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THE ROLE OF INNOVATION IN FOSTERING ENTREPRENEURIAL MINDSET AMONG TVET STUDENTS

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ABSTRACT

Purpose: This quantitative study explores the relationship between innovation, entrepreneurial education, and entrepreneurial mindset among Technical and Vocational Education and Training (TVET) students, providing insights for educators and policymakers.

Design/Methodology/Approach: Over four months, data were collected from 800 TVET students from ten technical universities in Ghana using a stratified random sampling technique. The analysis was conducted using Partial Least Square-Structural Equation Modeling (PLS-SEM).

Findings: The findings indicate a significant relationship between innovation and entrepreneurial education, which positively influences the entrepreneurial mindset of TVET students.

Research Limitation: The study is limited by its focus on TVET students in specific technical universities, which may affect the generalizability of the findings to other educational contexts or regions. Future research could expand to include diverse educational settings.

Practical Implication: The results provide evidence-based strategies for curriculum development aimed at fostering innovation and cultivating entrepreneurial mindsets, which educators and policymakers can utilise to enhance TVET programmes.

Social Implication: By promoting an entrepreneurial mindset among TVET students, this study supports broader economic development initiatives, potentially leading to increased job creation and economic growth within communities.

Originality/Value: This research contributes to the existing literature on entrepreneurship education by highlighting the critical role of innovation in shaping the entrepreneurial mindset of TVET students. It fills a gap in understanding how TVET can be optimised for future skills and hands-on training.

Keywords: *Education. entrepreneurial. mindset. innovation. TVET*

INTRODUCTION

Technical and Vocational Education and Training (TVET) institutions are increasingly recognised for their pivotal role in equipping individuals with practical skills for various industries. According to Global Entrepreneurship Monitor (2022), with the advent of rapid technological advancements and shifting global economic landscapes, nurturing an entrepreneurial mindset within TVET students has

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become imperative. An entrepreneurial mindset encompasses technical proficiency and the ability to innovate, take risks, and seize opportunities (Viebig, 2023).

Recent research underscores the need for a holistic educational approach beyond technical skills, emphasising the importance of entrepreneurial thinking in addressing the challenges of a dynamic job market (Ntare & Ojwang, 2021; European Commission, 2021).

TVET institutions are uniquely positioned to bridge this gap by incorporating elements that stimulate innovation and entrepreneurial behaviour. World Economic Forum (2023) highlighted that employers seek individuals who exhibit adaptability, creativity, and entrepreneurial spirit alongside technical competence. Consequently, TVET programs are evolving to integrate entrepreneurial education to meet these changing demands.

Within this context, innovation plays a significant role in shaping the development of entrepreneurial mindsets. A study by Fayolle and Gailly (2018) established that innovation drives economic growth, fosters problem-solving abilities, and encourages a proactive approach to change. Another study by Johansen (2010) asserts that integrating innovation into TVET education is crucial for preparing students to make meaningful contributions to their industries. Despite the growing emphasis on entrepreneurial education, there is limited understanding of how exposure to innovation influences entrepreneurial mindset development within TVET institutional students (Viebig, 2023; Mbwambo & Magoma, 2022; Jiatong et al., 2021). Existing literature acknowledges the importance of innovation in entrepreneurship education but lacks empirical evidence specific to TVET settings. This research aims to fill this gap by investigating the role of innovation in fostering an entrepreneurial mindset among TVET students at the tertiary level.

The study's objective was to explore the impact of innovation in fostering an entrepreneurial mindset among TVET Students and, again, to establish the moderating role of self-efficacy in innovation exposure and Entrepreneurial mindset development among TVET students. By addressing these objectives, the research aims to contribute to the broader discourse on entrepreneurship education and serve as a basis for future studies. The findings are expected to have practical implications for educational institutions, policy formulation, and curriculum development, ultimately preparing TVET graduates for success in an innovation-driven global economy.

THEORIES UNDERPINNING THE STUDY

Social Cognitive Career Theory (SCCT), formulated by Lent et al. (1984), aims to elucidate the multifaceted aspects of career development, encompassing the emergence of interests, educational and career decision-making processes, and attaining success in academics and careers. The theory integrates various factors influencing career development, including interests, abilities, values, and environmental factors, drawing upon Albert Bandura's general social cognitive theory. The theory identifies three

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interconnected variables: goals, outcome expectations, and self-efficacy beliefs. Self-efficacy, particularly in entrepreneurship, reflects individuals' confidence in their ability to undertake entrepreneurial tasks successfully.

Exposure to innovative practices, successful entrepreneurial role models, and practical experiences with innovation within Technical Vocational Education and Training (TVET) programmes can enhance TVET students' self-efficacy beliefs about entrepreneurship, encouraging them to consider entrepreneurial endeavours (Gagné et al., 2018). Social Cognitive Career Theory (SCCT) serves as a valuable framework for understanding the development of educational and vocational interests, decision-making processes, and performance outcomes. It guides initiatives to foster career aspirations and assist individuals in implementing career goals across various stages of life. Incorporating SCCT principles into TVET programmes can provide pathways for students to pursue entrepreneurship as a career option, aligning with individual career goals and contributing to socioeconomic development.

SCCT highlights the influence of outcome expectations on career decisions, suggesting that emphasising entrepreneurship's potential advantages and rewards can shape students' perceptions of entrepreneurship as a viable and fulfilling career path (Azeem et al., 2022). By integrating SCCT into entrepreneurship education within TVET, the theory helps understand how exposure to entrepreneurial role models and experiences influences students' beliefs in their ability to engage in entrepreneurial activities, fostering the development of an entrepreneurial mindset (Kouakou et al., 2019). Furthermore, SCCT underscores the role of personal values, interests, and objectives in career decisions. TVET institutions can stimulate students' interest in entrepreneurship by exposing them to innovative practices and entrepreneurial role models, allowing them to explore entrepreneurial interests and align their career goals accordingly. Providing a supportive environment for entrepreneurial exploration and growth within TVET programs is essential for nurturing an entrepreneurial mindset among students and fostering networking opportunities, mentoring, and an innovative culture.

Ochieng et al. (2020) Muridan et al. (2023), and Azeem et al. (2022) applied this theory. They concluded that TVET programmes that foster a nurturing and supportive environment for entrepreneurship enable students to develop an entrepreneurial mindset more effectively. By offering networking opportunities, mentoring, and tools for entrepreneurship, TVET educators can create an entrepreneurial ecosystem that facilitates students' learning, collaboration, and success as future entrepreneurs. Moreover, SCCT emphasises the influence of expectations on career decisions, suggesting that creative teaching strategies in TVET programmes can shape students' expectations for academic performance and career success (Nthutang, 2021). This highlights the advantages and rewards of entrepreneurship and presents successful entrepreneurial role models. These strategies empower students to pursue entrepreneurial goals aligned with their interests and values. Thus, SCCT offers a comprehensive framework for understanding career development processes and guiding interventions in TVET settings. By leveraging SCCT principles, TVET institutions can effectively support students in developing an entrepreneurial

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mindset, empowering them to pursue entrepreneurial opportunities and contribute to economic growth and innovation.

Conceptual Framework and Hypotheses Development

Innovation Exposure in TVET

According to Leyer et al. (2023), innovative teaching strategies in TVET incorporate cutting-edge technologies, interactive learning, and real-world problem-solving techniques. They go beyond didactic approaches to include industrial partnerships, project-based learning, and experiential learning. Furthermore, Shankar et al. (2023) assert that experiential learning, such as internships and practical projects, enhances critical thinking, creativity, and adaptability, which are crucial for entrepreneurship.

Technology, including augmented reality, virtual reality, and simulation-based learning, allows students to explore creative ideas, fostering entrepreneurial thinking alongside technical skills. López et al. (2023) highlighted that design thinking, emphasising problem-solving and customer value creation, promotes an entrepreneurial mindset by addressing unmet needs and prototyping solutions iteratively. Entrepreneurship education programs within TVET colleges nurture opportunity perception, risk-taking, and resilience through exposure to entrepreneurial principles and venture creation processes. Collaborations between TVET institutions and industry stakeholders facilitate the integration of real-world experiences and industry-relevant skills, offering students insights into entrepreneurship through mentorship, sponsored projects, and exposure to workplace procedures (Din et al., 2024). This study, therefore, proposes that;

H1a*: Innovative teaching methods have a significant relationship with the creativity and entrepreneurial mindset of TVET students.*

H1b*: Innovative teaching methods have a significant relationship with opportunity identification of the Entrepreneurial mindset of TVET students.*

H1c*: Innovative teaching methods have a significant relationship with the risk-taking propensity of the Entrepreneurial mindset of TVET students.*

The moderating role of Self-Efficacy

This review investigates the impact of entrepreneurial education on TVET students' self-efficacy, which is crucial for entrepreneurial success. Entrepreneurial education encompasses various interventions and strategies to equip individuals with the attitudes, abilities, and information necessary for entrepreneurship (Ferreira-Neto et al., 2023). Self-efficacy, a key concept in social cognition theory, reflects individuals' confidence in their ability to achieve specific goals (Rodriguez & Lieber, 2020). Experiential learning strategies, such as startup internships and business simulations, have been shown to enhance TVET students' self-efficacy by providing practical entrepreneurial experiences (Kumar & Shukla, 2022). Interacting with successful entrepreneurs as mentors and role models also positively impacts students' self-efficacy, offering real-world examples of entrepreneurial success (Boldureanu et al., 2020).

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Moreover, in their studies, Ferreira-Neto et al. (2023) revealed that structured entrepreneurship education programs, including startup incubators and business plan competitions, enable students to overcome obstacles and persevere in pursuing their entrepreneurial ambitions, enhancing their self-efficacy. Additionally, programs incorporating self-reflection and feedback mechanisms contribute to self-efficacy improvement by promoting ongoing learning and development (Saoula et al., 2023). Furthermore, goal-setting and action planning within entrepreneurial education programs empower students to exercise control over their entrepreneurial pursuits, bolstering their self-confidence (Jiatong et al., 2021). The study, therefore, proposes the following hypotheses;

H2*: Self-efficacy will moderate the relationship between innovative teaching methods and the creativity of TVET students' entrepreneurial mindsets.*

H3*: Self-efficacy will moderate the relationship between innovative teaching methods and opportunity identification in TVET students' entrepreneurial mindsets.*

H4*: Self-efficacy will moderate the relationship between innovative teaching methods and the risk-taking propensity of the* Entrepreneurial mindset of *TVET students*

Entrepreneurial mindset

The: Cultivating an entrepreneurial attitude is paramount in TVET as it equips students with the essential traits needed for success in fast-paced, competitive environments (Jimoh, 2022). This review delves into the multifaceted aspects of an entrepreneurial mindset, focusing on creativity, risk-taking, opportunity identification, and proactive problem-solving within the context of TVET programs.

Creativity is a fundamental component of an entrepreneurial mindset, driving individuals to generate novel ideas and solutions. Creativity is increasingly recognised as a fundamental component of the entrepreneurial mindset. A study by Peljko & Antonˇciˇc (2022) emphasised that TVET programs foster a culture of experimentation and risk tolerance, enabling students to explore innovative concepts and methods and facilitating the creation of creative solutions. Moreover, an entrepreneurial mindset encourages curiosity and openness to learning, essential qualities for fostering original thinking and creativity (Anjum et al., 2021). According to Singh et al. (2024), fostering creativity in educational settings enhances students' ability to generate innovative ideas and solutions, which are critical for entrepreneurial success. The study emphasises that TVET programs should integrate creative thinking exercises into their curricula to nurture this essential skill.

Studies conducted by Nana (2018), Mack & Honig (2023), and Reaz (2022) indicate that creativity serves as a significant predictor of entrepreneurial intentions among TVET students. The study highlights that students who engage in creative problem-solving activities are more likely to pursue entrepreneurial ventures post-graduation.

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Risk-taking is a critical dimension of the entrepreneurial mindset, enabling individuals to pursue opportunities despite uncertainties. According to Rofa and Ngah (2022), fostering a risk-taking propensity among TVET students can enhance their entrepreneurial intentions and behaviours. The study emphasises that educational programs should encourage calculated risk-taking to prepare students for real-world entrepreneurial challenges. Furthermore, an entrepreneurial mindset instils a proactive approach to risk, fostering students' readiness to accept measured risks in pursuit of opportunities (Daspit et al., 2023; Peljko & Antonˇciˇc, 2022; Mbwambo & Magoma, 2022).

TVET programs that encourage a failure-tolerant culture and provide experiential learning opportunities, such as internships and entrepreneurial projects, empower students to accept uncertainty and view failure as a learning opportunity (Pham et al., 2023). A study by Malawu (2022) found that a higher propensity for risk-taking positively correlates with entrepreneurial intentions among TVET students. The authors argue that students engaging in risk-taking activities are more likely to develop an entrepreneurial mindset, which is essential for launching successful ventures. Research conducted by Noel (2023) and Mothibi et al. (2024) indicates that supportive educational environments foster a culture of risk-taking among TVET students. The study highlights that institutions encouraging experimentation and innovation lead to increased risk-taking propensity, which is vital for entrepreneurship.

Opportunity identification is a fundamental aspect of the entrepreneurial process, enabling individuals to recognise and exploit market gaps. Opportunity identification, closely linked with risk-taking propensity, is a hallmark of the entrepreneurial mindset. TVET programs prioritising curiosity and inventiveness enable students to question assumptions, explore multiple perspectives, and identify innovative solutions (Soebagio et al., 2021).

Design thinking methodologies further enhance students' ability to recognise opportunities by focusing on understanding user needs and prototyping solutions (Peljko & Antonˇciˇc, 2022). Moreover, an entrepreneurial mindset fosters proactive problem-solving, motivating students to seek out and address challenges in their environment actively (Daspit et al., 2023).

Experiential learning activities, such as industry projects and internships, provide students with firsthand experience in recognising and developing entrepreneurial opportunities (Mei & Symaco, 2022). According to Nkuna (2021), fostering an entrepreneurial mindset among TVET students involves enhancing their ability to identify viable business opportunities. The study emphasises that educational programs should focus on developing skills related to opportunity recognition and evaluation. Research conducted by Azila-Gbettor et al. (2024) indicates that psychological factors such as self-efficacy and risk-taking propensity significantly influence opportunity identification among TVET students. The study highlights that students with higher self-efficacy are more likely to perceive opportunities in their environment.

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In conclusion, an entrepreneurial mindset is essential for TVET students to thrive in dynamic workplaces. TVET programs can equip students with the skills and mindset needed to succeed as entrepreneurs in today's rapidly changing world by fostering creativity, risk-taking, opportunity identification, and proactive problem-solving. Through experiential learning, exposure to diverse perspectives, and a supportive learning environment, TVET institutions can nurture the entrepreneurial mindset and prepare students for future success (Ganbat et al., 2023; Jin et al., 2023; Soebagio et al., 2021).

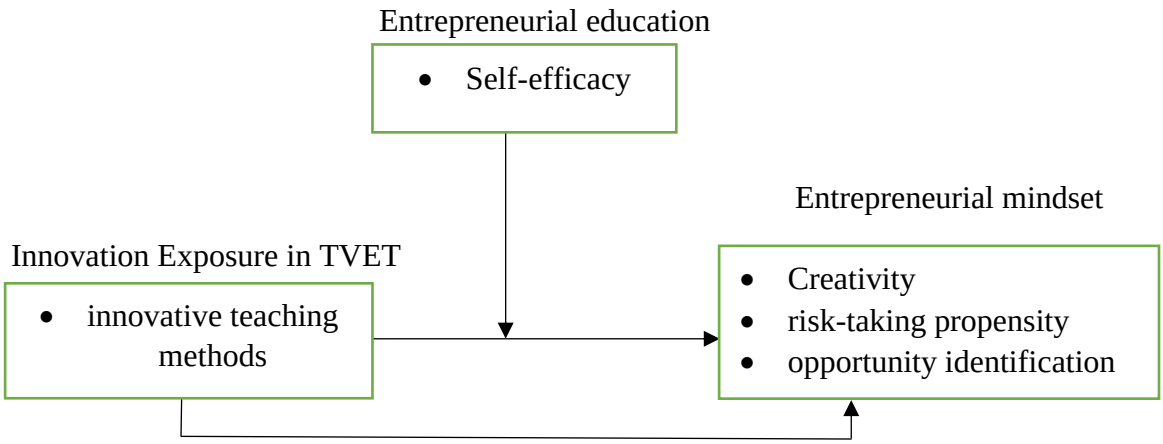

Figure 1: Proposed conceptual framework

METHODOLOGY

Research Context

Technical and Vocational Education and Training (TVET) is essential in providing students with the knowledge and skills needed for employment and self-employment. Okoro et al. (2022) revealed that tackling unemployment and promoting economic growth depends heavily on encouraging TVET students to have an entrepreneurial mindset in Ghana. Like many other developing nations, Ghana faces high youth unemployment rates and few formal employment opportunities (Jumpah, 2020). Since the government views TVET as a major force behind economic growth, it has implemented several programs to encourage and support entrepreneurial endeavours. Still, there is a need to give TVET students the knowledge, attitude, and resources they need to succeed as entrepreneurs in Ghana's changing economic environment.

Ghana's TVET system aims to give students practical skills training through a network of technical and vocational schools, training facilities, and apprenticeship programs (Gyimah, 2020). A growing number of people realise that to promote innovation, create jobs, and propel economic growth, TVET graduates

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should be instilled with an entrepreneurial mindset. The TVET sector has traditionally concentrated on training students for employment in particular trades and industries. Like many other developing nations, Ghana struggles with issues like high rates of youth unemployment and a lack of formal job opportunities (Arthur-Holmes et al., 2022). The government has implemented many programs to encourage and support entrepreneurial endeavours because it views TVET as a major engine of economic growth. However, there is still a need to give TVET students the knowledge, attitude, and assistance they need. Given Ghana's distinct socioeconomic setting, this study investigates how innovation fosters an entrepreneurial mindset among TVET students in Ghana.

Research Design

The study adopted the quantitative approach to comprehensively understand the relationships between innovation, entrepreneurial education, and entrepreneurial mindset among TVET students (Noel, 2023). Informed consent was obtained from the management of the participants' institutions. Confidentiality and anonymity of respondents are strictly maintained. The population consists of TVET students enrolled in various programmes at the ten technical universities in Ghana.

Sampling and Sample Size

A stratified random sampling technique was employed to select representative samples from the Technical Universities (Omar et al., 2020). Moreover, stratified sampling improves estimation efficiency and precision by facilitating researchers' more efficient use of sampling resources. Through stratified sampling, researchers can allocate sample sizes proportionate to the size and variability of each stratum rather than randomly selecting individuals from the entire population, which could lead to less efficient resource use (Shao et al., 2021). 800 TVET students from ten technical universities in Ghana were sampled.

Data Collection

A structured questionnaire was created to gather sufficient data for the study. The first section focuses on the respondents' profiles. In contrast, the second section addresses key constructs related to the study, including self-efficacy, innovative teaching methods, creativity, risk-taking propensity, and opportunity identification. A pilot study was first conducted to ascertain the study construct's reliability and validity, as Huei et al. (2020) affirm its importance.

A total of 1000 sets of questionnaire were administered, of which 850 responses were received from the respondents. To emphasise more on the data collection, 50 out of the 850 sets of questionnaires received were in default. This makes the total number of valid responses used for the data processing and analysis stand at 800, representing 94.18%. The questionnaire was administered online and offline. The online approach was made through the respondents' emails and Group WhatsApp platforms, which generated 478 valid responses, while the offline approach produced 322 valid responses. The data collection process took approximately four months (November 2023-February 2024), and each respondent used an average of ten to fifteen minutes to answer the questionnaire.

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Measurement Scales

Using a 5-point Likert scale, where 1 represents strongly disagree and 5 represents strongly agree, all multi-item constructs were measured. Table 1 presents the individual item details for the multi-item constructs and the extracted average variances and construct reliabilities. The seminal studies in their respective fields inspired the five constructs and their items (see Table 1). For instance, Innovative teaching methods (Zhu et al., 2013; Sivarajah et al., 2019), Creativity (Kharkhurin, 2014; Hashim et al., 2023; Abd Rahman et al., 2022), Risk-taking propensity (Mathosa, 2018; Kahando & Mungai, 2018; Rofa & Ngah, 2022), Opportunity identification (Yusop et al., 2023; Paryono, 2017; Muridan et al., 2019; Rasul et al., 2019, and Self-efficacy (Adeniyi et al., 2022; Teane & Gombwe, 2023; Etuk & Usoro, 2016).

Profile of Respondents

The gender distribution of the study respondents is 69.75% males and 30.25% males. The age distribution among respondents in the study shows that those above 28 years, representing 36.0%, are aware of TVET. The distribution of respondents based on their degree of education in the study reveals that Bachelor's Degree holders at 38.50% constituted the largest proportion, followed by HND holders at 22.12%. Respondents from the Applied Arts accounted for 28.0%, followed by information technology, 24.5%. On prior entrepreneurial exposure, students exposed to TVET through formal education accounted for 42.25.

FINDINGS AND DISCUSSION

Assessment of the measurement model

Partial least squares structural equation modelling (PLS-SEM) was used for the analysis using the SmartPLS software (version 4.0) (Egala et al., 2024; Bruce et al., 2023). Furthermore, PLS-SEM was employed because it could perform a thorough analysis of the dependent variables, manipulate the measurement and structural models, and, lastly, accurately estimate moderating effects while accounting for measurement errors, as stated by (Hair et al., 2017; Hair et al., 2019). The psychometric qualities of the supporting items for the research constructs were assessed using PLS-SEM. On the other hand, the requirements were exceeded by the minimum and maximum thresholds for the composite reliability of the constructs, which are shown in (Table 2). At last, the convergent validity average variance extracted (AVE) was recorded, with a minimum threshold of 0.5, as shown in Table 1.

The study's composite reliability coefficients were 0.881 and 0.902 for minimum and maximum thresholds, respectively. On the other hand, every factor loading surpassed the minimal cutoff of 0.5, signifying the most robust of the corresponding constructs, thereby verifying both discriminant and convergent validity (Hair et al., 2017). The variance inflation factor (VIF) was calculated to reflect the frequency of collinearity (variations) among the items used to measure the concept. Thus, a Variance Inflation Factor (VIF) of less than ten is a more accurate measurement. For instance, Hair et al. (2019) contended that all standardised factor loadings should be at least 0.5. Given this, the values for the factor loadings in this study met the threshold range from 0.635 to 0.903, respectively.

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Table 1: Constructs, measurement items, and reliability and validity tests

Construct	Item	Loading	VIF	CR	AVE	CA
Innovative teaching methods	**ITM1**. Innovative teaching methods are actively promoted in our TVET programme.	0.857	2.873	0.825	0.583	0.819
	ITM2. The current TVET curriculum supports the implementation of various innovative teaching strategies	0.778	1.973			
	ITM3. There is sufficient access to technology and tools that facilitate the use of innovative teaching methods	0.671	1.476			
	ITM4. The TVET programme encourages the exploration of emerging innovative teaching practices	0.723	1.613			
	ITM5. There is a system in place to collect and analyse student feedback on innovative teaching methods	0.775	1.966			
Creativity	**CR1**. The TVET programme emphasises the importance of fostering creativity in entrepreneurship	0.884	3.009	0.816	0.552	0.798
	CR2. I believe that my coursework in the TVET programme promotes the development of creative problem-solving skills	0.698	2.092			
	CR3. The TVET programme encourages students to think outside the box when making entrepreneurial decisions	0.749	1.917			
	CR4. The TVET programme provides opportunities for students to develop creative communication skills for entrepreneurship	0.720	2.076			
	CR5. The TVET programme encourages students to view challenges as opportunities for creative problem-solving	0.640	1.664			
Risk-taking propensity	**RTP1**. The TVET programme emphasises the importance of developing a healthy risk-taking mindset in entrepreneurship	0.635	1.592	0.867	0.622	0.842
	RTP2. I believe that my coursework in the TVET program enhances my ability to assess and navigate risks in entrepreneurial ventures	0.903	3.524			

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	RTP3. The TVET programme helps students develop the necessary skills to identify, evaluate, and manage risks in entrepreneurship	0.811	2.064			
	RTP4. The TVET programme provides practical experiences, such as simulations or real-world projects, to enhance risk-taking skills	0.888	3.749			
	RTP5. There are networking opportunities within the TVET programme that connect students with potential collaborators and mentors for risk assessment	0.668	1.626			
Opportunity identification	**OI1**. The TVET programme emphasises the importance of actively seeking and identifying entrepreneurial opportunities.	0.867	2.466	0.881	0.649	0.865
	OI2. The TVET programme provides training and coursework focused on recognising and assessing entrepreneurial opportunities	0.823	2.292			
	OI3. The TVET programme helps students develop the necessary skills to evaluate and validate business opportunities	0.812	1.893			
	OI4. The TVET programme facilitates interactions with industry professionals to learn from their experiences in recognising opportunities	0.808	2.075			
	OI5. The TVET programme provides mentorship or guidance to students in identifying and pursuing entrepreneurial opportunities	0.710	1.689			
Self-efficacy	**SE1**. The TVET programme has contributed to enhancing my overall self-efficacy	0.820	2.154	0.902	0.711	0.896
	SE2. The TVET programme provides opportunities for me to build and develop my skills, contributing to my overall self-efficacy	0.839	2.518			
	SE3. The TVET programme helps me develop problem-solving skills, increasing my self-efficacy in addressing challenges	0.726	2.339			

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SE4. The TVET programme encourages me to take initiative and make informed decisions, contributing to my self-efficacy	0.937	3.096
SE5. The TVET programme gives me the skills and motivation to pursue and attain my academic and career goals.	0.879	4.405

The degree to which a test measures what it claims to measure is known as construct validity, and discriminant validity is one of its constituents. Ensuring the construct being measured is different from other study constructs by establishing discriminant validity is crucial to bolstering the measurement instrument's overall validity. A study's variables must be assessed to ascertain their discriminant validity. To ensure this, the researchers were advised by Hair et al. (2019) to use the Fornell-Larcker (1981) criterion to identify the latent variables of the discriminant validity. As the first point of evaluation, all of the values on the diagonally arranged, such as 0.743, 0.763, 0.806, 0.789, and 0.843, effectively meet the required threshold requirements of above 0.5, according to the results in Table 2 below, which also displays the average variance that was extracted. The basic and significant parameters of the research constructs were established by considering the necessity, as stated in the discriminant validity table below (Fornell & Larcker, 1981), that the Average Variance Extracted (AVE) have larger values than the other constructs to meet the Fornell-Larcker criteria. The Fornell Larcker Criterion is used to measure discriminant validity, as shown in Table 2.

Table 2: Fornell Larcker measures to assess discriminant validity

Construct	Creativity	Innovative Teaching Method	Opportunity Identification	Risk-Taking Propensity	Self-efficacy
Creativity	**0.743**				
Innovative Teaching Method	0.628	**0.763**			
Opportunity Identification	0.569	0.630	**0.806**		
Risk- Taking Propensity	0.800	0.705	0.691	**0.789**	
Self-efficacy	0.657	0.708	0.858	0.695	**0.843**

Hypothesis Testing -PLS-SEM

At this investigation stage, the researchers evaluated the model and then proceeded to structural modelling to examine any possible connections between the constructs (Hair et al., 2020). The statistical estimates were computed using the regression coefficients (β) and the significant values, T-values > 1.96

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(or P-values 0.05) of the research constructs. Six hypotheses were put to the test. To be more precise, one of the indirect hypotheses does not directly correlate with the outcome variables. In contrast, the other five proposed hypotheses did have a positive relationship with the dependent variable. Furthermore, the outcomes demonstrated the conceptual framework's (specifically, the dependent variable's) predictive power, as indicated by the correlation coefficient of determination (R2). The coefficients show the percentage of the dependent variable's variation that the independent variable can account for. Table 3 below shows that 49%, 73%, and 74% of the predictive variables account for creativity, opportunity identification, and risk-taking propensity (see Table 3 and Figure 2, respectively).

Table 3: Hypothesis Testing

		Standard bootstrap results				
Effect	**Original coefficient**	**Mean value**	**Standard error**	**t-value**	**p-value**	**Interpretation**
Inno. Teah Methods -> Creativity	0.360	0.363	0.052	6.897	0.000	**Accepted**
Inno. Teah Methods ->Opport ident.	0.028	0.028	0.038	0.752	0.452	**Rejected**
Inno. Teach Meth -> Risk-Taking Pro.	0.412	0.410	0.056	7.345	0.000	**Accepted**
Self-Eff->Inno. Tech Meth> Creat.	0.092	0.092	0.022	4.155	0.000	**Accepted**
Self-Eff->Inno. Tech Meth > Oppt. Ident.	-0.047	-0.047	0.016	2.872	0.004	**Accepted**
Self-Eff.->Inno Teach Meth > Risk-Taking Pros.	-0.041	-0.041	0.021	1.941	0.052	**Accepted**
		Coefficient of determination (R^2				***Adjusted R^2***
Creativity		0.495				0.491
Opportunity Identification		0.740				0.738
Risk-Taking Propensity		0.575				0.572

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp. 285-305
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Revised: November 28, 2024
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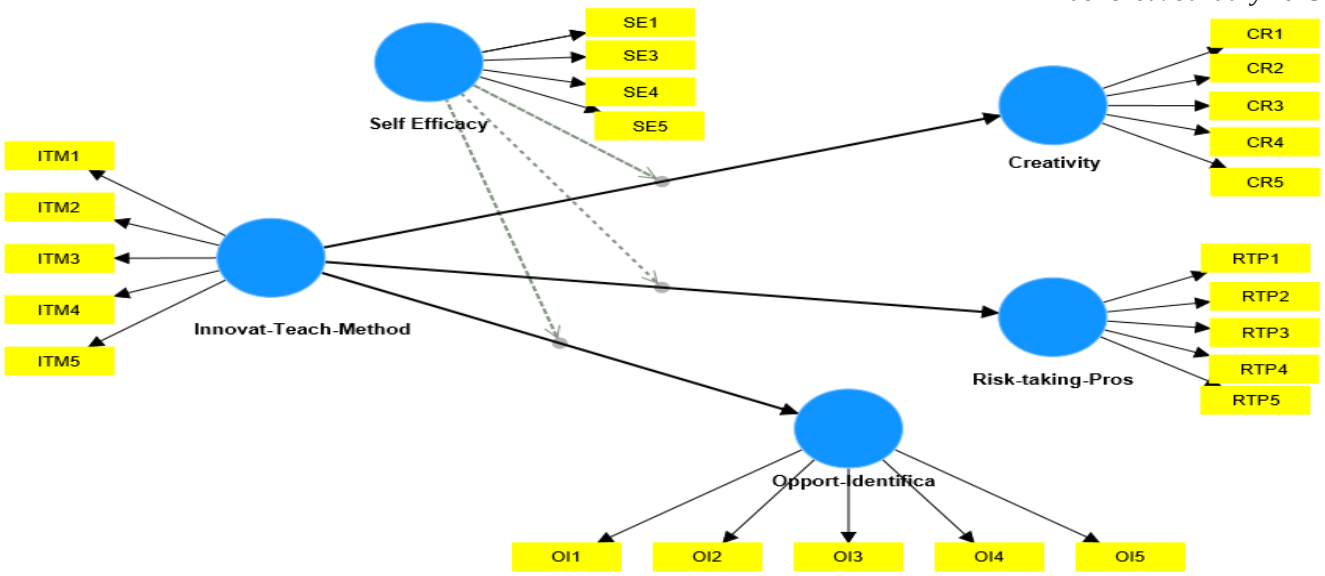

Figure 2: Estimated model

Discussion

One important area of research is how innovation has helped Technical and Vocational Education and Training (TVET) students develop an entrepreneurial mindset. Programs for Technical and Vocational Education and Training (TVET) are essential for preparing people for the workforce by giving them the information and abilities needed to succeed in various industries (Salleh & Sulaiman, 2020). Ncube and Matlala (2024) revealed that the growing awareness of the significance of encouraging an entrepreneurial mindset in TVET students has emerged in recent years. Beyond merely being technically proficient, an entrepreneurial mindset is a collection of attitudes, behaviours, and abilities that allow people to recognise opportunities, take calculated risks, innovate, and add value in various settings.

The role of innovation is essential in helping TVET students to develop an entrepreneurial mindset in Ghana. In this sense, innovation is creating fresh concepts, goods, services, or procedures that solve problems as they arise or open up new avenues. Technical Institutions can enable students to think creatively, adjust to change, and proactively look for solutions to challenging problems by incorporating innovation into TVET education. This will help students lay the groundwork for success as entrepreneurs. The underlying conceptual framework formulated six hypotheses to achieve the study's goals.

The first hypothesis (***H1a)*** sought to investigate the significant relationship between innovative teaching methods and the creativity of an entrepreneurial mindset of TVET students. This hypothesis was accepted, affirming the existing studies (Asykin et al., 2019; Ncube & Matlala, 2024). The results of this hypothesis indicate that improved creativity and exposure to cutting-edge teaching techniques are

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positively correlated. The acceptance of this hypothesis means that innovative teaching methods are now incorporated into the TVET programs to foster creative thinking skills and the entrepreneurial mindset required for success in today's dynamic and competitive labour market.

Furthermore, the study again investigated (***H1b)*** the relationship between innovative teaching methods and opportunity identification of the Entrepreneurial mindset of TVET students. This hypothesis was rejected. The fact that this hypothesis was rejected highlights the need for more research using other methodologies, large and more varied samples, contextual considerations, and more advanced measurement techniques to comprehend the relationship between teaching strategies and developing an entrepreneurial mindset in TVET students. However, a positive relationship was found with similar studies (Asykin et al., 2019; Ncube & Matlala, 2024).

Also, hypothesis (***H1c***) seeks to find out the significant relationship between innovative teaching methods and the risk-taking propensity of the entrepreneurial mindset of TVET students. The results of this hypothesis were accepted. The findings confirm the previous studies (Mathosa, 2018). The relationship between innovative teaching approaches and the risk-taking inclination of TVET students with an entrepreneurial mindset is noteworthy because these approaches lay the groundwork for developing the abilities, perspectives, and conduct necessary for entrepreneurship. Innovative teaching strategies equip students to embrace risk-taking and confidently pursue entrepreneurial opportunities by fostering creativity, problem-solving, adaptability, and resilience. According to Toncheva-Zlatkova (2018) and Trevallion and Nischang (2021), for instance, phenomenal pedagogies like project-based learning flipped classrooms, and experiential learning inspires students to think creatively. Students are presented with real-world issues and tasked with creating creative solutions. This helps students be more creative and gives them the tools they need to approach problems in entrepreneurship uniquely (Rivas, 2021).

Moreover, hypothesis (***H2)***, which states that *self-efficacy will moderate the relationship between innovative teaching methods and the creativity of an Entrepreneurial mindset* of *TVET students*, was investigated. This hypothesis was accepted. The findings of these results confirm that of (Adeniyi et al., 2023). In other contexts, earlier studies have demonstrated a positive relationship between self-efficacy and creative or entrepreneurial behaviour and innovative teaching methods. Therefore, this study opines that students who have confidence in their skills and have received innovative teaching methods are more inclined to take the initiative and use their imagination to solve problems.

Similarly, the study also investigated the hypothesis **(*H3)*** *that: self-efficacy will moderate the relationship between innovative teaching methods and opportunity identification of the* Entrepreneurial mindset o*f TVET students.* This hypothesis was also accepted. The results confirm studies such as (Raduan, 2021; Adeniyi et al., 2022). The hypothesis' acceptance suggests that using cutting-edge teaching techniques in TVET programs fosters students' capacity to recognise opportunities, a vital ability for aspiring business owners. The hypothesis is probably in line with more general conceptions found in the literature on entrepreneurship, which emphasise the importance of opportunity

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Vol. 11, No. 1 (2025), pp. 285-305
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identification in developing an entrepreneurial mindset (Adeniyi, 2023). It implies that increasing students' self-efficacy through creative teaching techniques can boost their confidence in spotting and seizing opportunities—a crucial component of entrepreneurial behaviour.

Lastly, hypothesis ***H4,*** *which states that Self-efficacy will moderate the relationship between innovative teaching methods and the risk-taking propensity of TVET students' Entrepreneurial mindset, was tested.* This hypothesis was hence accepted with a p-value of 0.052. The studies of Raduan *(*2021; Malawu, 2022; Noel, 2023) affirm this assertion. The acceptance of the hypothesis implies that using cutting-edge teaching techniques in TVET programmes supports the development of students' willingness to take risks, a critical quality for aspiring business owners.

The findings of this hypothesis have implications for educators and legislators who want to encourage students to think and act like entrepreneurs. It suggests that creative teaching strategies can affect students' risk-taking propensity by raising their self-efficacy or self-assurance in their skills, which is essential for successful entrepreneurship. Innovative teaching methods can boost students' self-efficacy and encourage a greater willingness to take risks by offering experiential learning, problem-solving, and skill development opportunities.

CONCLUSION

The study emphasises the crucial role of innovation in fostering an entrepreneurial mindset among Technical and Vocational Education and Training (TVET) students, which is essential for navigating the challenges and opportunities of the modern economy. Conducted in Ghana, it sampled 800 tertiary students from various technical universities. The research, employing Partial Least Square-Structured Equation Modeling (PLS-SEM), validated five of six hypotheses, highlighting the positive correlation between innovation and entrepreneurial mindset development. By focusing solely on students rather than including educators, the study underscores the importance of nurturing innovation directly among learners.

Study Implications

The implications of this study go beyond practical applications. Theoretically, the exploration of this study contributes to the understanding of the complex interplay between innovation, education, and entrepreneurship. It provides valuable insights for policymakers, educators, and researchers seeking to promote entrepreneurial mindset development among TVET students. First, the relationship between creativity, problem-solving skills, and entrepreneurial behaviour can be better understood theoretically by examining how innovation helps TVET students develop an entrepreneurial mindset. This could result in a better comprehension of how encouraging innovation in learning environments can develop entrepreneurial abilities and mindsets.

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp. 285-305
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Once more, investigating how to incorporate innovation into TVET curricula to encourage the development of an entrepreneurial mindset would help shape educational pedagogy and curriculum design. This could entail assessing how well project-based learning, interdisciplinary approaches, and experiential learning promote innovation and entrepreneurship.

Furthermore, an understanding of the contextual nature of entrepreneurship can be gained by examining how socio-cultural factors impact the relationship between innovation and entrepreneurial mindset among TVET students. This might entail looking at how different cultures view taking risks, being creative, and starting a business, as well as how social networks and support systems can encourage entrepreneurial behaviour. Lastly, a theoretical examination of how innovation helps TVET students develop an entrepreneurial mindset may impact educational policies and practices. Supporting entrepreneurial development may entail developing strategies for promoting cooperation between educational institutions, industry stakeholders, and government agencies and identifying policy interventions to encourage innovation and entrepreneurship within TVET systems.

This study offers many implications for managing institutions, government, and students, given that this study offers a preference elicitation mechanism. Innovation in TVET has practical applications outside the classroom that let students pursue various career paths as workers in innovation-driven industries, entrepreneurs, or intrapreneurs in established businesses. To management, it sets the ground for incorporating innovation-focused activities and courses into TVET curricula and creating practical projects, workshops, and internships that expose students to real-world innovation challenges and entrepreneurial experiences. Workshops on entrepreneurship pedagogy, creative teaching techniques, and industry engagement tactics might fall under this category.

For TVET students to be exposed to real-world innovation and entrepreneurship opportunities, forming partnerships with industry stakeholders is crucial. Management must wisely deploy resources to encourage entrepreneurship and innovation in TVET programs. This could entail finding money for technology infrastructure, innovation labs, and services that encourage entrepreneurship, like access to funding opportunities, startup incubators, and mentorship programs.

Future Research

Furthermore, to delve deeper into TVET's impact, it exclusively targeted technical tertiary institutions, omitting traditional universities. However, it suggests future studies broaden the scope to encompass a larger sample size and consider a mixed-method approach for a more comprehensive understanding. Despite these limitations, the findings stress integrating innovation education and entrepreneurship support services within TVET systems to unleash students' potential as future leaders and change agents.

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