Assessing TVET Knowledge and Acceptance among SPM Students in Malaysia: Empirical Validation of an Integrated Framework (SCCT–TPB)

Anwar Jaafar[1], Muhamad Jufri Ismail[2], Mohammad Syakir Zainozaman[3], Muhammad Nabil Mohd Razlan[4]

Jabatan Pendidikan Politeknik dan Kolej Komuniti JPPKK, Kolej Komuniti Bukit Beruang, Ayer Keroh, Melaka[1,2]

Department of Hospitality, Faculty of Hospitality, Tourism and Wellness, Universiti Malaysia Kelantan, Malaysia[3]

Kementerian Pendidikan Malaysia, Sekolah Kebangsaan Nibong Tebal, Nibong Tebal, Pulau Pinang[4]

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ABSTRACT

In Malaysia, the development of human capital and the country's economic transformation are greatly aided by Technical and Vocational Education and Training (TVET). However, Sijil Pelajaran Malaysia (SPM) candidates' student enrollment regularly falls short of strategic national goals. This empirical study assesses the structural relationships between TVET knowledge, social influence, perceived industry value, career self-efficacy, attitude toward TVET, and TVET acceptance. It is based on an integrated framework that combines Social Cognitive Career Theory (SCCT) and the Theory of Planned Behavior (TPB). A multi-stage stratified sampling technique was used to gather data from n = 387 SPM students in five different geographical regions in Peninsular and East Malaysia SPM. To test the proposed routes, partial least squares structural equation modeling (PLS-SEM) was used. The empirical results show that attitude toward TVET and career self-efficacy are strongly influenced by TVET knowledge ($\beta = 0.312$, $p < 0.001$), perceived industry value ($\beta = 0.354$, $p < 0.001$), and social influence ($\beta = 0.285$, $p < 0.001$). Additionally, the path toward TVET acceptance is significantly mediated by attitude toward TVET ($\beta = 0.384$, $p < 0.001$) and career self-efficacy ($\beta = 0.342$, $p < 0.001$) ($r2 = 0.584$). The effect of TVET knowledge on acceptance is strongly moderated by geographic location (rural vs. urban), with a greater positive effect among rural cohorts, according to multi-group analysis (MGA). For educational policymakers and career counseling frameworks under Dasar TVET Negara 2030, these findings offer practical empirical assistance.

Keywords: TVET Acceptance, SPM Students, Social Cognitive Career Theory, Theory of Planned Behavior, PLS-SEM, Malaysia.

INTRODUCTION

Background of the Study

In rising countries, technical and vocational education and training (TVET) is a vital catalyst for human capital development, national industrial upgrading, and economic resilience (Aldossari, 2020; Amin et al., 2025; UNESCO, 2021). A workforce with specialized skills in automated manufacturing, green energy, artificial intelligence, and digital infrastructure is necessary as Malaysia moves toward a high-tech, advanced economy (Hong et al., 2022; Ministry of Economy, 2021). In order to create a cohesive, superior vocational education ecosystem that can satisfy the expectations of the global industrial sector, the Malaysian government recognized this necessity and implemented strategic policies like Dasar TVET Negara 2030 (Abdul-Aziz et al., 2020; Prime Minister's Office, 2024).

The active engagement of secondary school graduates, particularly those preparing for the Sijil Pelajaran Malaysia (SPM), is essential to meeting national TVET goals (Omar et al., 2023). Students choose between traditional academic pre-university matriculation, foundation programs, or skill-based vocational paths at SPM, which is the main crossroads where they choose their post-secondary trajectories (Wong & Atan, 2021). Enrollment uptake among SPM graduates often falls short of national strategic targets, despite aggressive infrastructure investments, the growth of public TVET institutions (such as Politeknik, Kolej Komuniti, and Institut Latihan Perindustrian), and the creation of structured skill frameworks like the Sijil Kemahiran Malaysia (SKM) and Diploma Vokasional Malaysia (DVM) (Abdul-Aziz et al., 2020; Hong et al., 2022; Economic Planning Unit, 2021). Therefore, maximizing adolescent engagement in skill-based education requires an understanding of the cognitive, social, and structural mechanisms that influence secondary students' career decisions (Ajzen, 1991; Bandura, 1986; Lent et al., 1994).

Problem Statement

There is still a significant disconnect between national strategic goals and Sijil Pelajaran Malaysia (SPM) candidates' actual post-secondary enrollment choices, even though TVET is positioned as a key driver of national economic growth under Malaysia's Dasar TVET Negara 2030 and recent Malaysia Plans (Abdul-Aziz et al., 2020; Prime Minister's Office, 2024). Actual youth enrollment in skill-based pathways continues to fall short of institutional quotas, despite economic projections showing that over 60% of new employment opportunities created in Industrial Revolution 4.0 sectors will require high-level technical qualifications (Economic Planning Unit, 2021; World Bank, 2020). In addition to severe operational knowledge deficiencies among SPM candidates regarding qualification structures, dual-accreditation by the Malaysian Qualifications Agency (MQA), and Bachelor of Technology articulation routes across the Malaysian Technical University Network, this disconnect is caused by deeply ingrained cultural stigmas that reduce technical certificates (Sijil Kemahiran Malaysia) to second-class backup options (Aldossari, 2020; Amin et al., 2025; Omar et al., 2023). Additionally, a lack of TVET-specific secondary school career counseling, perceived starting wage disparities close to national minimum baselines, and systemic institutional fragmentation across several governing ministries all work together to undermine career self-efficacy and reinforce unfavorable social norms among students and their parents (Amin et al., 2025; Wong & Atan, 2021; World Bank, 2020).

Since existing studies frequently looks at cognitive variables, social pressures, or economic incentives in isolation, addressing these issues involves going beyond disjointed explanations toward a coherent structural model (Ajzen, 1991; Lent et al., 1994). From an empirical standpoint, there is still a clear dearth of validated, integrated theoretical frameworks that combine the Theory of Planned Behavior (TPB) and Social Cognitive Career Theory (SCCT) to systematically map how internal psychological mechanisms like self-efficacy and attitude to drive TVET acceptance are shaped by external antecedents like TVET knowledge, social influence, and perceived industry value (Hong et al., 2022; Lent & Brown, 2019). Furthermore, little is known about how these structural relationships differ among other sociodemographic categories, especially when it comes to the moderating effect of school location (rural vs. urban) (Aldossari, 2020; Omar et al., 2023). Educational policymakers run the risk of enacting general interventions that fail to reduce youth underemployment, address industrial skill mismatches, or maximize technical skill adoption among secondary school-leavers in Malaysia in the absence of solid empirical evidence elucidating these multifaceted psychological pathways and geographic nuances (Abdul-Aziz et al., 2020; Amin et al., 2025).

Research Objectives

To resolve these empirical and theoretical challenges, this study establishes five specific research objectives:

RO1:	To evaluate the structural impact of TVET knowledge on SPM students' attitudes toward skill-based education.
RO2:	To assess the influence of key social actors (parents, educators, and peers) on student subjective norms and TVET acceptance.

RO3:	To examine how perceived industry value influences students' career self-efficacy regarding TVET qualifications.
RO4:	To test the mediating roles of attitude toward TVET and perceived career self-efficacy in converting external antecedents into TVET acceptance.
R05:	To evaluate the moderating impact of school location (urban vs. rural) and socio-economic status on the relationship between TVET knowledge and acceptance.

Research Questions

RQ1:	How does factual TVET knowledge directly influence SPM students' attitudes toward enrolling in vocational education?
RQ2:	To what extent do social influences affect subjective norms and individual TVET acceptance among SPM candidates?
RQ3:	Does perceived career self-efficacy mediate the relationship between TVET knowledge and the intention to enroll in TVET pathways?
RQ4:	How do socio-economic status and school location (urban vs. rural) moderate the relationship between TVET knowledge and overall acceptance?

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

TVET Knowledge (Independent Variable)

A student's operational understanding of vocational qualification structures (such as SKM Levels 1–5 versus traditional academic diplomas), accreditation frameworks overseen by the Department of Skills Development (JPK) and the Malaysian Qualifications Agency (MQA), vertical credit transfer pathways, and post-graduation articulation routes into higher technical degrees across institutions such as the Malaysian Technical University Network (MTUN) are all included in their factual TVET knowledge (Abdul-Aziz et al., 2020; Amin et al., 2025; Ismail et al., 2020). According to cognitive theories, precise, factual knowledge is the necessary basis for each person's cognitive assessment and decision-making (Ajzen, 1991; Eagly & Chaiken, 1993). Secondary students often rely on antiquated prejudices that misrepresent vocational tracks as low-tier, dead-end manual labor paths when they encounter severe information asymmetry and lack comprehensive operational knowledge (Aldossari, 2020; Omar et al., 2023). On the other hand, positive cognitive attitudes about technical pathways are directly produced by clear institutional awareness of dual-training frameworks and formal degree articulation (Amin et al., 2025; Mustapha et al., 2021).

Social Influence (Independent Variable)

Key interpersonal actors, such as parents, secondary school instructors, career counselors, and peer networks, apply normative demands, recommendations, and underlying expectations that are referred to as social influence (Ajzen, 1991; Hong et al., 2022; Restubog et al., 2010). Family expectations and societal validation processes play a significant role in educational decisions within collectivist socio-cultural frameworks (Hong et al., 2022; Sawitra et al., 2013). Due to the greater social prestige associated with white-collar credentials, widespread parental status bias frequently pulls secondary school graduates away from vocational education and toward traditional academic degrees (Aldossari, 2020; Wong & Atan, 2021). However, positive subjective norms that reduce social anxiety and positively reorient students' individual attitudes toward technical careers are fostered by active endorsement and validation from reputable educators, career guidance counselors, and supportive peers (Ajzen, 1991; Hong et al., 2022; Tang et al., 2019).

Perceived Industry Value (Independent Variable)

A student's expectations regarding the practical economic benefits of a degree, such as entry-level starting salaries, long-term job security, quick career advancement, and market demand in Industrial Revolution 4.0 (IR4.0) sectors, are referred to as perceived industry value (Bandura, 1986; Lent et al., 1994; Amin et al., 2025). Social Cognitive Career Theory (SCCT) states that people are more confident in their ability to learn domain-specific abilities when they perceive high industry demand and competitive compensation for particular skill sets (Bandura, 1997; Lent & Brown, 2019; Rasul et al., 2015). Students' career self-efficacy and belief in the long-term validity of technical qualifications are strengthened when market potential in cutting-edge technology sectors—such as automation, robots, electric vehicles, and digital infrastructure—are highlighted (Abdul-Aziz et al., 2020; Amin et al., 2025).

Attitude Toward TVET (Mediating Variable)

A person's overall positive or negative cognitive and affective assessment of choosing technical and vocational courses for post-secondary education is represented by their attitude toward TVET (Ajzen, 1991). According to the Theory of Planned Behavior (TPB), a person's attitude toward carrying out a certain behavior directly influences their behavioral choices (Ajzen, 1991; Fishbein & Ajzen, 2010). When students see skill-based learning as a high-value, respected, and intellectually fulfilling educational option rather than a backup plan, positive attitudes are developed in vocational education (Aldossari, 2020; Hong et al., 2022). Attitude is an important mediating element that transforms tangible behavioral intentions from external environmental inputs like social influence and factual TVET knowledge (Ajzen, 1991; Eagly & Chaiken, 1993; Hong et al., 2022).

Perceived Career Self-Efficacy (Mediating Variable)

A student's personal belief and confidence in their capacity to effectively finish technical training, acquire practical skills, and handle future job demands in skilled vocations are reflected in their perceived career self-efficacy (Bandura, 1997; Lent et al., 1994). According to SCCT, self-efficacy is a fundamental psychological factor that influences professional interest, choice, and perseverance (Lent et al., 1994; Lent & Brown, 2019). Students are more resilient and interested in realistic employment possibilities when they have good self-efficacy about technical skills (Bandura, 1997; Tang et al., 2019). According to the theoretical paradigm, professional self-efficacy serves as a crucial mediating bridge that converts real enrollment decisions into external outcome expectations, such as perceived industry worth and skill demand (Lent et al., 1994; Lent & Brown, 2019; Amin et al., 2025).

TVET Acceptance / Intention to Enroll (Dependent Variable)

The final outcome variable is TVET acceptance, or the intention to enroll, which represents an SPM student's clear willingness, dedication, and decision to choose a technical or vocational school as their main post-secondary educational path (Ajzen, 1991; Hong et al., 2022; Omar et al., 2023). Both TPB and SCCT contend that real physical activity is directly preceded by behavioral intention (Ajzen, 1991; Lent et al., 1994). When students have both a good cognitive attitude about vocational tracks and strong career self-efficacy for technical training, they are more likely to embrace TVET (Ajzen, 1991; Bandura, 1997; Hong et al., 2022; Wong & Atan, 2021).

School Location & Socio-Economic Status (Moderating Variables)

Critical contextual modifiers that modify the strength of associations within profession choice models are household socioeconomic status (SES) and school location (rural vs. urban) (Aldossari, 2020; World Bank, 2020). According to Abdul-Aziz et al. (2020) and Omar et al. (2023), candidates from rural secondary schools often have more limited resources, have less access to direct university outreach, and are more sensitive to immediate career chances. Because information dissemination directly reduces high levels of choice uncertainty in rural environments, factual knowledge campaigns and TVET awareness initiatives have a greater positive impact on enrollment acceptance among rural cohorts than among urban students (Abdul-Aziz et al., 2020; Aldossari, 2020; Amin et al., 2025; Omar et al., 2023).

Theoretical Synthesis: Combining TPB and SCCT

The Theory of Planned Behavior (TPB) (Ajzen, 1991) and Social Cognitive Career Theory (SCCT) (Lent et al., 1994; Lent & Brown, 2013) are two complimentary paradigms that are synthesized in this research to assess career selection among secondary school candidates.

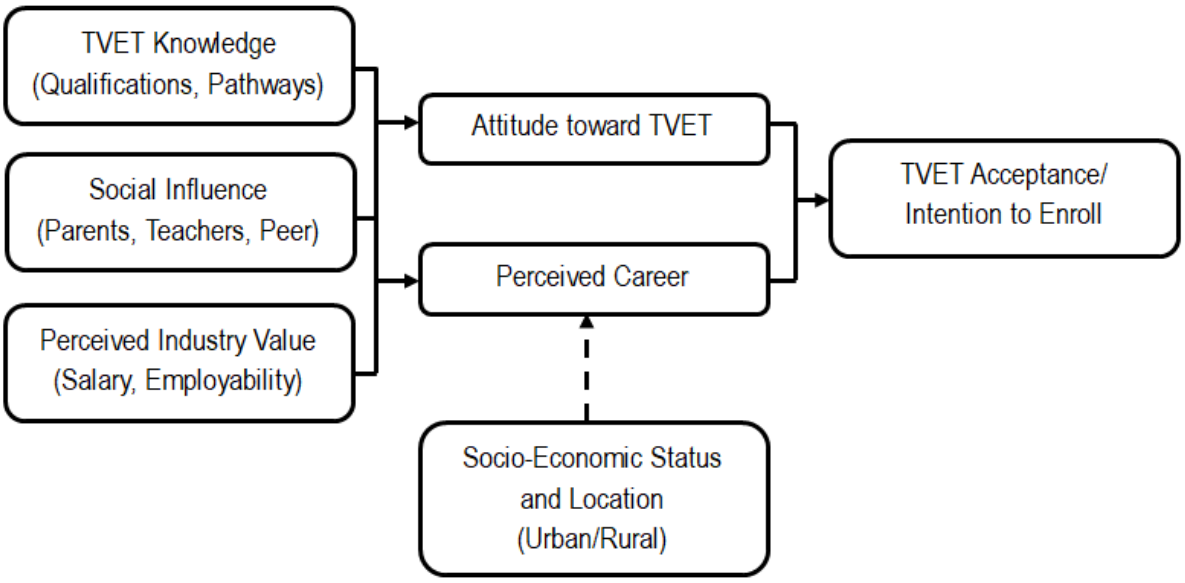

Figure 1: Integrated Theoretical Framework (SCCT–TPB)

According to TPB, personal attitudes toward the conduct, subjective norms that reflect societal expectations, and perceived behavioral control over carrying out the action are the three main factors that determine an individual's behavioral intention (Ajzen, 1991; Fishbein & Ajzen, 2010). Although TPB offers a strong framework for evaluating choice intentions, career-specific psychological factors like self-efficacy and outcome expectations are sometimes overlooked (Bandura, 1997; Lent et al., 1994).

In order to overcome this constraint, SCCT explains how professional interests and choice goals are shaped by environmental supports, self-efficacy, and personal outcome expectancies (Lent et al., 1994; Lent & Brown, 2019). This study creates a comprehensive multi-dimensional architecture that can capture both internal cognitive evaluations and external environmental constraints by including SCCT outcome expectations and professional self-efficacy into TPB's behavioral framework.

Construct Conceptualization and Variable Relationships

TVET Knowledge and Attitude Toward TVET

Students' comprehension of qualification structures (such as SKM Levels 1–5 versus academic diplomas), institutional accreditation through MQA and JPK, credit articulation pathways, and industry progression frameworks are all included in factual TVET knowledge (Abdul-Aziz et al., 2020; Amin et al., 2025; Ismail et al., 2020). According to cognitive theories, the main basis for the development of an individual's attitude is factual information (Ajzen, 1991; Eagly & Chaiken, 1993). Students who experience information asymmetry and mistake technical education for low-tier, terminal manual credentials develop unfavorable cognitive views that are shaped by societal stereotypes (Aldossari, 2020; Omar et al., 2023). On the other hand, favorable cognitive assessments of the strategic value of TVET are fostered by clear understanding of dual-training schemes (SLDN) and degree articulation (Amin et al., 2025; Mustapha et al., 2021).

H1: Accurate and comprehensive TVET knowledge directly and positively influences SPM students' attitudes toward TVET

Social Influence, Subjective Norms, and Attitude

Social influence refers to the normative encouragement, expectations, and attitudes given by key interpersonal actors, notably parents, secondary school instructors, career guidance counselors, and peer networks (Ajzen, 1991; Hong et al., 2022; Restubog et al., 2010). In collectivist socio-cultural cultures such as Malaysia, teenage educational choices are profoundly ingrained in family systems. Parental status bias frequently leads children toward traditional academic degrees, considering technological jobs as low-status "blue-collar" work (Aldossari, 2020; Wong & Atan, 2021). However, active validation and encouragement from respected educators and supportive peers reduce social anxiety by developing positive subjective norms and improving students' personal attitudes toward vocational enrollment (Ajzen, 1991; Hong et al., 2022; Tang et al., 2019).

H2: Social influence directly and positively shapes subjective norms and SPM students' attitudes toward TVET

Perceived Industry Value and Perceived Career Self-Efficacy

Students' expectations for graduate employability rates, competitive starting salaries, job security, and quick career advancement in IR4.0 fields are reflected in perceived industry value (Bandura, 1986; Lent et al., 1994; Amin et al., 2025). According to SCCT, people's personal self-efficacy—their confidence in their capacity to master those technical competencies and achieve professional success—increases proportionately when they perceive high economic returns and strong market demand for particular skills (Bandura, 1997; Lent & Brown, 2019; Rasul et al., 2015). Secondary students' confidence and belief in their technical abilities are increased when advanced technical career pathways (such as mechatronics, robotics, and EV technology) are highlighted (Abdul-Aziz et al., 2020; Amin et al., 2025).

H3: High perceived industry value directly and positively influences SPM students' perceived career self-efficacy

Attitude, Career Self-Efficacy, and TVET Acceptance

A person's overall positive or negative assessment of pursuing vocational education is reflected in their attitude toward TVET (Ajzen, 1991). The internal confidence to effectively complete technical education and land a skilled job is reflected in perceived career self-efficacy (Bandura, 1997; Lent et al., 1994). According to TPB and SCCT, final behavioral intentions are directly determined by internal cognitive assessments (Ajzen, 1991; Fishbein & Ajzen, 2010; Lent et al., 1994). TVET is far more likely to be accepted and chosen as a top post-secondary option by students who have positive attitudes toward practical skill training and high career self-efficacy (Hong et al., 2022; Wong & Atan, 2021).

H4:	Attitude toward TVET significantly and positively drives TVET acceptance / intention to enroll
H5	Perceived career self-efficacy significantly and positively drives TVET acceptance / intention to enroll

The Mediating Roles of Attitude and Self-Efficacy

Internal cognitive processes moderate the effects of external structural inputs, such as industrial market signals, social influence, and factual information, on final behavioral decisions (Ajzen, 1991; Bandura, 1986; Lent et al., 1994). While industry outcome expectations increase enrollment intention by fostering career self-efficacy (Lent & Brown, 2019; Tang et al., 2019), knowledge distribution largely modifies behavior by reconfiguring internal cognitive attitudes (Eagly & Chaiken, 1993). In order to link environmental antecedents to real decision intentions, attitude and career self-efficacy are essential psychological bridges.

H6:	Attitude toward TVET and Perceived Career Self-Efficacy mediate the indirect relationships between external antecedents (TVET Knowledge, Social Influence, Industry Value) and TVET Acceptance

The Moderating Role of Geographic Location and Socio-Economic Status

Educational decision-making differs significantly by geographic region (urban vs. rural) and household socioeconomic status (SES) (Aldossari, 2020; World Bank, 2020). Rural SPM students generally face greater budget restrictions, less exposure to traditional university campuses, and a higher sensitivity to immediate job prospects (Abdul-Aziz et al., 2020; Omar et al., 2023). As a result, factual knowledge interventions and TVET awareness campaigns have a greater favorable impact on rural cohorts, as information gains immediately reduce decision uncertainty (Aldossari, 2020; Amin et al., 2025).

H7:	School location (Urban vs. Rural) moderates the relationship between TVET Knowledge and TVET Acceptance, showing a stronger positive effect among rural candidates

METHODOLOGY

Research Design and Regional Sampling Strategy

This study used a deductive method with a quantitative, cross-sectional, survey-based research design (Ajzen, 1991; Hong et al., 2022). Form 5 SPM students registered in Malaysian public national secondary schools (Sekolah Menengah Kebangsaan [SMK]) in Peninsular and East Malaysia made up the target population (Omar et al., 2023; Wong & Atan, 2021). To guaranty thorough national coverage, a multi-stage stratified random sampling approach was applied across five different geographic regions. After screening, n = 387 valid, fully completed replies from the 450 questionnaires that were delivered were kept.

Table 1: Regional Breakdown of Respondent

Region	**n**	**Percentage(%)**
Northern (Perlis, Kedah, Pulau Pinang, Perak)	87	22.48
Central (Selangor, W.P Kuala Lumpur, Negeri Sembilan	97	25.06
Southern (Melaka, Johor)	70	18.09
East Coast (Pahang, Terengganu, Kelantan)	75	19.38
East Malaysia (Sabah, Sarawak)	58	14.99
Total	**387**	**100**

Instrumentation

The questionnaire used validated measurement scales from Ajzen (1991), Lent et al. (1994), Abdul-Aziz et al. (2020), and Omar et al. (2023) with a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

Table 2: Variables number's and item.

Variables	**Item Label**	**No of Item**	**Sources**
TVET Knowledge	KNO	5	Ismail et al. (2020); Abdul-Aziz et al. (2020); Omar et al. (2023); Amin et al. (2025).
Social Influence	SOC	5	Ajzen (1991); Restubog et al. (2010); Sawitra et al. (2013); Lang et al. (2019); Wong & Atan (2021); Hong et al. (2022); Omar et al. (2023);

Peer Industry Value	VAL	5	Bandura (1986); Lent et al. (1994); Rasul et al. (2015); Lent & Brown (2019); Abdul-Aziz et al. (2020); Amin et al. (2025).
Attitude toward TVET	ATT	5	Ajzen (1991); Eagly & Chaiken (1993); Fishbein & Ajzen (2010); Aldossari (2020); Wong & Atan (2021); Hong et al. (2022).
Perceived Career Self-Efficienvy	CSE	5	Lent et al. (1994); Bandura (1997); Rasul et al. (2015); Lent & Brown (2019); Tang et al. (2019)
TVET Acceptance	ACC	5	Ajzen (1991); Lent et al. (1994); Fishbein & Ajzen (2010); Wong & Atan (2021); Hong et al. (2022); Omar et al. (2023);

DATA ANALYSIS AND RESULTS

Demographic and Geographic Profile

SPSS was used to do descriptive statistical profiling on the demographic features of the 387 SPM student participants.

Table 3: Respondent Demographic and Geographic Profile

Demographic Variables	Category/Sub-Group	n	%
Geographic Region	**Northern Region** (Perlis, Kedah, Pulau Pinang Perak)	87	22.48
	Central Region (Selangor, W.P Kuala Lumpur, Negeri Sembilan)	97	25.06
	Southern Region (Melaka, Johor)	70	18.09
	East Coast Region (Pahang, Terengganu, Kelantan)	75	19.38
	East Malaysia (Sabah, Sarawak)	58	14.99
Gender	Male	185	47.81%
	Female	202	52.19%
School Location	Urban	208	53.75%
	Rural	179	46.25%
Academic Stream	Science Stream	124	32.04%
	Arts/Humanities	191	49.35%
	Technical/Vocational Stream	72	18.61%
Household Income	B40 (< RM 4,850/month)	224	57.88%
	M40 (RM 4,851 – RM 10,959/month)	128	33.07%
	T20 (> RM 10,960/month)	35	9.05%

Measurement Model Evaluation (Outer Model)

The reflective measurement model was tested using conventional PLS-SEM criteria (Hair et al., 2022; Hong et al., 2022) for indicator reliability, internal consistency, convergent validity, and discriminant validity.

Table 4: Measurement Model Result

Construct	Item Code	Outer Loading	Cronbach Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
KNO	KNO1 – KNO5	0.782 – 0.864	0.884	0.915	0.683
SOC	SOC1 – SOC5	0.751 – 0.849	0.869	0.905	0.656
VAL	VAL1 – VAL5	0.795 – 0.881	0.892	0.921	0.700
ATT	ATT1 – ATT5	0.811 – 0.890	0.910	0.933	0.735
CSE	CSE1 – CSE5	0.768 – 0.855	0.878	0.911	0.672
ACC	ACC1 – ACC5	0.824 – 0.902	0.923	0.942	0.765

All outer loads above the 0.70 threshold. The Composite Reliability (CR) scores ranged from 0.905 to 0.942, which above the suggested 0.70 threshold. The average variance extracted (AVE) values above 0.50, indicating convergent validity across all constructs. Discriminant validity was proven using the Heterotrait-Monotrait (HTMT) ratio criterion, with all construct pairs falling below the rigorous 0.85 threshold (Henseler et al., 2015).

Structural Model Evaluation (Inner Model)

SmartPLS used a 5,000-bootstrap resampling process to examine structural routes.

Table 5: Structural Model Assessment with Path Coefficients

Hypothesized Path	Path Coefficient (β)	m	SD	*t* - value	*p* - value	Result
KNO > ATT	0.312	0.315	0.048	6.500	< 0.001	**Supported**
SOC > ATT	0.285	0.281	0.052	5.481	< 0.001	**Supported**
VAL > CSE	0.354	0.358	0.050	7.080	< 0.001	**Supported**
ATT > ACC	0.384	0.380	0.055	6.982	< 0.001	**Supported**
CSE > ACC	0.342	0.345	0.053	6.453	< 0.001	**Supported**

Coefficients of Determination (r2): The model explained 46.2% of the variance in attitude (r2 = 0.462), 41.8% of the variance in career self-efficacy (r2 = 0.418), and 58.4% of the overall variance in TVET acceptance. Predictive Relevance (q2): Blindfolding procedures resulted in (q2) = 0.421 for TVET Acceptance, indicating good predictive relevance.

Mediation Analysis (H6)

Specific indirect impacts were examined to determine the mediating processes.

Indirect Path Sequence	Indirect Effect	*t* - value	*p* - value	95% Confidence Interval	Result
KNO > ATT > ACC	0.120	4.615	< 0.001	[0.069, 0.171]	**Partial Mediation**
SOC > ATT > ACC	0.109	4.192	< 0.001	[0.058, 0.160]	**Partial Mediation**
VAL > CSE > ACC	0.121	4.654	< 0.001	[0.070, 0.172]	**Partial Mediation**

H6 is completely supported; attitudes toward TVET and career self-efficacy moderate the links between external inputs and acceptance decisions (Hong et al., 2022).

Multi-Group Moderation Analysis (H7: Urban vs. Rural)

PLS-MGA looked at structural differences between urban (n = 208) and rural (n = 179) cohorts.

Path Sequence	Urban β(n =208)	Rural β(n =179)	Path Difference	*p* - value	Moderation Effect
KNO →ACC	0.182	0.365	0.183	0.008	Significant (Rural > Urban)
SOC →ACC	0.310	0.215	0.095	0.062	Not Significant

H7 is validated; factual TVET knowledge has a considerably greater favorable impact on TVET acceptability in rural SPM students than in urban candidates.

CONCLUSION

Comprehensive Conclusion

This empirical study validates an integrated theoretical model that combines Social Cognitive Career Theory (SCCT) and the Theory of Planned Behavior (TPB) to explain TVET adoption among SPM candidates in Malaysia (n= 387). By bridging the gap between external environmental determinants and internal psychological mechanisms, the study shows that TVET acceptance is a complex decision influenced by structural knowledge, social validation, and industry outcome expectations, rather than just academic performance. The structural model explains 58.4% of the variation (r2 = 0.584) in students' intentions to enrolll in TVET, demonstrating the integrated framework's significant predictive capacity. Importantly, the empirical data emphasize that:

Findings	Description
Knowledge alone is insufficient without cognitive reframing	While factual TVET knowledge directly influences students' attitudes (β = 0.312, p < 0.001), its ultimate effect on enrollment decisions is channeled through the mediating role of personal attitude and career self-efficacy.
Social actors dictate perceived prestige	Subjective norms shaped by parents, teachers, and peers (β = 0.285, p < 0.001), continue to exercise significant control over whether technical paths are viewed as prestigious alternatives or secondary fallbacks
Market value drives internal confidence	Perceived industry value, encompassing expectations of salary, employability, and IR4.0 career progression serves as the primary catalyst for career self-efficacy (β = 0.354, p < 0.001), which in turn directly fuels TVET acceptance (β = 0.342, p < 0.001).

Geographic location conditions knowledge impact	Multi-group analysis (PLS-MGA) confirms that school location significantly moderates the knowledge–acceptance link ($p = 0.008$), revealing that rural secondary candidates display a far stronger positive shift in enrollment intention when provided with structured, operational TVET information.

Finally, bridging Malaysia's technical talent supply gap demands a shift in public perception from considering TVET as a low-achieving alternative to recognizing it as an elite, high-technology career path critical to the country's high-income economic transition under Dasar TVET Negara 2030.

Extended Policy and Practical Implications

To turn these scientific findings into effective national plans, important educational and industrial stakeholders should execute targeted interventions across four core pillars:

Re-engineering Secondary School Career Guidance Protocols	
Specialized TVET Counselors	The Ministry of Education (MOE) should update career guidance frameworks in national secondary schools (SMK). Guidance counselors must receive dedicated training on the TVET ecosystem, enabling them to provide clear information on SKM-to-Degree articulation pathways, credit transfers, and MQA/JPK accreditation standards (Omar et al., 2023).
Early Exposure Initiatives	Comprehensive TVET awareness modules and practical skill exposure workshops should be integrated earlier into lower secondary education (Forms 1–3) to mitigate negative stereotypes before students make post-SPM tracking decisions.

Strategic Parental and Social Outreach Campaigns	
Reframing Public Perception	National marketing campaigns led by government agencies should target parents and key community influencers rather than students alone (Abdul-Aziz et al., 2020; Hong et al., 2022). Campaigns must frame technical qualifications as high-prestige, technology-driven trajectories (e.g., AI, EV maintenance, green technology, and industrial automation) under Dasar TVET Negara 2030 (Prime Minister's Office, 2024).
Showcasing Success Pathways	Highlighting successful TVET alumni and competitive salary structures in high-growth industries can actively shift family social norms and alleviate status anxiety among parents (Aldossari, 2020; Wong & Atan, 2021).

Tailored Geographic and Socio-Economic Interventions	
Targeted Rural Roadshows	Given that rural candidates exhibit a significantly higher responsiveness to TVET knowledge ($\beta_{Rural} = 0.365$ vs $\beta_{Urban} = 0.182$), educational authorities should prioritize hands-on mobile roadshows, interactive skill exhibitions, and direct institutional recruitment in rural secondary schools (Omar et al., 2023).
Targeted Financial Incentives	Expanding targeted TVET stipends, living allowances, and guaranteed housing for B40 rural students can remove financial barriers and accelerate youth participation in technical institutions (Abdul-Aziz et al., 2020; World Bank, 2020).

Industry Alignment and Starting Wage Reform

Minimum Starting Salary Baselines	Policy initiatives must address the perceived low starting wages of TVET certificate holders. Collaborations between the Ministry of Human Resources (MOHR) and private sector leaders should establish competitive baseline wages aligned with SKM skill levels to reflect market value (Amin et al., 2025; World Bank, 2020).
Expanded Industry-Led Apprenticeships	Broadening the National Dual Training System *(Sistem Latihan Dual Nasional [SLDN])* will allow students to experience real-world technical environments, building career self-efficacy and guaranteeing clear employer absorption post-graduation (Rasul et al., 2015).

Limitations of the study

While this study provides useful empirical insights into the factors influencing TVET acceptance among SPM candidates, a number of methodological and theoretical limitations should be acknowledged:

Cross-Sectional Research Design

The study used a cross-sectional survey approach to collect student perceptions, attitudes, and behavioral intentions at a specific moment in time before they completed their SPM exams. As a result, while the structural model identifies significant statistical correlations between variables, it is unable to prove definite long-term causal effects or explain for shifts in student intentions following the release of official SPM findings.

Reliance on Intention as a Proxy for Behavior

In accordance with conventional TPB and SCCT methods, the primary outcome variable measured was "intention to enroll" (TVET acceptance), not actual physical matriculation. Following graduation, environmental considerations such as direct university offers, immediate family financial changes, or localized career prospects may influence actual enrollment behavior.

Sample Size Distribution Across Sub-Regions

Although multi-stage stratified sampling was carried out throughout five geographical regions (n = 387), the sub-sample sizes for specific regions, such as East Malaysia (n = 58), made up a lower proportion of the overall dataset. This may reduce the depth of comparison insights for certain regional administrative zones.

Scope of Environmental Factors:

The theoretical framework centered on social influence, expertise, and perceived industrial value. External macroeconomic variables such as regional industry density, scholarship availability, and accessibility to local institutions were not explicitly included in the structural model.

Directions for Future Research

To expand on the conclusions of this study and solve its inherent limitations, future academic inquiries could investigate the following research avenues:

Longitudinal Tracking Studies

Future study should use a longitudinal approach that follows SPM candidates from the secondary school decision process to actual post-secondary enrollment. This will enable researchers to assess the structural relationship between enrollment intention and actual behavior while also measuring student retention rates in TVET paths.

Expanded Regional and School-Type Sampling

Scholars can broaden the geographical sampling frame by including bigger, devoted sub-samples from Sabah and Sarawak, as well as conducting comparative analyzes of ordinary academic national secondary schools (SMK), technical secondary schools (SMKT), and vocational colleges (Kolej Vokasional).

Integration of Digital and Media Determinants

Given Gen-Z secondary students' changing information habits, future choice models should include variables related to digital media engagement, such as the impact of social media campaigns, online career guidance platforms, and virtual skill simulation tools on career self-efficacy and attitude development.

Qualitative and Mixed-Methods Explorations

Incorporating qualitative methodologies, such as focus group conversations with parents, school guidance counselors, and industry employers, would provide greater contextual depth into the underlying socio-cultural hurdles and qualitative determinants shaping vocational perception in Malaysia.

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