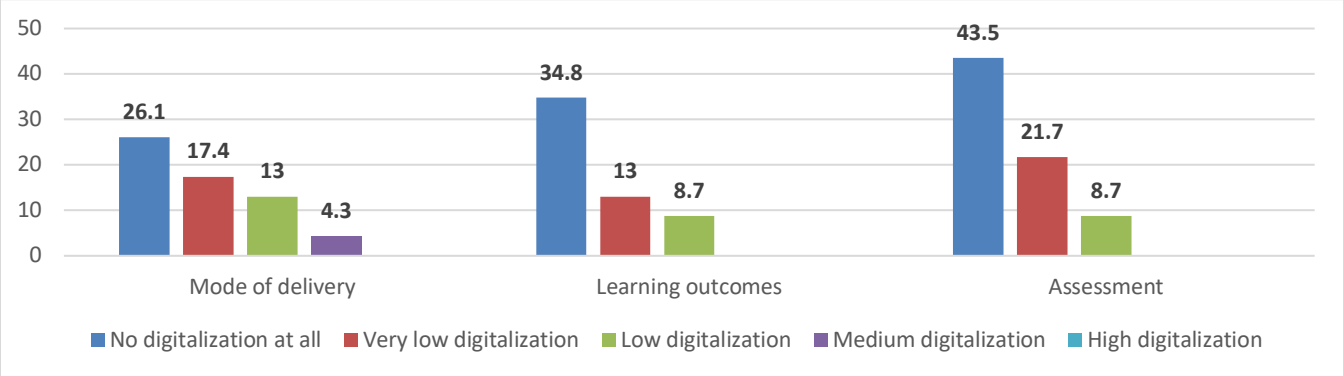
Despite this progress, challenges remain, particularly in regions where cultural and societal norms continue to reinforce gendered career pathways. To address the gender disparities in labor market skills demand requires deliberate interventions, including targeted STEM education initiatives for girls, mentorship programs, and industry-driven efforts to dismantle gender biases in recruitment and professional development (UNESCO, 2022f). Without proactive measures, gendered labor market demands may persist, limiting equitable access to emerging opportunities in the digital and technological economy.

3.4. Digitalization of Ghana's TVET systems

Ghana's Strategic Plan for TVET Transformation (2023–2027) aims to consolidate the various inroads made in strengthening TVET delivery, including the digitalization of TVET systems. To this end, DPs are supporting the government of Ghana to, among other things, digitalize TVET (GIZ, 2023). Despite evidence of ongoing digitalization of Ghana's TVET educational systems, with emphasis on building the digital skills of TVET instructors (ILO, 2021a), the challenge has been how to integrate digital skills into pedagogy and have systemic impacts, rather than project outcomes. Digital skills must be integrated into TVET curricula at both TVET teacher training colleges and TVET schools and training centers.

The survey results align with secondary data that the TVET system in Ghana is not sufficiently digitalized. Among stakeholders, 26.1 percent indicated the nonexistence of digitalization in the mode of delivery, and only 17.4 percent noted a very low extent of digitalization. Regarding learning outcomes, 34.8 percent reported no digitalization at all, and 13 percent said the level is very low. In terms of the level of digitalization of assessment, 43.5 percent said there is no digitalization at all and 21.7 percent stated that it is very low (figure 15).

Figure 15. Extent of digitalization of Ghana's TVET curriculum (%)



Source: Field data.
Note: Figure shows responses from TVI heads (10), teachers (10), and policy and regulatory actors (3).

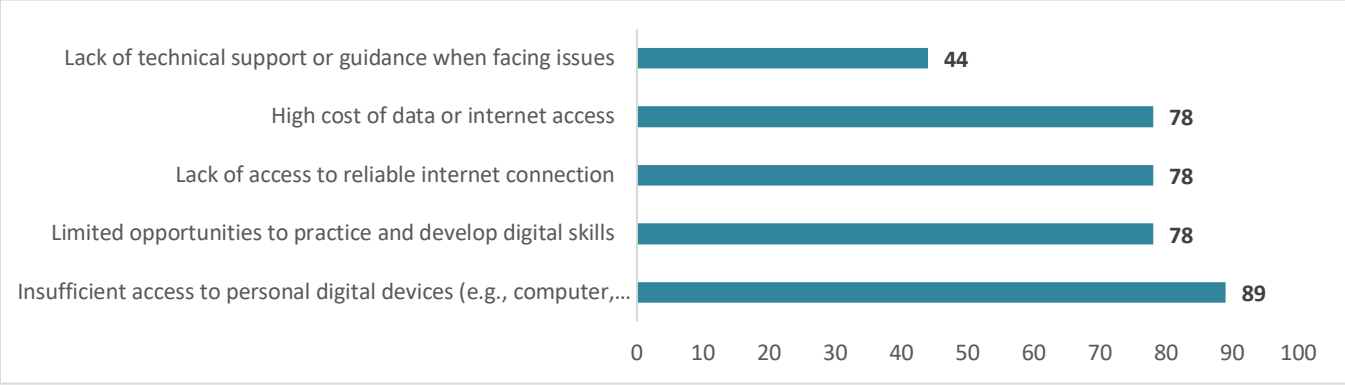
The digitalization of TVET has become a key driver of workforce competitiveness in the 21st century, yet Ghana's TVET curriculum remains largely analog. Many institutions continue to rely on traditional instructional methods with limited integration of digital tools, leaving graduates ill-prepared for technology-driven work environments. This challenge stems from factors such as outdated curricula, insufficient investment in ICT infrastructure, and a lack of digital literacy

among instructors. According to ILO (2021b), digital transformation in TVET enhances learning efficiency, promotes interactive skills development, and bridges the gap between theoretical knowledge and practical application.

In contrast to the situation in Ghana, countries such as Estonia and Korea have integrated digital modules, including virtual reality simulations and AI-assisted learning, into TVET programs to ensure students develop competencies relevant to the evolving job market (European Commission, 2022). Without deliberate efforts to digitalize its TVET curriculum, Ghana risks widening its skills gap, making local graduates less competitive in both national and global labor markets.

This generally low level of digitalization of TVET systems in Ghana poses challenges to students. Although 89 percent of students reported insufficient access to personal digital devices, 78 percent identified the high cost of data or internet as the major challenge, with 78 percent complaining about unreliable internet connection. Another 78 percent had limited opportunities to practice and develop skills within their TVET programs (figure 16).

Figure 16. Challenges for students in using digital tools for TVET studies (%)

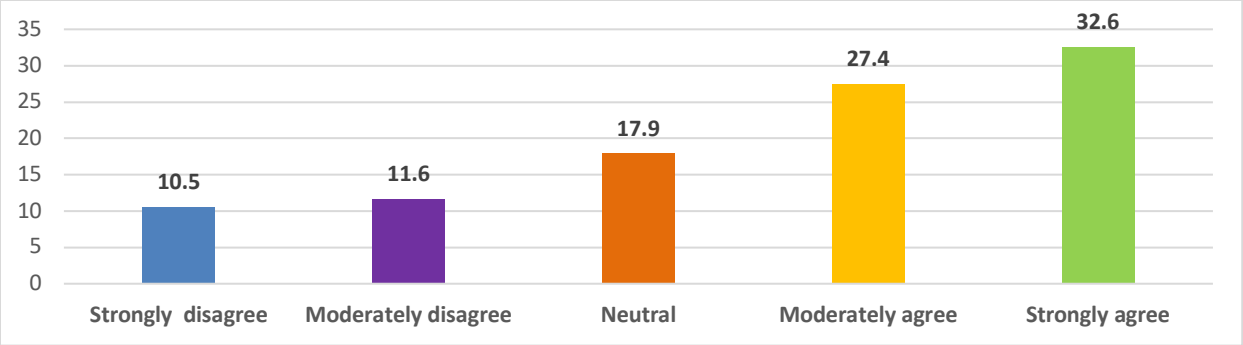


Source: Field data.

Enhancing digitalization in Ghana's TVET system requires a strategic and multistakeholder approach. One effective strategy is the adoption of blended learning models, which combine online and in-person training to make digital education more accessible (African Union, 2021). Additionally, fostering partnerships between TVET institutions and technology-driven industries can accelerate digital adoption by integrating work-based learning experiences that expose students to digital tools and real-world applications. Rwanda, for instance, has successfully partnered with private sector firms to introduce coding and cybersecurity training within its TVET system, significantly improving graduate employability rates (World Economic Forum, 2022). Ghana can replicate such models by promoting industry co-creation of digital curricula and incentivizing investments in ICT-enabled learning environments. Moreover, government-led digital skills initiatives should prioritize capacity-building programs for TVET instructors to enhance their proficiency in delivering digital content.

Survey results on the extent to which TVET programs provide opportunities for developing digital skills confirm the low level of digitalization of Ghana's TVET systems, with only 32.6 percent of students interviewed agreeing strongly that their TVET programs provide opportunities for them to develop digital skills (figure 17). Moreover, most MCPs asserted that the level of digitalization of their mode of training is very low, and some indicated that their training systems are not digitalized at all.

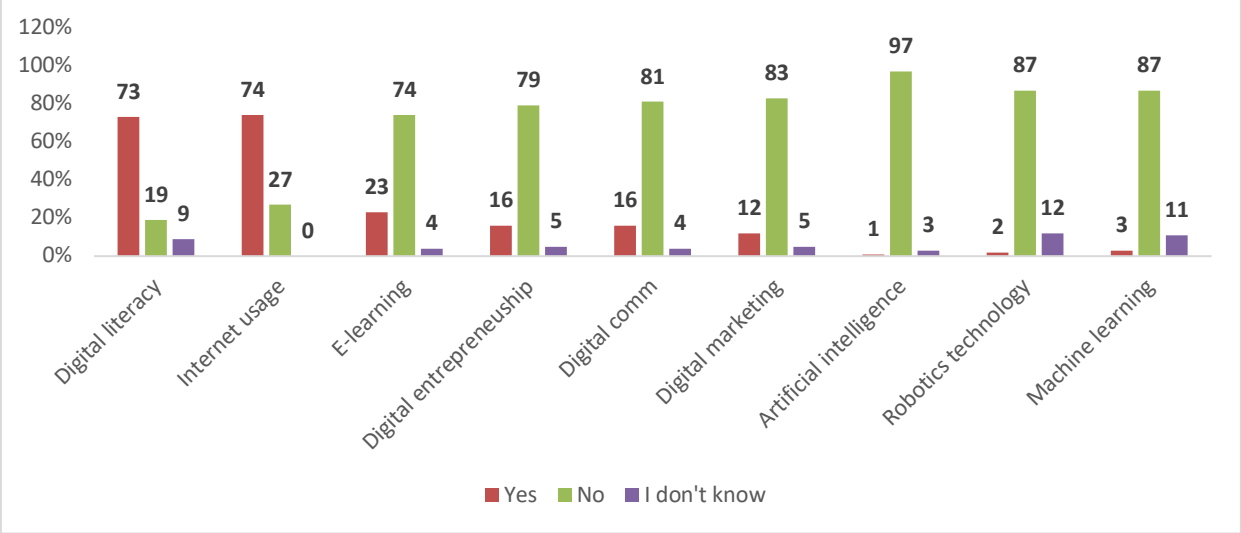
Figure 17. Extent to which TVET programs provide opportunities to develop digital skills (%)



Source: Field data.
Note: Figure shows responses from students.

The survey results highlight significant gaps in the teaching of digital skills in Ghana's TVET institutions. Basic digital literacy (73 percent) and internet usage (74 percent) receive relatively high levels of affirmative responses; however, other crucial digital skills are severely lacking. E-learning adoption is low (23 percent), and 74 percent of respondents indicated its absence. Similarly, digital entrepreneurship (16 percent), digital communication (16 percent), and digital marketing (12 percent) are largely untaught. More advanced digital competencies, such as AI (1 percent), robotics technology (2 percent), and machine learning (3 percent), are almost nonexistent in these institutions. The widespread lack of these critical skills suggests that Ghana's TVET system does not equip learners with the digital competencies needed for the modern workforce, potentially limiting their employability and the nation's competitiveness in a technology-driven global economy (figure 18).

Figure 18. Knowledge and digital skills taught in TVET programs (%)



Source: Field data.
Note: Figure shows responses from students (90), TVI heads (10), teachers (10), and policy and regulatory actors (3).

The lack of digital skills integration in TVET institutions poses a significant challenge to Ghana's efforts to modernize and digitalize its vocational education sector. The absence of training in e-learning (74 percent) means that many institutions struggle to adopt blended learning approaches, limiting access to education, particularly for remote and underserved communities. Furthermore, the lack of exposure to digital entrepreneurship, digital communication, and digital marketing reduces the ability of TVET graduates to leverage online platforms for job opportunities and business creation.

In contrast, countries like Estonia and Finland have successfully integrated digital skills into their TVET curricula by embedding ICT modules into all vocational courses and ensuring industry collaboration to make training relevant (European Commission, 2021). Ghana must adopt similar strategies, ensuring that digital skills become a core component of all technical training programs.

Globally, successful TVET digitalization strategies have emphasized government-led policies, public-private partnerships, and curriculum reforms. For instance, Singapore's SkillsFuture Initiative has embedded AI, robotics, and digital marketing into TVET programs, preparing graduates for the future job market (ILO, 2022). Similarly, Germany's dual training system integrates practical digital skills training through apprenticeships in tech-driven industries (UNESCO, 2023). Ghana can learn from these models by collaborating with the private sector to provide hands-on training in digital technologies, offering incentives for TVET institutions to invest in digital infrastructure, and introducing policy reforms that make digital skills training mandatory. Without these interventions, the country risks widening the digital divide and limiting its ability to compete in the 4IR, ultimately hindering economic growth and job creation.

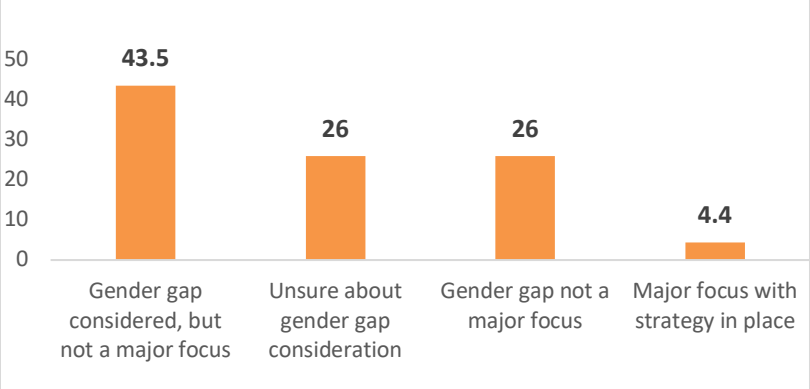
Gender responsiveness of TVET digitalization

Arguably, although the low level of digitalization of Ghana's TVET system results from the relative youth of the government's digitalization efforts in the sector (for example, the European Union–Ghana Pact for Skills: Support for the Transformation of TVET System began only in 2023), these efforts have no specific gender, inclusion, or rural/urban digital gap focus. None of the digitalization initiatives currently implemented by the government of Ghana, including the free school Wi-Fi and the distribution of tablets for students, has set gender equality and social inclusion policies and targets.

Survey findings support this argument, with 43.5 percent of respondents (TVI heads, teachers, and policy and regulatory actors) indicating that TVET digitalization considers the gender gap but does not make it a major focus. Another 26 percent noted that the gender gap is not a major

focus. These responses highlight the lack of gender responsiveness of Ghana's TVET digitalization. Consequently, the TVET digitalization drive has no initiatives to mainstream gender, according to all TVI heads and, policy and regulatory actors (figure 19).

Figure 19. Gender consideration in TVET digitalization in Ghana (%)



Source: Field data.
Note: Figure shows responses from TVI heads (10), teachers (10), and policy and regulatory actors (3).

Regarding the rural-urban divide, 35 percent of respondents (TVI heads, teachers, and policy and regulatory actors) reported that TVET system digitalization efforts do not make it a major focus, whereas 30.4 percent thought that TVET system digitalization considers the rural-urban divide but has no strategy to bridge it. Consequently, interviews with the CTVET revealed that it currently has no initiatives to bridge the rural-urban gap even though the MoE is in the process of developing a proposal to seek Italian government funding in that regard.

Considering that a lack of gender responsiveness and inclusivity renders Ghana's TVET systems not fit for the 4IR era, all efforts at digitalization, on which the emerging economy is anchored, must address gender and inclusion concerns. Providing initiatives to break gender stereotypes, including the Seats for Ladies in STEM (S4LIS) initiative by the Ministry of Communication and Digitalization in partnership with the Ghana Chamber of Telecommunication to offer free training to girls in ICT,[5] have to some extent attracted more women into engineering-related trade areas in both formal and informal TVET.

Strategically however, the digital revolution should be leveraged to emphasize the increased use of "brain power" instead of "brawn power" by integrating digitalization into training and delivery of training in trades like construction that require physical exertion. Doing so would increase the interest of women who hitherto had none because of the physical nature. Other areas to consider for increased female participation are soft construction skills: drawing building plans and designs using digital tools, and so on. With such skills, women can rise to the role of supervisor, essential in the construction sector.

[5] SF4LIS, "Launch of the Seats for Ladies in S.T.E.M. Initiative Held in Accra," https://www.s4lis.com/launch-of-the-seats-for-ladies-in-s-t-e-m-initiative-held-in-accra/.

3.5. Green responsiveness of TVET curricula

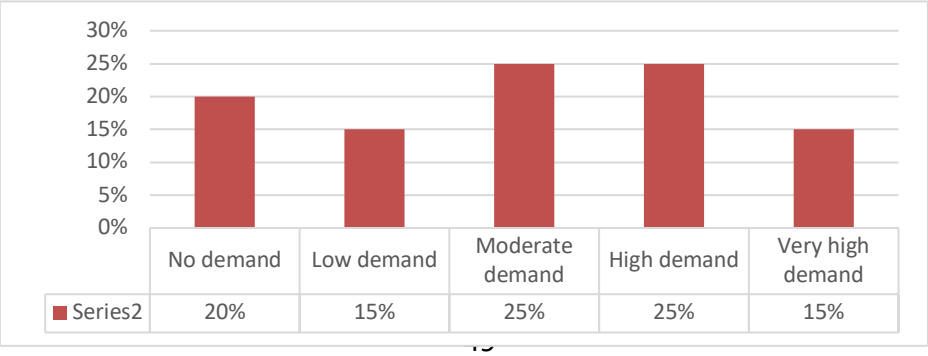
As part of strategies to mitigate the impact of climate change, countries including Ghana that ratified Sustainable Development Goal 13 (climate action) are enjoined to adopt sustainable means of work. Doing so requires training systems to equip learners (who will end up in the workforce) with skills and competencies that promote sustainable economies and protect the environment. As part of efforts to achieve environmental sustainability, employers now demand graduates with green skills to drive the climate agenda.

The demand for environmentally friendly products and services in Ghana is gradually expanding, spurred by the increasing public awareness of climate change and global sustainability commitments. In sectors such as renewable energy, waste recycling, organic agriculture, and eco-friendly construction, businesses are witnessing a growing preference for green alternatives. A market assessment by the Ministry of Employment and Labour Relations, ahead of developing the Ghana Green Jobs Strategy, highlighted rising investment interest in green sectors and the potential for job creation through environmentally sustainable practices (MoELR, 2022). Similarly, ILO (2021a) estimates that the transition to a green economy could generate up to 24 million jobs globally by 2030, with significant prospects for Africa, including Ghana. These trends signal the need for aligning skills development, especially through TVET, with green industry requirements to enhance employability and promote sustainable economic growth.

Survey results on employers' demand for TVET graduates with green skills reflect mixed perceptions. Whereas 25 percent of stakeholders (teachers, SSBs, and private sector actors) report a moderate demand and another 25 percent indicate a high demand, a notable 20 percent see no demand for such graduates. Additionally, 15 percent of employers report low demand, but another 15 percent perceive a very high demand (figure 20). This distribution suggests that, despite growing recognition of green skills in the job market, demand is not yet uniform across industries. The significant proportion of respondents citing no or low demand points to potential gaps in awareness, policy enforcement, or industry-specific needs, highlighting the need for further alignment between TVET curricula and labor market expectations.

Although these results point to a notable level of demand for green skills, filling positions that require green skills and competencies comes with several challenges. According to private sector stakeholders interviewed, these challenges include the lack of innovative environmental sustainability, waste management, renewable energy, climate change literacy, and climate responsive agriculture skills on the part of TVET graduates.

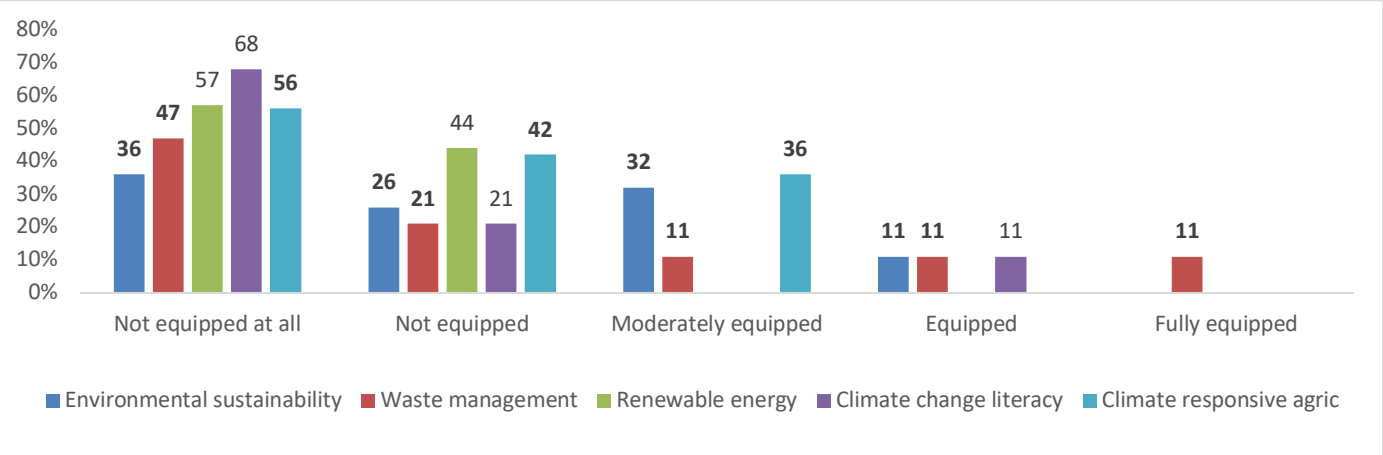
Figure 20. Employer demand for TVET graduates with green skills (%)



Source: Field data.
Note: Figure shows responses from teachers (10), SSBs (5), and private sector actors (5).

Regarding TVET learners' preparedness for the green economy, the survey results highlight a concerning trend regarding the extent to which they feel equipped with green skills across various domains. A significant proportion of learners perceived themselves as not equipped at all or not equipped, particularly in climate change literacy (68 percent not equipped at all), renewable energy (57 percent), and climate-responsive agriculture (56 percent). Although waste management shows slightly better preparedness, with 11 percent of learners considering themselves fully equipped (figure 21), the overall trend suggests that green skills training in TVET programs is largely inadequate. The absence of learners who feel fully equipped in most categories points to a major gap in curriculum delivery and practical skill development, raising concerns about the system's ability to produce graduates ready to meet the demands of a green economy.

Figure 21. Extent to which TVET learners feel equipped with green skills (%)



Source: Field data.
Note: Figure shows responses from students (90) and apprentices (5).

The moderate level of demand for TVET graduates with green skills, as shown in figure 20, correlates with the low levels of preparedness among learners. Employers exhibit moderate to high demand (50 percent), but a significant 35 percent indicate low or no demand, likely reflecting an industry that has yet to fully integrate green practices into its operations. The low level of green skills training in TVET institutions contributes to this cycle, with employers not prioritizing green skills because of the lack of sufficiently trained graduates and with learners, in turn, not seeing the relevance of these skills in the job market. Countries that have successfully bridged this gap, such as Germany and the Netherlands, have done so by aligning TVET curricula with labor market needs and ensuring mandatory industry placements in green sectors (UNESCO, 2022c).

The lack of green skills among TVET graduates undermines efforts to transition to a sustainable, low-carbon economy, ultimately slowing progress toward achieving global climate goals. Countries that have successfully embedded green skills into their TVET programs, such as Finland and Korea, have leveraged strong public-private partnerships to ensure industry-relevant training and government incentives for green skills adoption (ILO, 2021c). Ghana and other developing economies can draw lessons from these models by incorporating green competencies into core curricula, enhancing practical training through internships in green industries, and incentivizing businesses to prioritize green talent. Without urgent reforms, the current gap between employer demand and learner preparedness risks perpetuating a workforce ill-equipped for climate resilience, hindering Ghana's ability to contribute meaningfully to the global sustainability agenda.

Despite the increasing relevance of green skills in the emerging economy, and the claim by most TVI heads that their institutions have, to varying extents, implemented initiatives to integrate green skills into curriculum, an assessment of TVET learners' knowledge of green skills revealed that only 25.6 percent had ever heard of green skills, and that most (74.4 percent) had no knowledge. This finding implies that initiatives, including the introduction of CBT programs in renewable energy technology, environmental sanitation technology, recycling technology, bio-digester construction, and training of SSBs on skills anticipation for green jobs, have not sufficiently been mainstreamed in TVET delivery, and students not sufficiently inducted in the green concept.

Students' low green awareness implies that the training of TVET institutions to develop institutional greening plans by CTVET has yet to yield any significant results. Enhanced collaboration with DPs will accelerate the transformation of TVET, as in the case of GIZ's support of CTVET to integrate green concepts and approaches into existing TVET curricula and to develop a new green curriculum in waste management and recycling technology (according to field data). Beyond donor-funded projects, however, the government of Ghana must intentionally mainstream green skills into TVET system policy, curriculum, pedagogy, facilities, and assessment.

This constrained progress in greening TVET in Ghana, according to all policy and regulatory actors in this study, results from limited funding, inadequate infrastructure and equipment, and lack of awareness of the green concept. Key stakeholders agree that the green concept is relatively new in Ghana's TVET ecosystem and that the pace of curriculum reforms for green responsiveness is slow, accounting for the limited expertise in the area. This study also makes evident that few professional development opportunities focus on green TVET, limiting instructors' ability to integrate the concept into their instruction. Furthermore, only 60 of over 233 TVIs have institutional greening plans (Africa Education Watch, 2023a). Most initiatives have so far focused only on capacity building for trainers without sufficiently equipping TVET institutions with tools and equipment to replace obsolete ones and enable institutions to effectively implement the green curriculum. This focus is largely due to the cost-intensive nature of TVET delivery, especially in the private sector.

Therefore, the government of Ghana needs private sector support in the green TVET agenda; however, private sector actors asserted that they require motivation from the government in the form of tax exemptions on the procurement of green equipment for TVET promotion in Ghana. Developing and delivering relevant green skills will require collaboration between industry, TVET institutions, DPs, and government agencies. For example, the MoE should adopt collaborations to promote green TVET, such as the one between GIZ and the Kumasi Institute of Tropical Agriculture on the GIZ ATVET program, which provided staff of the institute with capacity building training in the design and delivery of CBT in sustainable agriculture and pedagogic skills, and expand them to include other components of the TVET system and TVIs in furtherance of the green TVET agenda in Ghana.

4. Identifying key players and priorities

4.1. Mechanisms for stakeholder coordination

Ensuring synergy in the TVET delivery system requires stakeholder coordination. However, interviews with CSOs, DPs, and policy, regulatory, and management actors indicate the nonexistence of established functional mechanisms to promote coordination among all stakeholders. For instance, according to survey findings, no formal operational framework exists for close collaboration between the GTVETS and the CTVET (including the SSB operating under the CTVET).

Notably, however, governance in the sector has improved considerably with the harmonization of all public TVIs under the MoE and the efforts to integrate the formal and informal sectors to streamline their delivery, evaluation, assessment, and certification mechanisms. Survey findings reveal that CTVET is exploring approaches to establish a mechanism for cooperation among all the actors; however, the main barrier remains conflict of roles, that is, whether CTVET or GTVETS should lead the cooperation/coordination.

The Pre-Tertiary Education Act 2020 (Act 1049) and the Education Regulatory Bodies Act 1023 define the mandates and functions of these bodies. Conflicts of roles between CTVET and GTVETS arise mainly because of overlapping mandates in policy implementation, institutional management, and quality assurance. One key issue is the duplication of oversight responsibilities over pre-tertiary TVET institutions: both entities claim jurisdiction over curriculum enforcement and institutional supervision. For instance, whereas CTVET is mandated to regulate and accredit TVET institutions, GTVETS also assumes managerial and administrative roles, leading to confusion over which agency has ultimate authority over operational standards and institutional governance.

Additionally, tensions emerge regarding the implementation of CBT, because both bodies play roles in ensuring its adoption, sometimes causing bureaucratic inefficiencies and delays. A similar conflict exists in Kenya, where disagreements between the Technical and Vocational Education and Training Authority and the Kenya National Qualifications Authority over accreditation and curriculum standardization have slowed TVET reforms (UNESCO, 2022d). To resolve these issues, Ghana must clearly delineate the functions of these agencies, promote interagency collaboration, and streamline regulatory frameworks to ensure efficiency and prevent administrative bottlenecks.

Policy-level key informants suggested the enactment of a legislative instrument to clarify the roles and responsibilities of the various TVET agencies. CSO and DP respondents maintained that mechanisms exist for cooperation. They cited the Development Partners Platform, with members from CSOs, private sector, CTVET, industry, DPs, and TVIs, but noted its ineffectiveness, which they attributed to the failure of the relevant government agencies to organize the biannual stakeholders' meeting as agreed. Digesting both categories of responses highlights the need to

strengthen, and make more effective and inclusive, platforms for regular dialogue between the leadership of CTVET, GTVETS, the TVET Directorate of the MoE, DPs, and the private sector.

4.2. The role of the private sector in revitalizing the TVET system

As mentioned earlier, the private sector represents key actors in the TVET ecosystem that play a role in both training and the labor market. This role makes establishing and maintaining close collaborations with the sector very essential. A well-coordinated private sector could play a major role in TVET systems' improvement and delivery, both in training and employment.

Responses on private sector involvement in TVET system improvement highlight varying levels of priority among respondent categories. Apprenticeship/internship programs (69.31 percent) and organizing job fairs (62.06 percent) received the highest overall support, particularly from students (90 percent), indicating a strong demand for workplace exposure and employment linkages. Hiring new graduates (50.53 percent) and providing career guidance (42.76 percent) also ranked high, emphasizing the need for structured employment pathways. Whereas TVI heads, teachers, and agencies emphasized updating qualifications, CBT, and feedback mechanisms (28–42 percent), students showed minimal concern for defining standards (1.11 percent) and curriculum involvement (0 percent), suggesting a gap between policy-level improvements and learner priorities.

The relatively low shares of respondents prioritizing funding for technology (38.14 percent) and staff training (25.39 percent) indicate a need for stronger private sector investment in infrastructure and teacher capacity building. These findings suggest that strengthening Ghana's TVET system will require a balanced approach integrating workplace partnerships, curriculum enhancements, and employer engagement (table 7).

Table 7. Opinions on the role of the private sector in revitalizing the TVET system (%)

Responses	Students	Heads and teachers	MoE/TVET agencies and others	Average
Supporting apprenticeship/internship programs	90	65	52.94	69.31
Organizing job fairs	90	55	41.18	62.06
Hiring new graduates	28	65	58.82	50.53
Providing professional development/career guidance	54	15	58.82	42.76
Providing information on changes taking place in the workplace (skill demands)	10	65	52.94	42.65
Funding for technology	40	45	29.41	38.14
Providing feedback and expert assessment of TVET programs and graduates	10	35	41.18	28.73

Involvement in CBT	10	40	35.29	28.43
Funding TVET staff training	0	35	41.18	25.39
Defining core competencies and occupational standards in TVET provision	1	30	23.53	18.21
Membership of Training Advisory Boards/Sector Skills Councils	0	15	35.29	16.76
Updating qualification frameworks	28	10	5.88	14.55
Involvement in curriculum development	0	0	5.88	1.96

Source: Field data.

Apprenticeship and internship programs

The overwhelming emphasis on apprenticeship and internship programs aligns with global best practices, with hands-on experience significantly improving employability. Countries like Germany and Switzerland have successfully integrated dual TVET systems, in which students spend a portion of their training in industries, leading to better job placement and productivity (OECD, 2020b). The lack of structured apprenticeship programs in Ghana has been a major concern, because many TVET graduates struggle to gain real-world experience before entering the job market (Afeti, 2018). Strengthening partnerships between TVET institutions and private industries would ensure that graduates acquire practical, industry-relevant skills, making them more competitive in the labor market.

Organizing job fairs

The high ranking of job fairs as a means of private sector involvement highlights the need for stronger linkages between TVET graduates and potential employers. Job fairs serve as crucial networking platforms where companies identify skilled TVET graduates and students gain insights into industry expectations. Countries such as Canada and Singapore have institutionalized TVET-specific career expos, ensuring that graduates have direct access to recruiters and career opportunities (UNESCO, 2022b). Implementing regional and national job fairs in Ghana, backed by the private sector, would help bridge the employment gap and provide graduates with real-time labor market information.

Hiring new graduates

The emphasis on hiring new graduates reflects the necessity for industries to recognize and absorb TVET-trained individuals into their workforce. In advanced economies such as Finland and Korea, government incentives encourage businesses to hire TVET graduates, boosting youth employment and economic growth (World Bank, 2019). However, Ghana's private sector has been reluctant to employ TVET graduates because of perceived skill gaps. Strengthening quality assurance in TVET programs, promoting CBT, and offering wage subsidies for TVET graduate employment can improve hiring rates and foster confidence among employers.

Career guidance and development

Career guidance programs are crucial for ensuring that TVET students make informed decisions about their career paths and industry expectations. Countries like Australia and Denmark have robust career mentorship programs embedded in TVET institutions, enabling students to align their skills with industry demands (ILO, 2020b). In Ghana, the absence of structured career counseling services within TVET institutions limits students' understanding of emerging labor market trends, entrepreneurial opportunities, and skill demand projections. Strengthening private sector involvement in career mentorship, coaching, and networking initiatives would enhance graduate employability.

Workplace skill demand updates

The need for regular industry updates on evolving skill demands highlights concerns over TVET curricula that lag behind market needs. In countries like Germany and Japan, industry representatives actively participate in periodic skill assessments to ensure that TVET curricula align with technological advancements and labor market needs (ILO, 2020b). The lack of real-time labor market data in Ghana results in a skills mismatch, with TVET graduates potentially lacking industry-relevant competencies. Establishing a national labor market observatory with strong private sector collaboration could help TVET institutions adjust their training programs to meet real-time industry demands.

Despite the significance of the private sector in the system improvement and delivery of TVET in Ghana, interviews with representatives of CSOs and DPs revealed that, with regard to adapting to the 4IR, the private sector faces the following challenges: the absence of a labor market information or skills forecasting system, lack of policy-level incentives, lack of funding for technology adoption, limited curriculum responsiveness to the 4IR, and limited responsiveness of assessment systems to the 4IR (table 8).

Table 8. Challenges faced by the private sector in adapting to the 4IR, according to CSOs and DPs

Challenge	Rank
Absence of labor market information or skills forecasting system	**1**
Lack of policy level incentives	**2**
Lack of funding for technology	**3**
Limited curriculum responsiveness to the 4IR	**4**
Limited responsiveness of assessment systems to the 4IR	**5**

Source: Survey responses from CSO and DP representatives.

The perspective of policy actors on challenges the private sector faces in adapting to the 4IR aligns, to a large extent, with the perspective of CSOs and DPs. Although both categories of stakeholders identified similar challenges, the priority placed on some differed. Responses from CSO stakeholders prioritized the absence of labor market information or skills forecasting in Ghana, whereas policy and regulatory actors prioritized the large informal private sector (table 9). Both categories of stakeholders, however, prioritized lack of policy-level incentives.

Table 9. Challenges in adapting to the 4IR, according to policy and regulatory actors

Challenges	Rank

Large informal private sector	**1**
Lack of policy level incentives	**2**
Limited curriculum responsiveness to the 4IR	**3**
Limited responsiveness of assessment systems to the 4IR	**4**
Absence of labor market information or skills forecasting system in Ghana	**5**

Source: Survey responses from policy and regulatory actors.

Effectively addressing these challenges requires close collaboration between private and public TVET because of the private sector's key role in the efforts to achieve 4IR-relevant TVET systems and delivery. Results from this study point to the absence of close collaboration between TVET institutions and the private sector. The situation is worse for nonformal sector private trainers (that is, MCPs), whose highly informal nature denies them recognition. Most indicated that they have not established collaboration with any private company or TVET institution.

A proportion of policy and regulatory actors cited financial constraints as responsible for the lack of collaboration with the private sector. Nevertheless, they indicated strong collaboration between public TVIs, nongovernmental organizations, and DPs, a situation they attributed to the fact that these organizations absorb the cost of such engagements.

The burden of addressing these challenges, particularly those regarding curriculum, skills forecasting, and assessment, lie within the purview of the government, through its TVET agencies, to drive Ghana's TVET transformation agenda. Government efforts (with the support of DPs) to incentivize and facilitate greater private sector participation in TVET initiatives must be preceded by measures to remove obstacles hindering effective collaboration, especially the lack of financial incentives. Such measures should also address the limited engagement between CTVET and SSBs, while providing continuous professional development support to private TVIs and informal sector trainers.

SSBs, policy and regulatory actors, and CSOs and DPs ranked government incentives, tax breaks and financial incentives for companies involved in TVET activities, and tax rebates for firms that support TVET initiatives as the crucial measures needed to encourage private sector participation in TVET systems improvement. Private sector stakeholders and SSBs highlighted tax credits for companies that hire and train interns as the most encouraging incentive (table 10). In countries like Kenya, the private sector enjoys some tax incentives for admitting TVET interns, especially women and persons with disabilities (PWDs). This system is worth emulating by the government of Ghana.

Table 10. Measures to incentivize private sector participation in TVET

Stakeholder	Measures to incentivize private sector participation	Incentives	Importance
Private sector	1. Streamlined collaboration processes and regulations	Tax credits for companies that hire and train interns	1
	2. Stronger partnerships with TVET institutions	Facilitated insurance to cover potential property damage caused by interns	2
	3. Recognition and visibility for private sector contributions	Recognition programs for companies with outstanding internship programs	3
	4. Government incentives (e.g., tax breaks, grants)	Streamlined processes for hiring intern students	4
		Interest-free loans and modern machinery	5
Sector skills	1. Government incentives (e.g., tax breaks, grants)	Tax credits for companies that hire and train interns	1
	2. Recognition and visibility for private sector contributions	Facilitated insurance to cover potential property damage caused by interns	1
	3. Streamlined collaboration processes and regulations	Recognition programs in companies with outstanding internship programs	2
	4. Stronger partnerships with TVET institutions	Streamlined processes for hiring intern students	3
Policy level	1. Tax breaks and financial incentives for companies involved in TVET activities	N/A	N/A
	2. Capacity-building support for TVE institutions to better collaborate with the private sector		
	3. Capacity-building support for TVE institutions to better collaborate with the private sector		
	4. Government recognition and awards for companies actively engaged in TVET		
	Direct funding opportunities for private sector led TVET initiatives		
CSOs/DPs	1. Tax rebates for firms that support TVET initiatives	N/A	N/A

	2. Tax discounts for firms that employ fresh TVET graduates		
	3. Waivers of import duties on training equipment donated to TVET institutions		
	4. Recognition and awards for firms that support TVET initiatives		

Source: Survey responses.
Note: Under "Importance," 1 = most important and 5 = least important. N/A = not applicable (those categories of stakeholders did not rank these variables).

Although the government has embarked on initiatives to promote female participation in TVET, the focus on public TVIs and neglect of private and informal ones, the major training providers in Ghana, limits the reach of these initiatives. Stakeholders note particularly that gender participation in private TVIs and the informal sector underscore established societal norms and gender stereotypes. When asked if any specific government measures exist to ensure that the private sector promotes equal access and opportunities for female and male TVET students as well as PWDs regarding internships, workplace experiential learning, and employment, all policy-level stakeholders responded in the affirmative. They indicated, however, that the measure was limited to Workplace Experience Learning.

Although national laws and policies as well as government initiatives aim to ensure equal gender participation in all sectors including TVET, deliberate measures must exist to translate these policy-level objectives into actions at the TVET delivery level. Heads of TVIs in this study suggested TVET systems adaptation to respond to the needs of women and PWDs. Recommendations include offering flexible training arrangements, such as remote learning options, to accommodate the needs of girls, women, and PWDs, and enhancing the accessibility of TVET facilities to PWDs, such as through the provision of wheelchairs and assistive technologies to aid learning.

4.3. Guidelines for benchmarking national TVET systems

Other countries have taken the lead in leveraging the potential of TVET for industrialization and sustainable development. It is therefore prudent that Ghana benchmarks its national TVET systems against these forerunners by comparing delivery processes; identifying the factors promoting higher performance, differences in legislative requirements, resource levels, and demographic profile; and ultimately searching for and adopting best practices.

Although CSOs, DPs, and policy-level stakeholders indicate that no established guidelines exist for benchmarking its TVET systems, Ghana has adopted best practices such as the Formal Career Progression and Recognition of Prior Learning from countries like China and Germany. Another best practice under consideration is the dual system of training from Germany, where TVET students undergo a two-year on-campus training and spend their final year with industry.

According to policy-level actors, Ghana's My TVET campaign is benchmarked against TVET campaigns from Germany and Malaysia. Granted that no one-size-fits-all approach exists for TVET delivery, it is important that the MoE, while identifying and adopting best practices from TVET sectors around the world, establishes guidelines for benchmarking delivery, drawing from high-performing countries and adapting processes to address national TVET needs and aspirations.

Although CSOs and DPs interviewed in this study did not know of any existing benchmarking of TVET in Ghana from other countries, and are not directly involved in any advocacy efforts related to promoting or implementing benchmarking practices, their advocacies have rather focused on increased funding, efficiency, and accountability in TVET financing, inclusion, and gender equality. They further advocated for benchmarking Ghana's TVET systems on areas including adequate TVET funding, efficiency, and accountability in TVET financing, inclusion and gender equality, curriculum and skills development, instructor training and development, and tools and equipment.

4.4. Research areas to improve Ghana's TVET systems

Considering the gaps identified in Ghana's TVET delivery systems and the infant stage of research in the sector, key stakeholders participating in this study suggested research topics to improve Ghana's TVET system. These suggestions include sustainable sources of funding for TVET; exploring state-private partnership to strengthen TVET delivery in the formal and informal sectors; the importance of bridging the skills gap in all TVET-related fields of work to enhance productivity; how TVET can develop the capacity of youth, women, and marginalized populations (including immigrants); and incorporating digitalization into TVET to directly facilitate improvements in the national TVET system.

5. Recommendations

To transform Ghana's TVET system and enhance delivery to build a workforce with skills and competencies capable of participating effectively in the emerging digital and green economy, this report makes the following recommendations, first, for immediate consideration and, second, for strategic consideration.

5.1. Priority actions for immediate consideration

1. Provide adequate funding for TVET

- **Ensure sustained and innovative TVET funding.** TVET is more expensive than general education, and its inadequate funding has affected the quality of delivery. The government should ensure sustainable TVET funding by establishing a dedicated fund for TVET and should explore innovative resource mobilization alternatives to ensure adequate and sustained financing of TVET in Ghana.
- **Increase TVET's share of the education budget.** A trend analysis of education budget allocations indicates low budget allocations to TVET despite its cost-intensive nature. The MoE should increase TVET's share of the education budget and expenditure to 5 percent, to facilitate curriculum reforms and to equip TVIs by replacing obsolete tools and equipment while providing green and 4IR-compliant technologies for enhanced teaching and learning.
- **Ensure gender responsiveness in TVET budget allocation**. Current budget allocations to TVET do not make provisions for gender, so gender initiatives and interventions in TVET rely on donor funding for implementation. The Ministry of Finance should ensure gender responsiveness of the TVET budget, which should emanate from the MoE through the CTVET and GTVETS.

2. Strengthen TVET governance and management

The apparent conflict of roles between TVET policy and regulatory agencies, due to the overlapping of functions and similarities in mandate, negatively affects TVET governance and management. The MoE and its agencies, in collaboration with Parliament, should initiate efforts to review TVET regulatory and management legislation (for example, the Pre- Tertiary Education Act 2020 [Act 1049] and the Education Regulatory Bodies Act 1023) to streamline the mandates, establish distinct roles for CTVET and the TVET Directorate at the MoE, and consequently improve governance and management of the sector.

3. Ensure alignment of TVET policy with the National Development Plan

Ghana's current Strategic Plan for TVET Transformation (2023–2027) was developed to operationalize the TVET component of the ESP (2018–2030). The ESP (2018–2030) was also

developed as an offshoot of Ghana's National Development Plan–Vision (2057), which presupposes that the Strategic Plan for TVET aligns with that National Development Plan. However, the National Development Plan does not explicitly reference the Strategic Plan for TVET and vice versa. Ghana's ambitious vision of achieving economic transformation through TVET requires that its long-term development plan contain explicit plans for TVET. The National Development Planning Commission, in collaboration with all relevant TVET stakeholders, should initiate efforts to review the National Development Plan to ensure its alignment with Ghana's plan for TVET delivery.

4. Enhance private sector involvement in TVET

- **Enhance collaboration between the private sector and TVIs.** Private sector actors are key in the TVET ecosystem because of their role in both training and the labor market. They have the potential to provide opportunities for internship and are the main collaborators with TVIs on Workplace Experience Learning. This role makes establishing and maintaining close collaboration with the sector essential. The MoE should facilitate, promote, and strengthen collaboration between the private sector and TVIs to provide TVET students with Workplace Experience Learning in green and 4IR skills for all trades.
- **Leverage collaboration with the private sector to establish a skills forecasting mechanism.** The private sector and employers, by virtue of their position in industry, have access to information on industry's labor needs, making them a key partner with whom TVET management and regulatory bodies, and TVIs, must establish and maintain close and regular engagements for cross-learning and information sharing. Establishing a skills forecasting mechanism for Ghana will help to match skills training with industry needs.
- **Incentivize private sector involvement in the TVET sector.** A key obstacle hindering effective collaboration between the private sector and other TVET stakeholders, especially TVIs, and by extension their active involvement in TVET delivery is the lack of financial support or incentives from government. The government of Ghana, with the support of DPs, should incentivize and facilitate greater private sector participation in the TVET transformation agenda through interventions including tax breaks, tax waivers, grants, awards, and recognition.

5. Ensure green and 4IR responsiveness of TVET curricula and training

- **Mainstream the green concept in TVET curricula.** Climate change and its attendant impact on livelihoods across the globe have necessitated the move toward adopting more environmentally sustainable means of work, birthing the concept of green TVET. This concept is quite new in Ghana, however, and thus finds limited expression in TVET curricula, accounting for almost nonexistent awareness of the concept, especially at the training level. To address this challenge, CTVET should collaborate with the National Council for Curriculum and Assessment and the private sector to mainstream the green concept into all TVET curricula to ensure green responsiveness in terms of content, assessment, and mode of delivery.

- **Enable TVIs to deliver 4IR-relevant training.** The government of Ghana, with the help of the European Union and the German government, has been transforming TVET to respond to evolving labor market needs and align with the emerging economy (GIZ, 2023). Its efforts, however, face challenges including inadequate IT facilities, technology-mediated learning, and digital infrastructure; low capacity of TVIs in adapting training in line with changing skill needs; and a shortage of TVET teaching staff with required skills or qualifications. The government should support TVIs with 4IR-compliant facilities and equipment as well as TVET instructors with 4IR pedagogic competencies to equip TVET learners with 4IR skills.
- **Foster private sector and TVI collaborations for sharing of green and 4IR information and best practices.** The operations of industry actors expose them to innovations, trends, and best practices in the sector, making them the ideal source of knowledge transfers. Consequently, TVIs should collaborate with industry to share information on green innovations, 4IR skills, and best practices to integrate them into training and to inform TVET program design.
- **Build capacity of TVET teachers and instructors in green and 4IR skills training.** Skilled TVET instructors play an important part in a green and 4IR-compliant TVET delivery system, yet TVIs lack adequate instructors with the required skills or qualifications. The GTVETS should collaborate with the National Teaching Council and TVET teacher training institutions to create opportunities for pre- and in-service training of teachers to enhance their knowledge and pedagogical skills on green and 4IR skills development.
- **Introduce a licensing system for TVET facilitators.** Closely linked to teacher pedagogic capacity building is advocacy for the introduction of a licensing system to enhance professional recognition and open up international employment opportunities. Such a system would formalize teaching credentials, boost the credibility of TVET education, and provide assurance to employers of facilitators' qualifications and competence.

6. Enhance coordination among regulatory bodies

Despite the importance of coordination in ensuring synergy in the TVET delivery system, no formal operational framework exists for close collaboration between the GTVETS and CTVET, including the SSBs operating under the CTVET. This situation results in a conflict of roles between policy and regulatory bodies. The CTVET, GTVETS, and TVET Directorate at the MoE should establish mechanisms to streamline coordination processes and regulations to strengthen collaboration with other stakeholders.

7. Increase investment in digitalizing the TVET delivery system

Despite evidence of ongoing digitalization of Ghana's TVET systems, the generally low level of digitalization poses challenges including insufficient access to personal digital devices, high cost of data or internet, unreliable access to internet, and limited opportunities to practice and develop skills within the program. The government of Ghana should increase investments in this

area by expanding access to internet in TVIs that do not have it and ensuring reliable connectivity in TVIs already provided with internet. The government should ensure that the distribution of digital learning devices to senior high school students and teachers benefits TVET learners as well.

5.2. Recommendations for strategic consideration

1. Ensure effective integration of formal and informal TVET sectors

The detachment of the formal and informal TVET sectors perpetuates a fragmented informal TVET sector that lacks standardized training and certification, affecting the quality of training. The MoE, through the CTVET and GTVETS, should intensity ongoing efforts at integrating the formal and informal TVET sectors to streamline TVET delivery, assessment, evaluation, and certification to improve the quality of training.

2. Change negative perceptions about TVET

- **Sustain public education.** Despite progress, as seen in increased enrollment and participation, particularly for women, negative perceptions about TVET persist. The MoE and its TVET-focused agencies should collaborate with the National Commission for Civic Education to ramp up public awareness of the potentials of TVET, while the government continues its TVET transformation drive through modernization and provision of infrastructure, facilities, equipment, tools, and training materials.
- **Provide role models for TVET learners.** The negative stereotyping of TVET as a field for academically deficient learners contributes to the negative perception of TVET. TVIs should collaborate with the private sector to identify industry actors who excel in their trades or professions, and arrange interactions with TVET learners in similar fields to encourage them.
- **Use successful industry actors as TVET ambassadors.** Negative perceptions about TVET also stem from the lack of public awareness of individuals in the TVET industry who have led innovations and continue to affect the sector. It is important to highlight these individuals and present them to the public as examples of the possible achievements when pursuing a career in TVET. The MoE and its agencies should collaborate with the private sector to identify these actors and promote them as TVET ambassadors.
- **Strengthen career guidance in basic schools.** The GTVETS should collaborate with the Ghana Education Service to strengthen TVET career guidance support in basic schools. This guidance will ensure that basic school pupils grow up with positive perceptions about TVET before reaching secondary school. Designated TVET champions in basic schools could be used as the point of facilitation in each school.

3. Strengthen stakeholder collaboration

Ghana has a TVET policy and strategy in place, and achieving the objectives of the policy hinges greatly on the effectiveness of its implementation. Limited and ineffective collaboration between

TVET policy and regulatory bodies, however, results in a key gap in implementation. The MoE should establish a TVET Sector Working Group, similar to the Education Sector Working Group, that brings together leadership of the CTVET, GTVETS, TVET directorate at the MoE, DPs, and private sector converge to discuss policy implementation issues monthly, and that will report to the Minister of Education.

4. Ensure gender responsiveness and inclusion in TVET policy

Although Ghana's TVET policy recognizes the need for gender equality in enrollment, it does not have explicit objectives for promoting equal access and participation of both men and women in TVET. The MoE should lead a review of Ghana's TVET policy to ensure gender responsiveness in planning, budgeting, implementation, monitoring, and evaluation of TVET delivery. Similarly, it should explore a strategic and inclusive approach to increasing the participation of PWDs in TVET. Rather than blanket exclusions, value chains within various trades should be broken down to identify roles suited to different disability types and levels, enabling targeted capacity building and skill development. This approach promotes meaningful integration, shifts focus to ability-based placement, and enhances both the inclusivity and economic empowerment potential of TVET for PWDs.

5. Explore innovative strategies to transform TVET delivery

Considering the gaps identified in Ghana's TVET delivery systems and the infant stage of research in the sector, the government of Ghana, through its TVET policy and regulatory bodies, should collaborate with CSOs and academia to commission research exploring innovative ways to transform Ghana's TVET delivery systems.

Appendix A. Detailed Methodology

This study adopted a mixed approach to research, integrating both qualitative and quantitative methods to mitigate the weakness of each design with the strength of the other. It used this approach to gain detailed and contextualized insights provided by the qualitative data, while generalizing data from the quantitative component.

Sample. Overall, participants sampled for this study included 168 respondents consisting of heads of government agencies, heads of TVIs, TVET facilitators, MCPs, students from both public and private TVIs, apprentices, parents, CSOs, DPs, SSBs, and professional bodies (private sector actors).

Data collection technique. The study collected data through in-person one-on-one interviews and phone interviews (key informant interviews), and focus group discussions using semi-structured questionnaires (table 11 and table 12). It used Nvivo analysis software to thematically analyze the qualitative data and IBM SPSS software for the quantitative analysis.

Table 11. List of respondents sampled for the study

Stakeholder	Number of interviews	Institution(s)
Teachers	10 *(One from each TVI sampled)*	Tamale Technical Institute
		Kwadaso Agric College
		Opportunity Industrialization Centre
		Kumasi Technical Institute
		KITA College of Tropical Agriculture
		Design & Technology Institute
		Wintech Professional Institute
		Flair Catering
		Accra Technical Training Center
		2nd Image International Skills College
Students	90 *(10 focus groups of 9 students each from the 10 TVIs sampled)*	Tamale Technical Institute
		Kwadaso Agric College
		Opportunity Industrialization Centre
		Kumasi Technical Institute
		KITA College of Tropical Agriculture
		Design & Technology Institute
		Wintech Professional Institute
		Flair Catering
		Accra Technical Training Center
		2nd Image International Skills College
Sector Skills Bodies	5	Fashion and Garments Sector Skills Body
		Electrical and Electronics Sector Skills Body
		Catering, Tourism and Hospitality Sector Skills Body
		Construction Sector Skills Body
		Agric Sector Skills Body
Policy, regulatory, and management stakeholders	3	TVET Directorate of the Ministry of Education
		Commission for TVET
		Ghana TVET Service

MCPs	5	Fashion and Garments Sector
		Electrical and Electronics Sector
		Catering, Tourism and Hospitality Sector
		Construction Sector
		Agric Sector
Heads of TVIs	10	Principal, Accra Technical Training Centre
		Director, KITA College of Tropical Agriculture
		Principal, Wintech Professional Institute
		Director, Flair Catering
		Director, 2nd Image International Skills College
		Principal, Kwadaso Agric College
		Ag. Principal, Tamale Technical Institute
		Principal, Opportunity Industrialization Centre
		Principal, Kumasi Technical Institute
		Founder and Director, Design and Technology Institute
CSOs	3	Foundation for Security and Development in Africa
		GIZ
		CAMFED
Apprentices	5	Fashion and Garments Sector
		Electrical and Electronics Sector
		Catering, Tourism and Hospitality Sector
		Construction Sector
		Agric Sector
TVET sector trade associations	5	Peasant Farmers Association of Ghana
		Electrical Installers Association of Ghana
		Ghana Traditional Caterers Association
		Ghana Cooperative Fashion Designers Association
		Electronics and Electricals Technicians Association of Ghana
Parents	30 *(Snowball sampling technique used to reach parents through their wards in the TVIs; then convenience sampling to select parents for the interview)*	Accra Technical Training Centre
		KITA College of Tropical Agriculture
		Wintech Professional Institute
		Flair Catering
		2nd Image International Skills College
		Kwadaso Agric College
		Tamale Technical Institute
		Opportunity Industrialization Centre
		Kumasi Technical Institute
		Design and Technology Institute
TVET teacher training institution	1	Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development
Development Partner	1	National Project Coordinator, International Labour Organization
TOTAL	**168**	

Source: Field data.

Table 12. Stakeholder groups and institutions

Government stakeholders
1. Ministry of Education (TVET Directorate)
2. Ghana TVET Service
3. Commission for TVET
TVET institutions
4. Tamale Technical Institute
5. Kwadaso Agric College
6. Opportunity Industrialization Centre
7. Kumasi Technical Institute
8. KITA College of Tropical Agriculture
9. Design & Technology Institute
10. Wintech Professional Institute
11. Flair Catering
12. Accra Technical Training Center
13. 2nd Image International Skills College
Sector Skills Bodies
14. Fashion and Garments Sector Skills Body
15. Electrical and Electronics Sector Skills Body
16. Catering, Tourism and Hospitality Sector Skills Body
17. Construction Sector Skills Body
18. Agriculture Sector Skills Body
TVET trade associations/employers/private sector
19. Peasant Farmers Association of Ghana
20. Electrical Installers Association of Ghana
21. Ghana Traditional Caterers Association
22. Ghana Cooperative Fashion Designers Association
23. Electronics and Electricals Technicians Association of Ghana
Civil society partners
24. Foundation for Security and Development in Africa
25. GIZ
26. CAMFED
Development partners
27. International Labour Organization
TVET teacher training institution
28. Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development

Source: Field data.

TVET area selection criteria. To select the five TVET areas, fashion and garment, electrical and electronics, catering, tourism and hospitality, construction, and agriculture, the study used the following criteria: gender balance, popularity of program among learners, rate of program impact on the environment, and rate of technological advancement in the program area.

Sampling procedure. The study adopted different sampling procedures for the selection of the various categories of respondents for this study, as shown in the following breakdown:

- Purposive sampling of TVET institutions in both the private and public sectors based on their program(s) specialties in the five selected TVET areas
- Purposive sampling of the TVET teacher training institution based on its status as the premier public TVET teacher training institution in Ghana
- Snowball sampling technique of parents (learners assisted in contacting their parents) and convenience sampling of parents for interviews
- Convenience (accidental) sampling of students based on their proximity, availability, and willingness to participate
- Purposive sampling of MCPs, professional bodies (private sector), and SSBs based on their specialties in the five selected TVET areas
- Purposive selection of government agencies based on their roles in Ghana's TVET sector
- Purposive sampling of CSO and DP representatives based on their interest in Ghana's TVET sector.

References

AfDB (Africa Development Bank). (2016). Strategy for jobs for youth in Africa. https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/jobs-for-youth-in-africa/what-is-the-jobs-for-youth-in-africa-strategy.

AfDB (African Development). (2019a). Bridging the gender gap in STEM careers. AfDB Publications.

AfDB (African Development Bank). (2019b). Investing in technical and vocational skills for Africa's economic transformation. AfDB Publications.

AfDB (African Development Bank). (2020). The high demand for skilled labor in Africa: The case for TVET. African Development Bank Group.

Afeti, G. (2018). Technical and Vocational Education and Training (TVET) for Industrialization in Ghana. African Development Bank

Afeti, G., and Adubra, A. (2016). The role of technical and vocational education and training (TVET) in human development in Africa. African Union.

Africa Education Watch. (2020). Ghana free TVET report. https://africaeducationwatch.org/publication/ghana-free-tvet-report.

Africa Education Watch. (2021). Bridging the skills gap: Challenges and opportunities in Ghana's TVET sector. Accra: Africa Education Watch.

Africa Education Watch. (2023a). Green responsiveness of TVET teacher training institutions in Ghana policy brief. https://africaeducationwatch.org/publication/green-responsiveness-of-tvet-tti-in-ghana-policy-brief.

Africa Education Watch. (2023b). TVET reform in Ghana: Policy implications for skills development and industrial growth. Accra: Africa Education Watch.

Africa Education Watch. (2024). Education financing tracker (2017–2024). https://africaeducationwatch.org/publication/education-financing-tracker-2017-2024.

African Union. (2021). Digital transformation strategy for Africa. African Union Publications

Akyeampong, K., Djangmah, J., Oduro, A., Seidu, A., and Hunt, F. (2020). Improving technical and vocational education and training (TVET) in Ghana: Challenges and future directions. Brighton, UK: University of Sussex.

Alliance for Affordable Internet. (2014). Affordable internet in Ghana: The status quo and the path ahead. Washington, DC.

Anamuah-Mensah, J. (2022a). STEM education and workforce preparedness: Rethinking Ghana's TVET strategy for industrialization. Accra: National Science and Technology Council.

Anamuah-Mensah, J. (2022b). STEM education in Ghana: Challenges and prospects. Accra: Ghana Education Service.

AUC (African Union Commission). (2016). African Union continental TVET strategy.

AUDA-NEPAD (African Union Development Agency). (2021). Moving the needle on youth unemployment in Africa: From learning to employment. News, December 7, 2021. https://www.nepad.org/news/moving-needle-youth-unemployment-africa-learning-employment.

CTVET (Commission for Technical and Vocational Education and Training). (2021). Skills gap analysis and audit of seven sectors.

CTVET (Commission for Technical and Vocational Education and Training). (2023a). Skills gap analysis and audit, Ghana.

CTVET (Commission for Technical and Vocational Education and Training). (2023b). Strategic plan for TVET transformation (2023–2027).

CTVET (Commission for Technical and Vocational Education and Training). (2024). TVET competency-based training curricula, Ghana.

European Commission. (2021). Digitalisation in vocational education and training: A global perspective. Brussels.

European Commission. (2022). Digital education in vocational training: Lessons from Europe. European Commission.

GIZ. (2023). EU-Ghana pact for skills: Support for the transformation of TVET system (STTSG). https://www.giz2023-en-pact-for-skills-spport-to-the-transformation-of-tvet-system-in-ghana.

GSS (Ghana Statistical Service). (2023). Annual household income and expenditure survey quarter three labor bulletin.

ILO (International Labour Organization). (2020a). Gender equality in the future of work. ILO Publishing, Geneva.

ILO (International Labour Organization). (2020b). Skills for a resilient workforce: Preparing for the future of work. ILO Publishing, Geneva.

ILO (International Labour Organization). (2021a). A resource guide on sector skills bodies. ILO Publishing, Geneva.

ILO (International Labour Organization). (2021b). Digital skills in TVET: Preparing for the future of work. ILO Publishing, Geneva.

ILO (International Labour Organization). (2021c). Skills for a greener future: A global perspective. ILO Publishing, Geneva.

ILO (International Labour Organization). (2022). The future of work: Digital skills in TVET systems. ILO Publishing, Geneva.

Karkee, V., and O'Higgins, N. (2023). African youth face pressing challenges in transition from school to work. ILOSTAT, August 10, 2023. https://ilostat.ilo.org/blog/african-youth-face-pressing-challenges-in-the-transition-from-school-to-work/.

Langthaler, M., and Bazafkan, H. (2020). Digitalization, education and skills development in the Global South: An assessment of the debate with a focus on Sub-Saharan Africa. ÖFSE Briefing Paper.

MoE (Ministry of Education). (2022). Education sector medium term development plan (ESMTDP 2022–2025). Accra: MoE.

MoE (Ministry of Education). (2023). Technical and vocational education and training (TVET) policy framework and implementation plan. Accra, Ghana: MoE.

MoE (Ministry of Education). (2024). Infrastructure report (March 2024).

MoE (Ministry of Education) and CTVET (Commission for Technical and Vocational Education and Training). (2021). Ghana TVET report (2021). https://ctvet.gov.gh/wp-content/uploads/2022/09/GHANA-TVET-REPORT-2021SIGNED.pdf.

MoE (Ministry of Education) and CTVET (Commission for Technical and Vocational Education and Training). (2023). Ghana TVET report, second edition. https://ctvet.gov.gh/wp-content/uploads/2024/04/GHANA-TVET-REPORT-SECOND-EDITION-2023.pdf?utm_source=chatgpt.com.

MoELR (Ministry of Employment and Labour Relations). (2022). MoELR Ghana Green Jobs Strategy (2021–2025). Accra: MoELR.

MOEYS (Ministry of Education, Youth and Sports) and MMDE (Ministry of Manpower Development and Employment). (2004). TVET policy for Ghana – August 2004.

OECD (Organisation for Economic Co-operation and Development). (2020a). Strengthening vocational education and training for the future. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). (2020b). The future of TVET: Strengthening public-private partnerships. Paris

OECD (Organisation for Economic Co-operation and Development). (2021). Advancing gender equity in the digital economy. OECD Publishing.

Osei, G. M. (2004). The 1987 junior secondary-school reform in Ghana: Vocational or pre-vocational in nature? Int Rev Educ 50, 425–46.

South African Department of Higher Education and Training. (2021). TVET colleges: Quality assurance and teacher preparedness. South African Government.

UNDESA (United Nations Department of Economic and Social Affairs). SDG "Goal 4," https://sdgs.un.org/goals/goal4#targets_and_indicators."

UNECA (United Nations Economic Commission for Africa). (2019). African youths, an asset for their countries. UNECA Media Centre, December 2. https://archive.uneca.org/stories/african-youths-asset-their-countries.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2020a). Technical and vocational education and training (TVET) strategy.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2020b). Transforming education in Africa: An analysis of TVET opportunities and challenges. UNESCO Publishing.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2021a). Integrating STEM into TVET for sustainable development. UNESCO Publishing.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2021b). The gender divide in STEM: Challenges and opportunities. UNESCO Publishing.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2021c). Transforming TVET for sustainable development. UNESCO Publishing.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2022a). Digital transformation of TVET and skills development systems in Africa.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2022b). Enhancing TVET for economic growth: Global best practices. Paris

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2022c). Greening technical and vocational education and training: A pathway to sustainable development. Paris.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2022d). Governance and coordination of TVET systems in Africa: Lessons from Kenya and Ghana. Paris.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2022e). Transforming technical and vocational education and training for successful and just transitions: UNESCO strategy 2022–2029.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2022f). Women in science, technology, and innovation. UNESCO Publishing.

UNESCO (United Nations Educational, Scientific and Cultural Organization). 2023. TVET for the digital economy: Strategies for emerging markets. Paris.

United Nations. (2015). UN projects world population to reach 8.5 billion by 2030, driven by growth in developing countries. Sustainable Development (blog), July 29. https://www.un.org/sustainabledevelopment/blog/2015/07/un-projects-world-population-to-reach-8-5-billion-by-2030-driven-by-growth-in-developing-countries/.

World Bank. (2019). Skills development and employment strategies for emerging economies. Washington, D.C

World Bank. (2021). Financing technical and vocational education and training in Africa. World Bank, Washington, DC.

World Bank. (2022a). Breaking barriers: Women in STEM education and employment. World Bank Publishing.

World Bank. (2022b). Education sector review: Enhancing STEM education in developing economies. Washington, DC: World Bank

World Bank. (2022c). Education sector review: Enhancing TVET systems. World Bank Publishing.

World Bank. (2022d). Ghana skills and jobs report: Enhancing technical and vocational education for sustainable development. Washington, D.C.: World Bank.

World Economic Forum. (2022). The role of digital skills in the future of employment. WEF Reports.

World Economic Forum. (2023). How Africa's youth will drive global growth. https://www.weforum.org/stories/2023/08/africa-youth-global-growth-digital-economy/

ACET African Center for Economic Transformation

AFRICA EDUCATION WATCH

In partnership with mastercard foundation

Building TVET Systems for Economic Transformation in Africa:

GHANA COUNTRY REPORT

COUNTRY REPORT

The Ghana Country Report is part of the Building TVET Systems for Economic Transformation in Africa study, jointly implemented by ACET and think tanks in six African countries: Côte d'Ivoire, Ethiopia, Ghana, Niger, Rwanda, and Uganda. The study builds on earlier work by ACET in partnership with the Mastercard Foundation on secondary education in Africa and focuses on how national TVET systems can better respond to changing labor market demands and drive inclusive economic transformation. The objective of the study is to identify and map the key challenges facing the TVET sector across the six countries and to highlight promising practices and actionable policy recommendations. The country reports informed the study's synthesis report, available to read and download at acetforafrica.org/TVET.

Launched with support from YOTA Youth Opportunity & Transformation in Africa

AN AGENCY UNDER THE MINISTRY OF EDUCATION REPUBLIC OF GHANA