

Impact of TVET Programmes on TVET Graduate Outcomes in Ghana

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Abstract

The efforts made to promote Technical Vocational Education and Training (TVET) demonstrate the importance Ghanaian authorities attach to it. For some time now, TVET has been restructured, and new policies have been formulated, all to ensure elevation in graduate outcomes. However, there is a lack of research, especially regarding factors associated with such outcomes. Based on relevant variables derived from the Human Capital Theory and Employability Theory, this study examines the extent to which TVET programmes meet the expected graduate outcomes in Ghana. The study adopted a correlational research design and used a survey of key stakeholders in the TVET sector in the Greater Accra and Northern Regions of Ghana. Data were collected from 250 respondents using stratified random sampling. Using Partial Least Squares Structural Equation Modelling (PLS-SEM), the findings indicate that institutional factors, such as adequate and well-trained TVET staff, sufficient funding, effective financial management, and strong partnerships with industry and other stakeholders, were positively associated with graduate outcomes. These outcomes include graduates' employability, job readiness, confidence, entrepreneurial capability, and career sustainability. Although programme factors, such as industry-aligned curricula, effective instruction methods, knowledgeable trainers, and resources for hands-on learning, were positively associated with graduate outcomes, the relationship was not statistically significant. Moreover, government and stakeholder support through adequate funding, positive policies, and engagement with key stakeholders significantly enhances graduate outcomes. Additionally, the study found that government and stakeholder support positively moderate the relationship between institutional and programme factors and graduate outcomes. The results highlight the critical role of institutional factors, programme structure, and external support in improving TVET graduate outcomes in Ghana. Among other things, it was recommended that the Ghana government create curricula aligned with industry, develop more attractive and supportive ecosystems to boost instructors'

morale, and strengthen stakeholder collaboration. The government could do these through policy formulations.

Key words: TVET; TVET programmes; unemployment; government; graduate outcomes

Background to the study

Globally, unemployment remains a critical concern for development partners, governments, and scholars due to its significant socio-economic and political implications (Fenta, 2024; Demeke, 2022; Fergusson, 2021). The International Labour Organisation (ILO, 2024) projects a global unemployment rate of 4.9% in 2024, a slight improvement from 6.4% in 2023. However, the scale of the problem remains significant: approximately 402 million individuals aged 15 and older are seeking employment, of whom 182 million are officially unemployed (ILO, 2024). Youth unemployment is particularly prevalent, especially in developing countries where economic opportunities are limited. Scholars such as Byrne and Strobl (2004), Fenta (2024), and Hailu Demeke (2022) note that unemployment rates are disproportionately higher in developing economies due to mismatches between job supply and demand.

Unemployment is not solely a numerical issue but also a matter of disparity (Blustein et al., 2020; Dubra, 2016). The ILO (2024) reports a significant gender gap in employment: 69.2% of men aged 15 and older are employed, compared to only 45.6% of women in the same age group. Fergusson (2021) concurs and indicates that the gender gap is largely driven by societal expectations regarding family roles, particularly marriage and parenthood, which disproportionately affect women's participation in the labour market. The gender gap in employment reflects not just market dynamics but also entrenched social norms that restrict women's economic empowerment (Lahtinen, Sirniö, & Martikainen, 2020)

According to Lahtinen et al. (2020), women face structural barriers to full employment in many developing regions, including limited access to education, vocational training, and job opportunities. These barriers hinder women's career advancement and reinforce cycles of poverty and economic dependence (Santos Silva & Klasen, 2021;

Shellock et al., 2022; Bermúdez et al., 2023). Santos et al. (2021) argued that addressing gender inequality in employment requires policies that ensure equal access to education and training, provide support for working mothers, and challenge societal norms that limit women's workforce participation.

While global unemployment is expected to decline from 6.4% in 2023 to 6.3% in 2024 (Horne, 2023; ILO, 2024), unemployment remains a pressing challenge in Africa, particularly in Ghana. Ghana's unemployment rate rose from 13.7% in the first three quarters of 2022 to 14.7% in the same period of 2023, with approximately 1.4 million young people aged 15 to 35 unemployed in 2023, compared to 1.2 million in 2022 (Ghana Statistical Service, 2024; Yirenkyi et al., 2023). These figures underscore the growing challenges young people face in securing employment despite ongoing economic growth.

In Ghana, the youth unemployment crisis is exacerbated by a skills mismatch between the education system and labour market demands (Habiyaremye et al., 2022; Yirenkyi et al., 2023). Many graduates lack the practical and technical skills necessary to thrive in a rapidly evolving economy, particularly in rural areas where educational and vocational training opportunities are insufficient (Adams et al., 2024; McGrath, 2022). A key solution to youth unemployment is the expansion and strengthening of Technical and Vocational Education and Training (TVET) programmes (Habiyaremye et al., 2022; McGrath & Yamada, 2023). TVET is globally recognised for equipping young people with practical skills that enhance employability and economic contribution. By focusing on areas such as manufacturing, construction, and technology, TVET programmes prepare students for the demands of modern industry, helping reduce poverty and promote social stability (Paryono, 2017; Bekana, 2020; Palmer, 2019; Wang, 2024).

Empirical literature consistently positions TVET as a critical mechanism for addressing youth unemployment by aligning skills development with labour market demands. Across both global and African contexts, studies converge on the argument that TVET enhances employability through practical, industry-relevant competencies, particularly in sectors such as construction, manufacturing, and technology (Paryono, 2017; Bekana, 2020; Palmer, 2019; Wang, 2024). However, this positive relationship is conditional rather than automatic. Evidence from developing economies suggests that the effectiveness of TVET is mediated by the extent to which

training systems are responsive to labour market dynamics and supported by coherent policy frameworks (Habiyaremye et al., 2022; McGrath & Yamada, 2023). Thus, while TVET is widely acknowledged as a solution to skills mismatches, its impact varies significantly depending on systemic quality and implementation fidelity.

Within the Ghanaian context, recent policy interventions, including the Free TVET policy and targeted initiatives such as the Ghana TVET Voucher Project, have significantly expanded access and enrolment, indicating strong governmental commitment to the sector (TVET Commission, 2023). Nonetheless, empirical studies reveal a persistent disconnect between increased participation and improved graduate outcomes. Specifically, while access has improved quantitatively, qualitative dimensions such as training relevance, practical exposure, and transition-to-work support remain inconsistent. This suggests that expansion without corresponding quality enhancement may yield limited labour market returns, reinforcing concerns in the broader literature about the “access–quality paradox” in vocational education systems.

Further synthesis of Ghana-focused studies highlights recurring structural and institutional constraints that undermine TVET effectiveness. Evidence consistently identifies outdated equipment, inadequate infrastructure, limited industry collaboration, and weak pedagogical approaches as critical barriers (Gyimah, 2020; Kissi et al., 2020; Darteh, 2021; Otchi, 2023). Importantly, these challenges are not isolated; they interact to produce systemic inefficiencies that weaken skill acquisition and reduce graduates’ competitiveness in the labour market. This aligns with international findings that TVET outcomes are shaped by the interplay between institutional capacity, curriculum relevance, and stakeholder engagement rather than by any single factor (Mack & White, 2019; Mensa, 2023). Consequently, the literature points to a need for integrated reforms that simultaneously address infrastructure, pedagogy, and governance, rather than fragmented interventions.

In light of these challenges, comprehensive reforms in TVET implementation are urgently needed in Ghana. To achieve the desired outcomes of skills development, employability, and entrepreneurship, systemic and institutional barriers must be addressed. Government policies should prioritise the standardisation of TVET curricula to

ensure training meets industry standards across all regions. Furthermore, investments in infrastructure and teaching materials are critical to providing students with the practical experience needed for success in the workforce. Equipping teachers with up-to-date knowledge and teaching methods, particularly in emerging fields such as technology and engineering, is also essential. Continuous professional development programmes for TVET educators are necessary to ensure high-quality instruction. Without such reforms, the disconnect between education and labour market demands will continue to undermine TVET's effectiveness in combating unemployment.

This study examines the extent to which institutional and program-related factors influence graduate outcomes in TVET institutions, with particular attention to employability, job-readiness, confidence, and entrepreneurial capabilities. It also aims to assess the role of government and stakeholder support in enhancing graduate outcomes and to determine whether such support moderates the relationships between institutional factors, programme factors, and graduate outcomes. By identifying the key determinants of improved graduate performance and labour market relevance, the study provides empirical evidence to inform policy formulation, institutional strengthening, curriculum improvement, and stakeholder engagement strategies.

Statement of the Problem

Despite the growing recognition of TVET as a strategic pathway for addressing youth unemployment and skills shortages in Ghana, graduate outcomes remain a persistent concern. Many TVET graduates continue to face difficulties in securing employment, transitioning effectively into the labour market, and developing sustainable entrepreneurial ventures. Existing literature, such as Gyimah (2020), Ghana Education Service (2020), Kissi et al. (2020), and Mohammed (2020), suggest that challenges related to institutional capacity, programme design, and limited support from government and stakeholders undermine the effectiveness of TVET delivery. However, empirical evidence on how these and many other factors individually and interactively influence graduate outcomes in the Ghanaian context remains limited. In particular, there is insufficient understanding of the extent to which institutional factors, programme-related factors, and

government and stakeholder support contribute to employability, job readiness, and entrepreneurial capabilities among TVET graduates. This gap constrains the formulation of evidence-based policy and the effective allocation of resources within the TVET sector. Addressing this problem is critical to strengthening TVET's relevance and impact in Ghana, enhancing graduate employability, and supporting national development objectives.

Objectives

The general objective of the study was to examine the extent to which TVET programmes influence graduate outcomes in Ghana. The specific objectives that guided the study were as follows.

1. To assess the extent to which institutional factors (e.g., infrastructure, funding, staff quality, partnerships) influence TVET graduate outcomes.
2. To evaluate the extent to which programme-related factors (e.g., curriculum alignment, instructional methods, training resources) affect graduate outcomes.
3. To examine the role of government and stakeholder support in enhancing TVET graduate outcomes.
4. To determine whether government and stakeholder support moderates the relationship between:
 - Institutional factors and graduate outcomes
 - Programme factors and graduate outcomes
5. To identify key determinants of graduate outcomes, including employability, job readiness, confidence, entrepreneurial capability, and career sustainability.

Research Questions

We sought to answer the following research questions.

1. To what extent do institutional factors influence TVET graduate outcomes in Ghana?
2. To what extent do programme factors influence TVET graduate outcomes in Ghana?
3. To what extent does government and stakeholder support directly influence TVET graduate outcomes in Ghana?
4. To what extent does 'government and stakeholder support' moderate the relationship between institutional factors and graduate outcomes?

5. To what extent does government and stakeholder support moderate the relationship between programme factors and graduate outcomes?
6. How do TVET programmes contribute to specific dimensions of graduate outcomes, namely:
 - employability
 - job readiness
 - confidence
 - entrepreneurial capability
 - career sustainability?

Theoretical Framework

This study integrates Human Capital Theory, Systems Theory, Stakeholder Theory, and Employability Theory to explain how institutional and programme factors influence TVET graduate outcomes in Ghana, and how these relationships are strengthened through government and stakeholder support.

Human Capital Theory (Schultz, 1961; Becker, 1964) provides the foundational logic for linking *institutional factors* and *programme factors* to *graduate outcomes*. The theory posits that investments in education and training enhance individuals' productivity and labour market value. In this study, institutional factors such as infrastructure, funding, staff quality, and industry partnerships represent structural investments, while programme factors such as curriculum alignment, instructional methods, trainer competence, and hands-on learning represent direct mechanisms for skill formation. Together, these investments are expected to translate into improved graduate outcomes, including employability, job readiness, confidence, entrepreneurial capability, and career sustainability. Thus, Human Capital Theory explains the direct effects of both institutional and programme factors on graduate outcomes.

Systems Theory (Bertalanffy, 1968; Checkland, 1999) complements this perspective by conceptualising TVET institutions as dynamic systems in which multiple inputs are transformed into outputs through internal processes. Within this framework, institutional factors function as *system-level inputs* (e.g., resources, governance structures), while programme factors represent *process variables* (e.g., teaching methods, curriculum delivery). Graduate outcomes are the *outputs* of this system. Systems Theory, therefore, clarifies that the relationship

between institutional factors and graduate outcomes is not merely direct but is also partially mediated through programme factors, as the effectiveness of institutional investments depends on how they are operationalised within training programmes.

Employability Theory (Hillage & Pollard, 1998; Yorke, 2006; Jackson, 2016) further specifies the nature of the dependent variable by framing graduate outcomes as multidimensional. Rather than limiting outcomes to employment status, the theory conceptualises employability as a composite of skills, adaptability, self-efficacy, and entrepreneurial orientation. In this study, employability theory informs the operationalisation of the *graduate outcomes construct*, which includes employability, job readiness, confidence, entrepreneurial capability, and career sustainability. This theoretical lens ensures that the study captures both immediate labour market entry and long-term career development capacities.

Stakeholder Theory (Freeman, 1984; Donaldson & Preston, 1995) introduces the role of external actors in shaping the effectiveness of TVET systems. Government agencies, industry partners, employers, and other stakeholders provide critical resources, policy direction, and labour market linkages. In this study, these contributions are conceptualised as *government and stakeholder support*, which functions as a moderating variable. Specifically, stakeholder support strengthens the relationship between (a) institutional factors and graduate outcomes and (b) programme factors and graduate outcomes by enhancing resource availability, improving policy alignment, and facilitating industry engagement. This implies that even well-designed institutional and programme structures may yield suboptimal outcomes in the absence of strong stakeholder involvement.

Drawing these perspectives together, the conceptual framework proposes three key relationships. First, institutional factors have a direct positive effect on graduate outcomes. Second, programme factors also directly influence graduate outcomes and serve as a pathway through which institutional factors exert their effects. Third, government and stakeholder support moderates these relationships, amplifying the impact of both institutional and programme factors on graduate outcomes. This integrated framework underscores that improved TVET outcomes are not the result of isolated interventions but emerge from the interaction between structural capacity, programme quality, and

external support systems. The conceptual framework has been illustrated in Figure 1.

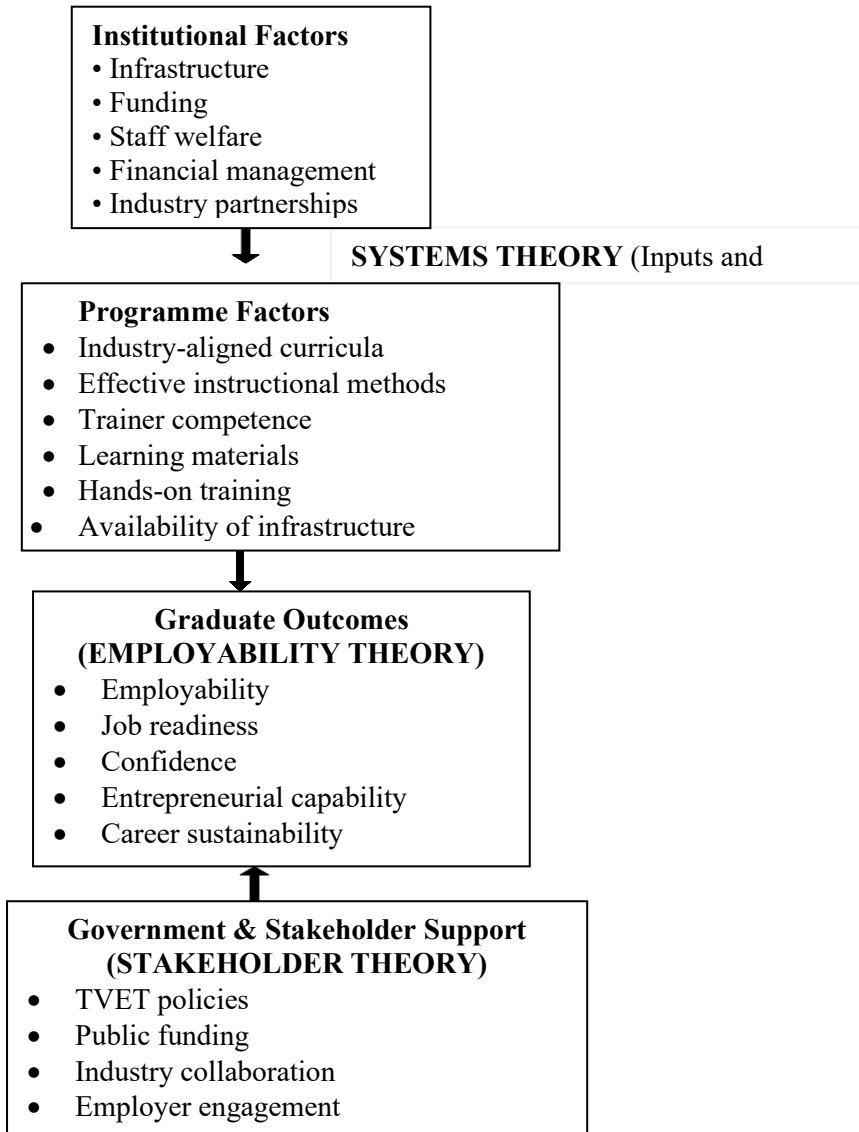


Figure 1: Impact of Institutional/Programme Factors and Government Support on Graduate Outcomes

Method

The study adopted a correlational research design within the positivist paradigm, using a quantitative survey approach. The correlational design was considered appropriate because the study sought to examine the relationships among student, institutional, and programme factors and the outcomes of TVET graduates without manipulating the variables. The positivist philosophy guided the study through its emphasis on objective measurement, scientific inquiry, and statistical analysis of observable phenomena. Consistent with this philosophical orientation, quantitative data were collected through structured questionnaires and analysed statistically to generate reliable and generalisable findings on the TVET system in Ghana. The survey method was also considered suitable because it enabled efficient data collection from a relatively large population within a limited time and at a relatively low cost. In addition, the flexibility of both online and face-to-face administration improved accessibility and response rates.

The study population comprised TVET graduates, TVET teachers, and Ghana TVET Service personnel in the Greater Accra and Northern Regions of Ghana. The two regions were purposively selected because they represent contrasting socioeconomic conditions, thereby providing a broader perspective on Ghana's TVET system. The Ghana TVET Service is currently responsible for managing all secondary-level Technical and Vocational schools in Ghana. In this study, TVET schools encompass the vocational and technical institutes organised at the pre-tertiary level of education. The lists of graduates, teachers, and Ghana TVET Service personnel, which were obtained from the respective Ghana TVET Service Regional Offices in the two regions, served as the sampling frame for the study. At the time of the study, the accessible population consisted of 540 graduates whose locations were known to the TVET Service Officers, 160 teachers, and 70 Ghana TVET Service personnel.

The required sample size was determined using the Raosoft Online Sample Size Calculator. With a 95% confidence level, a 6.2% margin of error, and an estimated response distribution of 52%, the minimum sample size should be 250 respondents. Stratified sampling was first used to group participants into graduates, teachers, and Ghana TVET Service personnel to ensure proportional representation of each subgroup in the sample. To account for potential low response rates, the selected sample comprised 210 graduates, 63 teachers, and 33 Ghana

TVET Service personnel. Systematic sampling was employed within each stratum to select respondents from lists obtained from the Ghana TVET Service Regional Offices. This sampling procedure enhanced the representativeness and generalisability of the findings by ensuring that all relevant participant categories were adequately represented in the study. The average response rate was 77%, compared with the estimated 52%. Table 1 presents a breakdown of each population stratum and the selected samples.

Table 1: Breakdown of Accessible Population, Samples and Response Rates

Group	Accessible Population	Sampled	Percentage Sampled	Those who Responded
Teachers	160	63	39	51 (81%)
TVET Officials	70	33	47	24 (70%)
Graduates	540	210	39	170 (81%)

This study used two main methods for collecting primary data. In other words, the primary data were collected via online and in-person methods to maximise response rates and accessibility (Stern et al., 2014). The online mode provided a convenient and efficient way to gather responses from participants, enabling broader geographical coverage and increased participation. The in-person mode supported those who could not use the online survey. They complemented the efforts to achieve a high response rate, especially for those with limited internet access or who preferred in-person contact. The dual-mode strategy ensured the study captured a wide range of perspectives, thereby enhancing the richness and reliability of the collected data.

Several ethical considerations were observed throughout the study to ensure the integrity of the research process and enhance the credibility of the findings. Prior to data collection, the research proposal was reviewed by senior university faculty members, who provided expert guidance on potential ethical issues and appropriate safeguards. Their feedback informed the refinement of the study procedures and strengthened adherence to accepted ethical standards. Furthermore, informed consent was obtained from all participants, and measures were implemented to ensure their privacy, anonymity, and confidentiality throughout the research process.

Although several validated and standardised instruments exist for assessing factors associated with successful educational programmes, the present study required items that specifically measured graduate employability and TVET delivery outcomes. Consequently, items were identified and adapted from the UNESCO-UNEVOC TVET Toolkits and the Graduate Employability Instrument (GEI) following a thorough review of their relevance to the constructs specified in the study's theoretical framework. Additionally, the researchers developed several items to assess Government and Stakeholder Support, as this construct was not adequately represented in existing instruments. In total, the questionnaire measured five variables each under the Institutional Factors, Programme Factors, and Employability Factors constructs, and four variables under the Government and Stakeholder Support construct. The questionnaire had 5 sections. In the biodata section, respondents provided their answers by filling in the blanks. However, in the other four sections, respondents had to select a point corresponding to their choice on five-point Likert scales.

The study also conducted reliability and validity checks. The results have been presented in Table 2. The reliability tests based on Cronbach's Alpha and Dijkstra-Henseler's rhoA indicate that all constructs in this study have strong internal consistency, with values exceeding the minimum acceptance threshold of 0.7 (Carmines & Zeller, 2013).

Table 2: Reliability and Validity Analysis

Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Government Support and Stakeholders Support	0.891	0.940	0.920	0.743
Graduate Outcomes	0.919	0.921	0.937	0.713
Institutional Factors	0.929	0.947	0.941	0.696
Programme factors	0.945	0.962	0.951	0.619

Further, the composite reliability, with a minimum acceptable threshold of 0.7, was also met for all variables considered (Chua, 2023). In terms of validity, the study also relied on the Average Variance

Explained (AVE), with values running between 0.619 to 0.743. The validity was deemed acceptable because the AVEs exceeded the minimum threshold of 0.5 (Chua, 2023). Validity results show that all the constructs accounted for more than 50% of the variance in their indicators.

Assessment of the Structural Model

The coefficient of determination (R^2) was used to assess the explanatory power of the structural model. R^2 indicates the proportion of variance in an endogenous construct that is explained by its predictor variables. According to Hair et al. (2022), R^2 values of 0.25, 0.50, and 0.75 may be interpreted as weak, moderate, and substantial, respectively. As shown in Table 3, the model yielded an R^2 of 0.631 and an adjusted R^2 of 0.623 for Graduate Outcomes. This indicates that the predictor variables accounted for 63.1% of the variation in Graduate Outcomes. The small difference between the two values suggests that the model's explanatory power remained relatively stable after adjustment.

Table 3: Coefficient of determination (R^2)

	R^2	R^2 Adjusted
Graduate Outcomes	0.631	0.623

Cohen's (1988) guidelines stipulate that f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. The results of this study showed that Government Support and Stakeholder Support ($f^2 = 0.158$) and the interaction between Institutional Factors and Government Support and Stakeholder Support ($f^2 = 0.156$) exerted moderate effects on Graduate Outcomes. Institutional Factors ($f^2 = 0.097$), Program Factors ($f^2 = 0.094$), and the interaction between Program Factors and Government Support and Stakeholder Support ($f^2 = 0.141$) exhibited small effects. Table 4 provides a bird's-eye view of the effect sizes. These results suggest that overall, Government Support and Stakeholder Support contribute to Graduate Outcomes both directly and through their interaction with Institutional Factors, while Institutional Factors and Program Factors contribute to a lesser extent.

Table 4: An assessment of the relative contribution of each construct

f Square	Graduate Outcomes
Government Support and Stakeholders Support	0.158
Institutional Factors	0.097
Institutional Factors X Government Support and Stakeholders Support	0.156
Program Factors X Government Support and Stakeholders Support	0.141
Program Factors	0.094

The model's predictive relevance was evaluated using Stone–Geisser's Q^2 statistic obtained via the blindfolding procedure. A Q^2 value of 0.26 indicated that the model has a medium predictive relevance for a particular endogenous construct. The Q^2 value of 0.640 for Graduate Outcomes demonstrates that the model possesses adequate predictive capability and can accurately predict observations not used in model estimation. This finding suggests that the proposed framework has practical utility in explaining and forecasting TVET graduate outcomes.

Discriminant validity was further assessed using the Heterotrait–Monotrait ratio of correlations (HTMT), which is considered a more rigorous criterion than traditional approaches such as the Fornell–Larcker criterion. According to Henseler et al. (2015), HTMT values below 0.85 (or, more conservatively, 0.90) indicate adequate discriminant validity. The HTMT values ranged from 0.666 to 0.792 as shown in Table 5. Since all values were below the recommended threshold of 0.85, the results indicate adequate discriminant validity among the constructs. This suggests that Government Support and Stakeholder Support, Institutional Factors, Program Factors, and Graduate Outcomes represent conceptually distinct constructs.

Table 5: The Heterotrait–Monotrait Ratio of the Correlations

Constructs	Government Support and Stakeholders Support	Graduate Outcomes	Institutional Factors	Program Factors
Government Support and Stakeholders Support				
Graduate Outcomes	0.784			
Institutional Factors	0.713	0.710		
Program Factors	0.792	0.666	0.729	

The Fornell-Larcker Criterion results in Table 6 also confirm discriminant validity, as the square root of each construct's AVE is greater than its inter-construct correlations. Based on the reliability and validity results, all constructs (Government Support and Stakeholder Support, Graduate Outcomes, Institutional Factors, and Programme factors) were reliable and consistent.

Table 6: Discriminant Validity Results

Fornell-Larcker Criterion				
1. Government Support and Stakeholder Support	0.862			
2. Graduate Outcomes	0.770	0.844		
3. Institutional Factors	0.871	0.725	0.834	
4. Programme factors	0.930	0.712	0.757	0.787

Figure 2 presents the results obtained from the path analysis. It visually displays the SEM model's coefficients and their corresponding reliability scores, thereby justifying its reliability and validity.

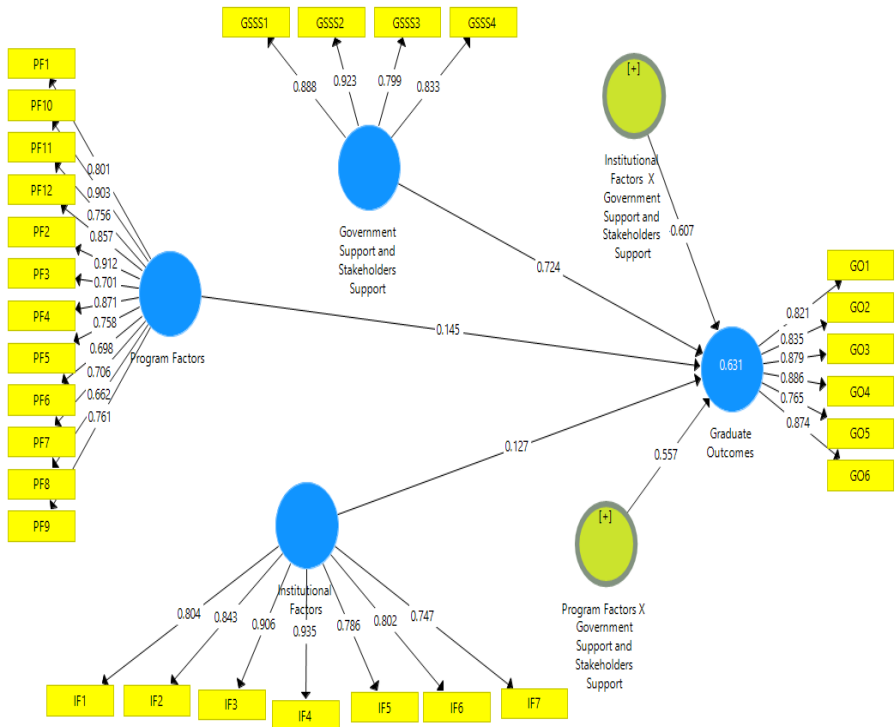


Figure 2: Path Results

Profile Analysis of Respondents

Of the 250 respondents, 68% were TVET graduates, approximately 20% were TVET teachers, and approximately 10% were Ghana TVET Service staff affiliated with the TVET program. Their ages ranged from 15 to 60. The rest of the respondents' profile is shown in Table 7.

Table 7: Profile Analysis of the Respondents

Variable	Level	Number of Respondents	Percent (%)
Role within the TVET programme	TVET Teachers	51	20.4
	TVET Graduates	170	68.0
	Ghana TVET Service Staff	24	9.6
Age	15 to 25	72	28.8
	26 to 35	21	8.4

	36 to 45	94	37.6
	46 to 60	63	25.2
Gender	Male	187	74.8
	Female	63	25.2
Highest educational qualification	Certificate	30	12
	Diploma	126	50.4
	Bachelor's Degree	52	20.8
	Master's Degree	42	16.8
Years of been involved in education or related fields	Less than 1 year	42	16.8
	1-3 years	30	12
	4-6 years	31	12.4
	7-10 years	42	16.8
	More than 10 years	105	42
Geographical location	Urban	208	83.2
	Rural	42	16.8
Years of being associated with the TVET program	Less than 6 months	42	16.8
	6 months - 1 year	72	28.8
	1-2 years	136	54.4
	More than 2 years	0	0
Have pursued any professional development courses related to TVET	Yes	177	70.8
	No	73	29.2
Primary reason for engaging with the TVET program	Career advancement	42	16.8
	Skill development	135	54

	Interest in education	73	29.2
Sufficient access to the resources required for effective participation in TVET	Yes	0	0
	No	94	37.6
	Partially	156	62.4

Results

Table 8 presents the results obtained from the Partial Least Squares Structural Equation Modelling (PLS-SEM). The table presents the path coefficients and related statistical indicators for the various factors and graduate outcomes shown in Figure 2.

Table 8: PLS-SEM results

Path	Original Sample (O)	Sample Mean (M)	SD	T Statistics (O/STDEV)	P Values
Government Support and Stakeholders Support -> Graduate Outcomes	0.724	0.721	0.155	4.676	0.000
Institutional Factors -> Graduate Outcomes	0.127	0.121	0.054	2.340	0.020
Programme factors -> Graduate Outcomes	0.145	0.158	0.166	0.869	0.385
Institutional Factors X Government Support and Stakeholders Support -> Graduate Outcomes	0.607	0.620	0.159	3.823	0.000
Programme factors X Government Support and Stakeholders Support -> Graduate Outcomes	0.557	0.570	0.212	2.628	0.009

From Table 8, a unit change in institutional factors like (adequate infrastructure, well-trained TVET instructors, adequate funding, transparent, effective financial management and strong partnerships with stakeholders and industry) had positive association with Graduate Outcomes (how graduates quickly secure employment, well prepared towards job market, feel confident in their abilities, receive support for entrepreneurship and exhibit strong entrepreneurial capabilities) by 0.127 units. In other words ($B = 0.127$, $t\text{-value} = 2.340$, $p\text{-value} < 0.05$). The relationship between institutional factors and graduate outcome is significantly positive at 5% level of significance.

Similarly, a unit change in programme factors like (industry alignment and well-structured curriculum, effective instructional methods, knowledgeable trainers, comprehensive and up-to-date training materials, adaptable teaching methods and styles and proper resources for hands-on learning experiences is positively associated with graduate outcomes by 0.145. The results, as presented in Table 8, revealed a positive but not statistically significant relationship.

Findings from Table 8 reveals that a unit change in government and stakeholders' support in terms of (adequate funds for TVET programmes, effective positive policies, and key stakeholders' support) increases the chances of graduate outcomes by 0.724. This is justified by ($B=0.724$, $t\text{-value} = 4.676$, $p\text{-value} < 0.05$).

In terms of the moderation analysis, Government Support and Stakeholder Support moderate the relationship between Institutional Factors and Graduate Outcomes positively by 0.607. Similarly, Government Support and Stakeholders Support also moderate the relationship between programme factors and graduate outcomes by a unit change of 0.557.

Discussion and Policy Implications of Findings

The findings of this study are largely consistent with previous research in the TVET literature both in the Ghanaian and global contexts. The significant positive influence of institutional factors on graduate outcomes supports earlier studies that identified adequate infrastructure, funding, competent instructors, and strong industry linkages as critical determinants of employability and workforce readiness among TVET graduates (Kissi et al., 2020; Mack & White, 2019; UNESCO-UNEVOC, 2013). Similarly, the strong contribution of government and stakeholder support aligns with the stakeholder

perspective advanced by McGrath and Yamada (2023) and Habiyaemye et al. (2022), who argued that effective policy frameworks, public investment, and industry engagement enhance the relevance and effectiveness of vocational training systems.

However, the finding that programme factors exhibited a positive but statistically insignificant relationship with graduate outcomes contrasts with studies that have reported significant effects of curriculum relevance and instructional quality on employability outcomes (Paryono, 2017; Shi & Bangpan, 2022). This discrepancy may reflect persistent implementation challenges within the Ghanaian TVET system, including limitations in training resources, practical exposure opportunities, and curriculum responsiveness to labour market needs. Overall, the findings reinforce the growing consensus that improving graduate outcomes requires not only well-designed programmes but also strong institutional capacity and sustained support from government and industry stakeholders.

The findings indicate that institutional factors, including adequate infrastructure, well-trained TVET instructors, sufficient funding, transparent governance, effective financial management, and robust partnerships with industry stakeholders, positively influence graduate outcomes. These outcomes include enhanced employment opportunities, job-market readiness, increased self-efficacy, entrepreneurial support, and the development of strong entrepreneurial capabilities (Psacharopoulos & Patrinos, 2018; UNESCO-UNEVOC, 2013; Smith & Kemmis, 2014). However, despite the acknowledged potential of these institutional determinants to foster favourable graduate outcomes, significant areas for improvement remain. Targeted interventions to strengthen financial management practices, ensure sustainable funding, upgrade infrastructure, and cultivate strategic stakeholder collaborations are critical. Such enhancements are essential for advancing graduates' employability and confidence, thereby contributing to more successful transitions into the labour market (OECD, 2017; World Bank, 2020).

The findings also suggest that programme factors, including instructional methods and curriculum alignment, had a positive impact on graduate outcomes, though the effect was not statistically significant. This implies that the current structure of the TVET programme, in terms of its programme factors, does not align with efforts to improve graduate outcomes in employability and to meet the

demands of the job market. In other words, further interventions are needed towards programme factors, such as instructional methods and curriculum structure. In addition, further improvement is needed in ongoing evaluation and refinement to ensure that training programmes meet the evolving demands of the job market.

Moreover, the findings suggest that government and stakeholders should strengthen the contributions of institutional and programme factors towards graduate outcomes. Findings further suggest that boosting government and stakeholders' support will help address implementation gaps in the TVET programme by amplifying the effects of institutional and programme-related improvements on graduate outcomes. Based on the study's findings, policymakers can strengthen institutional infrastructure and programme curricula. In addition, boosting instructors' morale, among other factors, can be helpful. By creating a more supportive ecosystem, stakeholders can enhance the programme's effectiveness by targeting employment opportunities for graduates.

Conclusions and Policy Implications

This study found that institutional factors and government and stakeholder support significantly influence TVET graduate outcomes in Ghana, while programme factors exhibited a positive but statistically insignificant effect. The findings suggest that improving graduate employability, job readiness, entrepreneurial capability, confidence, and career sustainability requires greater attention to the institutional environment within which TVET is delivered. Accordingly, policymakers should prioritise investments in modern training facilities, industry-standard equipment, instructor development, and transparent institutional management systems. The Commission for TVET and the Ghana TVET Service should also establish and enforce quality assurance standards relating to infrastructure, staffing, funding, and industry partnerships to ensure consistency in training quality across institutions.

The positive but insignificant influence of programme factors suggests that existing curricula and instructional approaches may not adequately respond to evolving labour market demands. Consequently, curriculum development should be guided by systematic labour market intelligence and stronger collaboration with employers, professional bodies, and industry representatives. Greater emphasis should be placed

on competency-based training, digital skills development, entrepreneurship education, apprenticeships, and work-based learning opportunities. Regular graduate tracer studies should also be institutionalised to assess the relevance of TVET programmes and provide evidence for continuous curriculum review and improvement.

The study further revealed that government and stakeholder support not only directly improves graduate outcomes but also strengthens the effects of institutional and programme factors. This finding underscores the importance of a coordinated TVET governance framework involving government agencies, industry partners, employers, development partners, and training institutions. Policies should therefore encourage public-private partnerships, industry-sponsored training initiatives, internship and industrial attachment programmes, entrepreneurship incubation centres, and graduate recruitment schemes. Beyond measuring enrolment and completion rates, policymakers should adopt outcome-based performance indicators such as graduate employment rates, entrepreneurial success, employer satisfaction, and career progression to ensure that TVET investments translate into meaningful labour market and national development outcomes.

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