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Factors Associated with Students' Outcome Expectations Toward Technical and Vocational Education and Training (TVET): A Social Cognitive Career Theory Study in Phnom Penh, Cambodia

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Abstract

Technical and Vocational Education and Training (TVET) is central to Cambodia's skills-development agenda, but limited evidence explains how students form expectations about public TVET pathways. Grounded in Social Cognitive Career Theory (SCCT), this study examined the factors associated with students' outcome expectations in public TVET institutions in Phnom Penh, Cambodia. A cross-sectional survey was conducted with 616 bachelor's-degree students, measuring self-efficacy, perceived social support, perceived government and institutional support, and outcome expectations. Data were analyzed using hierarchical multiple regression and stratified subgroup regressions by sector-based major group. Outcome expectations were positively correlated with all three predictors. Controlling for age and gender, the full model explained 64.9% of the variance in outcome expectations, with perceived government and institutional support showing the strongest association, followed by self-efficacy and perceived social support. In the stratified analyses, self-efficacy and perceived government and institutional support were significant within every sector-based subgroup, whereas perceived social support was significant only in the Engineering/Industrial Technical subgroup. These findings provide associational support for SCCT in a Southeast Asian, lower-middle-income setting and indicate that institutional and government credibility may carry particular weight where a public TVET system is still being established.

Keywords: TVET; outcome expectations; self-efficacy; Social Cognitive Career Theory; Cambodia

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1. Introduction

Technical and Vocational Education and Training (TVET) is widely recognized as an important pathway for strengthening workforce skills, improving employability, and supporting inclusive economic development. At the global level, TVET helps young people prepare for employment, entrepreneurship, and the changing demands of digital and green economies (UNESCO, 2022). For lower-middle-income countries, TVET is especially important because economic upgrading depends not only on investment and infrastructure, but also on the availability of a skilled workforce.

Cambodia provides a clear example of this challenge. The country aims to reach upper-middle-income status by 2030 and high-income status by 2050 (United Nations

Development Programme [UNDP], 2024). It is also scheduled to graduate from Least Developed Country status in 2029 (United Nations, 2024). This transition is an important national achievement, but it also creates new pressure. After graduation, Cambodia will gradually lose some preferential trade arrangements that have supported its garment-dependent economy. As a result, the country needs to move toward higher-value and more skill-intensive production (United Nations Development Programme [UNDP], 2024). Cambodia also has a young population, which creates a demographic opportunity. This opportunity can support long-term economic growth only if young people gain the skills needed by the labor market.

In response, skills development has become a national policy priority. The Cambodia Skills Development Roadmap 2023–2035 emphasizes improving training quality, expanding access, and aligning skills provision with current and future labor-market needs (Ministry of Labour and Vocational Training, 2023). Recent initiatives, such as the World Bank's Skills for Better Jobs Project and the national TVET 1.5M program, also show the government's effort to improve the relevance, accessibility, and employment outcomes of TVET (The Star, 2023; The World Bank Group, 2024). These policies reflect a clear national commitment to strengthening TVET as part of Cambodia's development strategy.

However, participation in TVET remains a major challenge. The TVET 1.5M program was launched in late 2023 to train 1.5 million youth from poor and vulnerable families. By the end of 2024, only about 80,000 participants had signed up for the scheme, or roughly 5% of the target (Khmer Times, 2024). This low level of participation exists alongside a continuing demand for skilled workers, as many jobs in industry and services remain unfilled (Khmer Times, 2024). This gap suggests that policy expansion alone may not be enough. It is also necessary to understand how students view TVET and what factors shape their expectations of this educational pathway.

Several barriers may help explain the limited participation in TVET. Public TVET institutions continue to face challenges related to management systems, training materials, equipment, and overall institutional capacity (ASEAN, 2022). Public perception is another important barrier. TVET is often viewed as less prestigious than university education, and many students continue to prefer academic pathways (ASEAN, 2022; Tes & Oeun, 2025). In addition, students often make education and career decisions with limited access to reliable labor-market information and career guidance (World Bank et al., 2023). Evidence from Cambodia also shows that many upper-secondary students have limited knowledge of TVET and still plan to pursue university education (Tes & Oeun, 2025).

These conditions raise an important question about how students evaluate TVET. Students' decisions to enter, continue, and engage in TVET are likely to depend partly on what they expect to gain from it. In this study, outcome expectations refer to students' beliefs about the likely benefits of TVET, including employment opportunities, income prospects, career development, and social recognition. If students believe that TVET can lead to good jobs and meaningful career opportunities, they may view TVET more positively. In contrast, if students doubt the value of TVET, they may avoid it even when national policy promotes it. Understanding the factors associated with students' outcome expectations is therefore important for improving TVET participation, institutional planning, and skills-development policy in Cambodia.

This study is grounded in Social Cognitive Career Theory (SCCT). SCCT explains how educational and career decisions are shaped by self-efficacy, outcome expectations, and contextual supports (Lent & Brown, 2019). Self-efficacy refers to students' confidence in their ability to succeed in learning and career-related tasks. Contextual support refers to the support students perceive from their surrounding environment, including family, teachers, peers, institutions, and government. In the TVET context, students' outcome

expectations may be shaped by their confidence in their own ability, the encouragement they receive from others, and their perceptions of government and institutional support. Because TVET is closely connected to employment and career preparation, SCCT provides a useful framework for examining how students form expectations about TVET in Cambodia.

Although Cambodia has placed strong policy emphasis on TVET, limited empirical evidence explains what shapes students' expectations of public TVET institutions. This gap is important because students' expectations can influence how they view TVET as a possible educational and career pathway. In addition, fields of study within TVET differ in their content, skill requirements, and links to the labor market. For example, engineering, construction, business, service, and digital fields may offer different career pathways and may depend on different forms of support. Therefore, the factors associated with students' expectations may not be the same across all fields of study. Accordingly, this study addresses two research questions (RQs):

- ***RQ1. To what extent are self-efficacy, perceived social support, and perceived government and institutional support associated with students' outcome expectations in public TVET institutions in Phnom Penh, Cambodia?***
- ***RQ2. Does the pattern of associations between these factors and students' outcome expectations appear consistent across sector-based major groups?***

Based on these questions, the study has two main aims. First, it examines the factors associated with students' outcome expectations toward public TVET in Phnom Penh, focusing on self-efficacy, perceived social support, and perceived government and institutional support. Second, it explores whether the pattern of these associations appears consistent across sector-based major groups through a stratified subgroup analysis. By doing so, the study contributes to the limited evidence on student expectations in a Southeast Asian, lower-middle-income public TVET system. It also provides policy-relevant insights into which forms of support are associated with more favorable expectations of TVET among students.

The remainder of the paper is organized as follows. Section 2 presents the literature review and hypotheses. Section 3 sets out the conceptual framework. Section 4 describes the methodology, including the research design, instruments, validity and reliability, and analytic strategy. Section 5 reports the results. Section 6 presents the discussion, policy implications, limitations, and conclusions.

2. Literature Review and Hypotheses

2.1. Social Cognitive Career Theory

Social Cognitive Career Theory (SCCT) explains how individuals form educational and career choices through the interaction of personal beliefs, outcome expectations, goals, and contextual supports and barriers (Lent & Brown, 2019; Lent et al., 1994). SCCT builds on Bandura's (2002) social cognitive theory, which emphasizes the importance of self-efficacy in motivation, behavior, and decision-making. In SCCT, self-efficacy, outcome expectations, and goals are central factors that influence how individuals evaluate educational and career pathways. Contextual supports and barriers also play an important role because they can shape what individuals believe they can achieve and what outcomes they expect from a particular choice. A key idea in SCCT is that perceived support matters. Students' beliefs about the support available to them may influence their educational and career expectations, even when the actual level of support is difficult to measure. For example, students may develop more positive expectations when they believe that their family, teachers, peers, institutions, and government provide meaningful support for their training and future careers. These perceived supports may influence outcome expectations directly and may also strengthen students' self-efficacy (Lent & Brown, 2019; Lent et al., 1994).

In this study, outcome expectations refer to students' beliefs about the likely benefits of pursuing TVET, including employment opportunities, income prospects, career growth, skill development, and social recognition (Lent, 2020). Because TVET is closely linked to workforce preparation and career development, SCCT provides a useful framework for examining how Cambodian students form expectations about public TVET institutions. This definition is important because outcome expectations are conceptually different from students' evaluations of current institutional quality. For example, expecting TVET to lead to better employment is not the same as believing that an institution currently has good facilities or effective teaching. This distinction is important because perceived government and institutional support is examined as a predictor of outcome expectations in this study.

2.2. Self-Efficacy and Outcome Expectations

Self-efficacy refers to students' beliefs in their ability to perform learning and career-related tasks successfully (Lent, 2020). Within SCCT, self-efficacy is expected to shape outcome expectations because students who believe they can meet training requirements are more likely to expect positive results from their educational pathway. In the TVET context, students with stronger self-efficacy may believe that they can acquire technical skills, complete practical training, adapt to workplace demands, and succeed in future employment. These beliefs can strengthen their expectations that TVET will lead to desirable outcomes, such as employability, income opportunities, career growth, and social recognition.

Previous studies support this theoretical relationship. Research in TVET and vocational settings has shown that self-efficacy is positively related to vocational interest, career choice, employability development, and outcome expectations (Azeem et al., 2021; Lent et al., 1994; Omar et al., 2023; Sandra & Mularsih, 2021; Suyitno et al., 2025). These findings suggest that students' confidence in their own abilities is an important foundation for how they evaluate vocational education and its potential benefits. Accordingly, this study proposes the following hypothesis:

H1. *Self-efficacy is positively associated with students' outcome expectations in public technical and vocational education and training (TVET).*

2.3. Perceived Social Support and Outcome Expectations

Perceived social support refers to students' perceptions that important people around them, such as parents, teachers, peers, and friends, provide encouragement, advice, guidance, and assistance in their educational and career decisions. Within SCCT, social support is a contextual factor that can shape students' career-related beliefs and expectations (Lent & Brown, 2019). When students receive positive messages and practical guidance from people they trust, they may be more likely to view TVET as a valuable and acceptable pathway.

In many educational contexts, students do not make career decisions independently. Family expectations, teacher advice, peer opinions, and community attitudes can influence how students understand the value of different educational pathways. This may be particularly relevant for TVET, because vocational education is sometimes viewed as less prestigious than university education (ASEAN, 2022; Tes & Oeun, 2025). Positive social support may therefore help students develop more favorable expectations of TVET by increasing their confidence, reducing uncertainty, and reinforcing the belief that vocational training can lead to meaningful employment and career development.

Prior research has shown that support from family, teachers, peers, and mentors is associated with students' educational decisions, career interests, and attitudes toward vocational pathways (Alshahrani et al., 2018; Ayub, 2017; Azeem et al., 2021; Hong et al., 2022; Wang et al., 2023). Based on this literature and the SCCT framework, this study proposes the following hypothesis:

H2. *Perceived social support is positively associated with students' outcome expectations in public technical and vocational education and training (TVET).*

2.4. Perceived Government and Institutional Support and Outcome Expectations

Perceived government and institutional support refers to students' perceptions that the government and public TVET institutions provide adequate policy support, funding, training quality, facilities, career guidance, and employment-related services. Within SCCT, contextual supports and barriers influence whether students expect an educational pathway to produce desirable outcomes (Lent & Brown, 2019). In this study, government and institutional support is treated as an important contextual factor because public TVET in Cambodia is closely connected to national skills-development policy and institutional capacity.

In Cambodia, national policy has emphasized improving TVET quality, expanding access, strengthening labor-market relevance, and increasing the attractiveness of TVET (Ministry of Labour and Vocational Training, 2023; Royal Government of Cambodia, 2017). However, the system continues to face challenges related to enrollment, equipment, institutional management, public perception, and labor-market alignment (ADB, 2018; ASEAN, 2022; UNESCO-UNEVOC, 2020; Veung, 2024). These challenges may influence how students evaluate the value of TVET. If students perceive that the government and their institutions provide strong support, they may be more likely to believe that TVET can lead to employment, income, and career development. In contrast, if they perceive weak support or poor institutional quality, their expectations may be less positive.

As operationalized in this study, this construct includes both government-level support and institution-level support. It therefore captures students' perceptions of the broader public TVET system as well as the quality of their own learning environment. Based on SCCT and Cambodia's TVET policy context, this study proposes the following hypothesis:

H3. *Perceived government and institutional support is positively associated with students' outcome expectations in public technical and vocational education and training (TVET).*

2.5. Differences Across Sector-Based Major Groups: Exploratory Analysis

Fields of study in TVET differ in their content, skill requirements, training methods, and occupational pathways. These differences are reflected in the International Standard Classification of Education, Fields of Education and Training 2013 (ISCED-F 2013), which classifies education programs according to their subject content and professional orientation (UNESCO Institute for Statistics, 2015). In the Cambodian context, sectoral differences are also important because job opportunities, salary levels, sector growth, and skill demand vary across economic sectors (Ky et al., 2024). For example, students in engineering, construction, digital, business, and service-related fields may face different labor-market conditions and may therefore form different expectations about the value of TVET.

Based on this reasoning, it is plausible that the associations between self-efficacy, perceived social support, perceived government and institutional support, and outcome expectations may vary across sector-based major groups. Students in some fields may rely more strongly on their own confidence, while students in other fields may place greater weight on institutional support, career guidance, employer linkages, or encouragement from family, teachers, and peers. However, because existing evidence on these field-based differences in Cambodian TVET remains limited, this study treats this issue as exploratory rather than as a confirmatory moderation hypothesis.

Accordingly, the study examines whether the pattern of associations appears to differ across sector-based major groups by estimating the regression model separately within each subgroup. This stratified analysis is descriptive. It is used to identify possible field-specific patterns, not to formally test whether the coefficients differ significantly across groups.

3. Conceptual Framework

This study develops its conceptual framework based on Social Cognitive Career Theory (SCCT), which explains that students' educational and career-related expectations are shaped by both personal beliefs and contextual supports (Lent & Brown, 2019; Lent et al., 1994). In this framework, as shown in Figure 1, students' outcome expectations (OE) serve as the dependent variable, and self-efficacy (SE), perceived social support (PSS), and perceived government and institutional support (PGS) serve as the three independent variables used to predict OE, corresponding to H1 to H3. These terms refer to the statistical roles of the variables in the regression model, and the estimated relationships are interpreted as associations rather than causal effects.

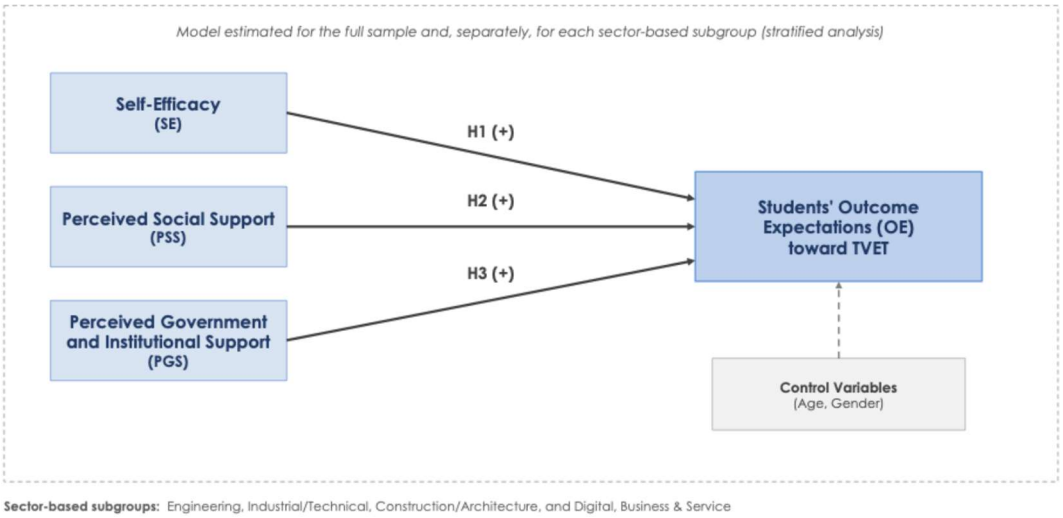


Figure 1. Conceptual framework. *Note:* Solid arrows denote the hypothesized direct associations (H1 to H3); the dotted arrow denotes control variables. The dashed border indicates that the model is estimated for the full sample and, separately, within each sector-based subgroup (stratified analysis).

Self-efficacy refers to students' confidence in their ability to succeed in TVET-related learning and career tasks. Students with higher self-efficacy are expected to have more positive outcome expectations because they are more likely to believe that they can complete their training, develop useful skills, and succeed in future employment. Perceived social support refers to students' perceptions of encouragement, guidance, and assistance from family members, teachers, peers, friends, and other important people. Such support may help students view TVET as a more acceptable and valuable educational pathway. Perceived government and institutional support refers to students' perceptions of policy commitment, institutional quality, training resources, teaching quality, facilities, career guidance, and employment-related support. This factor is particularly important in the Cambodian public TVET context, where students' expectations may depend on their confidence in the ability of government and institutions to provide relevant and credible training.

Age and gender are included as control variables to account for possible demographic differences in students' outcome expectations. Sector-based major group is not treated as a formal moderator in this study. Instead, it is used as a stratifying variable. The model is first estimated using the full sample and then re-estimated separately within each sector-based subgroup. This approach allows the study to describe whether the pattern of associations appears consistent across fields of study. Because no formal interaction test is conducted, the subgroup analysis should be interpreted as exploratory and descriptive.

4. Methodology

4.1. Research Design

The study employed a quantitative, cross-sectional survey design with an online, self-administered questionnaire, conducted among students enrolled in public TVET institutions in Phnom Penh, Cambodia. Because the design is cross-sectional and all variables are self-reported, the analysis supports statements of association and prediction rather than causal inference; the language of the paper has been set accordingly.

4.2. Research Sample

The study population comprised 3556 bachelor's-degree students enrolled in seven public TVET institutions in Phnom Penh. A stratified sampling approach was used to represent the institutions, with the planned number of respondents drawn from each institution set in proportion to its share of the population (Table 1). Based on Yamane's formula, the minimum sample size was estimated at approximately 450, including an allowance for nonresponse (Ahmed, 2024; Yamane, 1973). A total of 616 valid responses were obtained, corresponding to an overall participation rate of 17.32%, and all seven institutions were represented in the final sample. Population Share (%) was calculated as the institutional population divided by the total population of 3556 students. Respondents (n) refers to the number of valid responses obtained from each institution, while Respondents (%) refers to each institution's share of the final achieved sample of 616 valid responses. Difference (pp) was calculated as Respondents (%) minus Population Share (%). A positive value indicates that the institution was overrepresented in the achieved sample, while a negative value indicates underrepresentation. Because the final data were collected through an online voluntary survey, the achieved sample distribution should be interpreted with caution. However, the achieved distribution was not fully proportional to the institutional population (Table 1): NPIC, NIEI, and ITI were overrepresented relative to their population share, whereas NTTI, PPI, and NIB were underrepresented; CTSDI, by contrast, was sampled almost exactly in proportion to its population share. The divergence from proportional representation was largest for NIEI and ITI, which were sampled roughly 11 to 12 percentage points above their population share, and for PPI, which fell about 12 percentage points below it. The sample also included students from diverse TVET fields, with the largest groups from electrical engineering, civil engineering, information technology, accounting and finance, and other majors. Since the survey was conducted online, possible nonresponse and self-selection bias should be considered when interpreting the findings.

Table 1. Proportion allocation of sample size in each institution.

No.	TVET Institution	Male	Female	Total Population	Population Share (%)	Proportional Sample Size (n)	Respondents (n)	Respondents (%)	Difference (pp)
1	National Polytechnic Institute of Cambodia (NPIC)	938	114	1052	29.58	133	204	33.12	+3.54
2	National Technical Training Institute (NTTI)	629	88	717	20.16	91	91	14.77	−5.39
3	Preah Kossomak Polytechnic Institute (PPI)	665	129	794	22.33	100	65	10.55	−11.78
4	National Institute of Business (NIB)	202	502	704	19.80	89	66	10.71	−9.09

Table 1. *Cont.*

No.	TVET Institution	Male	Female	Total Population	Population Share (%)	Proportional Sample Size (n)	Respondents (n)	Respondents (%)	Difference (pp)
5	National Institute of Entrepreneurship and Innovation (NIEI)	62	69	131	3.68	17	92	14.94	+11.26
6	Industrial Technical Institute (ITI)	100	9	109	3.07	14	91	14.77	+11.70
7	Cambodian-Thai Skills Development Institute (CTSDI)	42	7	49	1.38	6	7	1.14	−0.24
	Total	**2638**	**918**	**3556**	**100.00**	**450**	**616**	**100.00**	**0.00**

Note: Population Share (%) = institutional population/total population × 100, representing the proportion expected under exact proportional allocation. Proportional Sample Size = Population Share applied to the planned sample of 450. Difference (pp) = Respondents (%) − Population Share (%), expressed in percentage points; a positive value indicates over-representation and a negative value indicates under-representation in the achieved sample. The difference is reported in percentage points (rather than raw counts) so that it reflects representativeness independently of the larger achieved total (n = 616 vs. planned n = 450).

4.3. Research Instruments

The questionnaire comprised five parts adapted from prior studies. Part I included five demographic items. Part II measured self-efficacy with 13 items adapted from Nordin and Omar (2024) and Schwarzer and Jerusalem (1995). Part III measured outcome expectations with 10 items adapted from Mutungi (2023), Taherdoost (2019), and Wong and Atan (2021). Part IV measured perceived social support with 10 items adapted from Wong and Atan (2021). Part V measured perceived government and institutional support with 10 items adapted from Mutungi (2023) and Taherdoost (2019). All substantive items used a six-point response format. The outcome expectations, perceived social support, and perceived government and institutional support items used agreement anchors (from strongly disagree to strongly agree), whereas the self-efficacy items used capability anchors (from not at all true to exactly true).

Two measurement features warrant explicit treatment. First, the self-efficacy scale combines general self-efficacy items (e.g., handling unexpected situations and remaining calm under difficulty) with TVET-specific items. This mixed composition is relevant to the convergent-validity results reported in Section 4.4, where the scale's lower average variance extracted is interpreted as a measurement limitation. Second, the perceived social support scale contains negatively worded items (e.g., an item stating that the counseling received about TVET was negative, and an item framing TVET as mainly for students from low-income families). Before computing the final scale scores, the negatively worded perceived social support items, PSS4 and PSS7, were reverse-coded so that higher scores consistently indicated higher perceived social support. The six-point format omits a neutral midpoint, which is a deliberate forced-choice design and is noted here for transparency.

4.4. Validity, Reliability, and Measurement Model

Content validity was established through several rounds of expert review and revision, together with the item–objective congruence (IOC) procedure. Three experts in relevant social-science fields rated each item, and an IOC value above 0.60 was treated as acceptable (Turner & Carlson, 2003). A pilot study with 30 students preceded the main survey. Internal consistency was assessed using Cronbach's alpha for both the pilot and the full sample (Table 2). Full-sample reliabilities ranged from acceptable to high (0.819 to 0.924), exceeding the conventional 0.70 benchmark for all four constructs (Aithal & Aithal, 2020).

Table 2. Internal consistency reliability for the pilot study and the full sample.

Construct (Number of Items)	Pilot α (n = 30)	Full-Sample α (n = 616)
Self-efficacy (13)	0.737	0.891
Outcome expectations (10)	0.797	0.924
Perceived social support (10)	0.781	0.819
Perceived government and institutional support (10)	0.896	0.923

To complement the reliability evidence, a measurement model was estimated to verify both convergent validity (i.e., that items load on their intended construct) and discriminant validity (i.e., that the constructs are empirically distinct). Composite reliability (CR) and average variance extracted (AVE) are reported in Table 3, and discriminant validity was evaluated using the heterotrait–monotrait (HTMT) ratio (Table 4) and the Fornell–Larcker criterion (Table 5).

Table 3. Construct reliability and convergent validity.

Construct (Number of Items)	Full-Sample α (n = 616)	CR	AVE	Interpretation
Self-efficacy (13)	0.891	0.910	0.443	CR acceptable; AVE < 0.50
Outcome expectations (10)	0.924	0.937	0.597	Convergent validity supported
Perceived social support (10)	0.819	0.874	0.415	CR acceptable; AVE < 0.50
Perceived government and institutional support (10)	0.923	0.937	0.601	Convergent validity supported

Table 4. Heterotrait–monotrait (HTMT) ratios.

Construct	SE	OE	PSS	PGS
SE	1.000			
OE	0.637	1.000		
PSS	0.570	0.715	1.000	
PGS	0.555	0.837	0.800	1.000

Table 5. Fornell–Larcker criterion: The diagonal values are the square roots of AVE.

Construct	SE	OE	PSS	PGS
SE	**0.665**			
OE	0.571	**0.772**		
PSS	0.470	0.588	**0.644**	
PGS	0.498	0.771	0.662	**0.775**

Composite reliability exceeded 0.70 for all four constructs (0.874 to 0.937), indicating strong internal consistency at the construct level. AVE exceeded the 0.50 threshold for outcome expectations (0.597) and perceived government and institutional support (0.601), supporting convergent validity for these scales. For self-efficacy (0.443) and perceived social support (0.415), AVE fell below 0.50. Because CR for both constructs remained well above 0.60, convergent validity can still be regarded as adequate (Fornell & Larcker, 1981). The lower AVE values are nonetheless noted as a measurement limitation, as they indicate that a substantial share of item variance is attributable to measurement error.

Discriminant validity was first assessed using the HTMT ratio (Henseler et al., 2015). All ratios fell below the conservative 0.85 cutoff (Table 4), supporting discriminant validity across the four constructs. The two highest ratios both involved perceived government and institutional support, specifically its relationship with outcome expectations (0.837) and with perceived social support (0.800); each approaches the threshold and points to limited separation among these constructs.

The Fornell–Larcker criterion (Table 5) produced a consistent but slightly more conservative pattern. Self-efficacy, outcome expectations, and perceived government and institutional support each met the criterion, with the square root of AVE exceeding the construct's correlations with the others, although the margin for outcome expectations was narrow. Perceived social support was the single exception: its correlation with perceived government and institutional support (0.662) marginally exceeded the square root of its own AVE (0.644). Because the HTMT ratio is generally regarded as the more sensitive and reliable test of discriminant validity (Henseler et al., 2015), and because the corresponding HTMT value (0.800) remained below the cutoff, the constructs are interpreted as empirically distinct, while the close relationship between perceived social support and perceived government and institutional support is acknowledged.

The construct pair that warrants the closest attention is perceived government and institutional support and outcome expectations, because items in both scales reference the quality of the student's institution. This pair satisfied both criteria under conventional thresholds, but it did so by the smallest margins in the model: it produced the highest HTMT ratio (0.837), and its latent correlation (0.771) fell just below the square root of AVE for outcome expectations (0.772). These results indicate that the two constructs are statistically separable while sharing meaningful conceptual overlap. Associations involving perceived government and institutional support and outcome expectations are therefore interpreted with caution, and the refinement of these scales (i.e., revising or removing items that conflate current institutional quality with anticipated future outcomes) is identified as a priority for future measurement work.

4.5. Data Analysis

Data were analyzed in SPSS version 29.0. Descriptive statistics summarized the sample and the item-level response distributions. Pearson correlations examined the bivariate associations among all constructs, including the predictor inter-correlations. Hierarchical multiple linear regression then estimated the associations of self-efficacy, perceived social support, and perceived government and institutional support with outcome expectations, entering the controls first and adding the substantive predictors in successive blocks. To support interpretation, standardized coefficients are reported alongside unstandardized coefficients, and multicollinearity is assessed using the variance inflation factor (VIF) and tolerance. Standard regression diagnostics (linearity, normality of residuals, homoscedasticity, and influential cases) are examined. Statistical significance was set at $\alpha = 0.05$.

To address RQ2, the regression was re-estimated separately within four sector-based subgroups (Engineering/Industrial Technical; Construction/Architecture; Digital, Business and Service; Other/Unclassified). This stratified analysis is descriptive: it characterizes the associations observed within each subgroup, and it does not test whether those associations differ significantly between subgroups. Because all variables were measured using self-reported data collected at a single time point, common method variance was assessed using Harman's single-factor test (Podsakoff et al., 2003). The unrotated solution showed that the first factor accounted for 36.93% of the total variance, below the commonly used 50% threshold. This provides preliminary reassurance that common method variance is unlikely to substantially bias the findings, although Harman's test is a relatively insensitive diagnostic, so the result is best read as suggestive rather than conclusive.

4.6. Ethical Considerations

The study received ethical approval from the Center for Ethics in Human Research, Khon Kaen University, Thailand (Reference No. HE683420). The questionnaire and participant information sheet were translated from English into Khmer and verified by the

ASEAN Languages and Cultures unit, Faculty of Humanities and Social Sciences, Mahasarakham University, to support linguistic and contextual accuracy. Participation was voluntary, and confidentiality was maintained throughout. Participants' identities were not disclosed, electronic data were stored in password-protected files, and hard copies were kept in a locked cabinet. No participant information was shared outside the research team.

5. Results

5.1. Profile of the Respondents

A total of 616 undergraduate students from public TVET institutions in Phnom Penh participated. Most respondents were aged 18 to 24 years (98.70%, n = 608), with 1.14% (n = 7) aged 25 to 44 and 0.16% (n = 1) aged 45 or older. The sample was predominantly male (65.42%, n = 403), followed by female students (33.60%, n = 207), and 0.97% (n = 6) preferred not to disclose their gender. The largest institutional group was the National Polytechnic Institute of Cambodia (33.12%, n = 204), and the most common major was Electrical Engineering (25.16%, n = 155). The full profile is shown in Table 6.

Table 6. Profile of the respondents (N = 616).

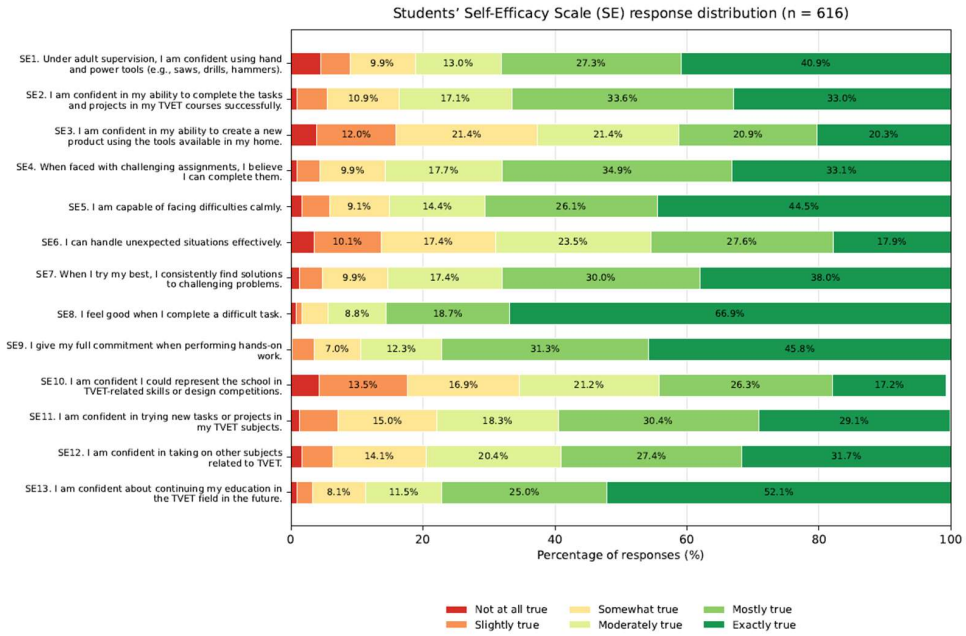
Characteristic	n	%
Age		
18–24	608	98.70
25–44	7	1.14
≥45	1	0.16
Gender		
Male	403	65.42
Female	207	33.60
Prefer not to say	6	0.97
Degree level		
Bachelor	616	100
TVET institution		
National Polytechnic Institute of Cambodia (NPIC)	204	33.12
National Technical Training Institute (NTTI)	91	14.77
Preah Kossomak Polytechnic Institute (PPI)	65	10.55
National Institute of Business (NIB)	66	10.71
National Institute of Entrepreneurship and Innovation (NIEI)	92	14.94
Industrial Technical Institute (ITI)	91	14.77
Cambodian-Thai Skills Development Institute (CTSDI)	7	1.14
Major in TVET		
Electrical Engineering	155	25.16
Electricity	15	2.44
Electronic Engineering	14	2.27
Civil Engineering	109	17.69
Civil Construction	3	0.49
Architecture Engineering	2	0.32
Mechanical Engineering	36	5.84
Computer Science	29	4.71
Information Technology	63	10.23
International Relations	1	0.16
Tourism Management	10	1.62
Energy Technology	1	0.16
Accounting and Finance	59	9.58
Business Management	18	2.92
Management	8	1.30
Marketing	16	2.60
Finance	4	0.65
English Literature	1	0.16
Other	72	11.69

Note: N = 616. All seven institutions are listed; percentages are rounded and may not sum to exactly 100.

5.1.1. Self-Efficacy

Overall, students reported high self-efficacy, with most responses falling in the positive categories (mostly true and exactly true). The highest agreement was for feeling good upon completing a difficult task (exactly true = 66.9%), followed by confidence about continuing

TVET education in the future (exactly true = 52.1%). The item-level distribution is shown in Figure 2.

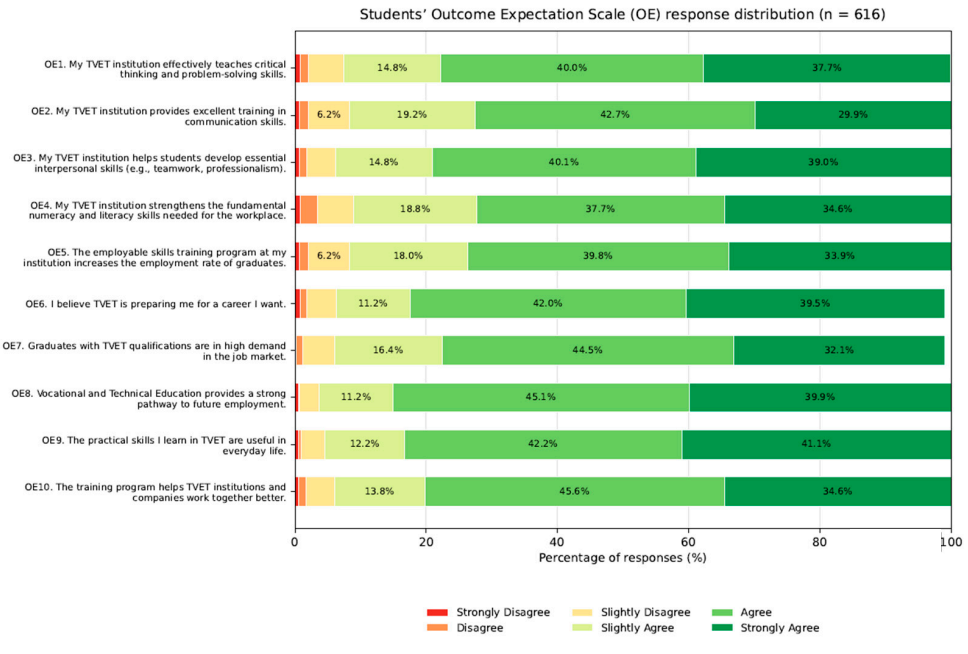


Note. Six-point response options: Not at all true, Slightly true, Somewhat true, Moderately true, Mostly true, Exactly true.

Figure 2. Item-level response distribution for the self-efficacy scale (N = 616).

5.1.2. Outcome Expectations

Students reported positive outcome expectations, with most selecting agree or strongly agree across items (72.24% to 85.07%). The highest agreement was for TVET providing a strong pathway to future employment (85.07%), followed by TVET skills being useful in everyday life (83.28%) and TVET preparing students for a desired career (81.47%). The distribution is shown in Figure 3.



Note. Six-point response options from Strongly Disagree to Strongly Agree.

Figure 3. Item-level response distribution for the outcome expectations scale (N = 616).

5.1.3. Perceived Social Support

Students generally reported positive perceived social support. Peer opinions were viewed favorably (66.39%), and teacher-provided information was also viewed positively overall (73.05%), with some variation across items. School counseling received comparatively lower agreement (47.57%). The distribution is shown in Figure 4.

5.1.4. Perceived Government and Institutional Support

Students reported positive perceived government and institutional support, with agreement (agree or strongly agree) ranging from 70.78% to 83.12% across the 10 items. The highest agreement was for instructors' knowledge of job-market requirements (83.12%) and the effectiveness of the National TVET Policy (82.95%), followed by the availability of trained trainers and teachers (81.82%). Lower agreement was reported for modern and adequate facilities (70.78%) and for tuition policies that make TVET affordable (71.43%). The distribution is shown in Figure 5.

5.2. Correlations

Pearson correlations examined the associations among the constructs. Outcome expectations were positively and significantly correlated with all three predictors: most strongly with perceived government and institutional support (r = 0.771, 95% CI [0.737, 0.801]), followed by perceived social support (r = 0.588, 95% CI [0.534, 0.637]) and self-efficacy (r = 0.571, 95% CI [0.515, 0.622]); all confidence intervals excluded zero. The full correlation matrix, including the predictor inter-correlations, is shown in Table 7, and the associations with outcome expectations are illustrated in Figure 6.

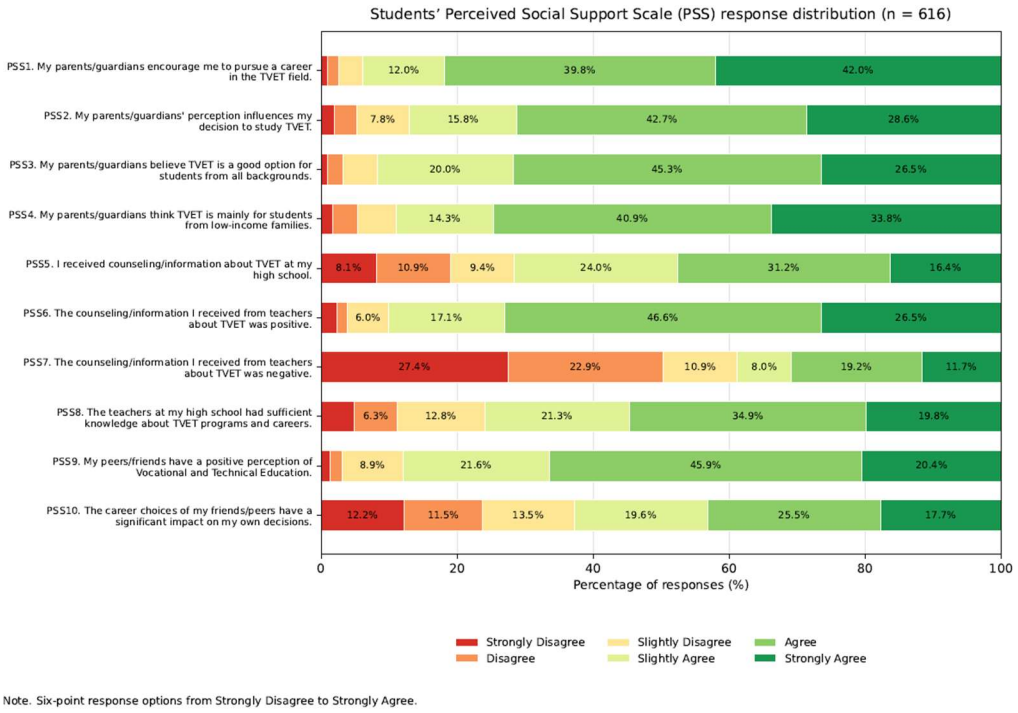


Figure 4. Item-level response distribution for the perceived social support scale (N = 616).

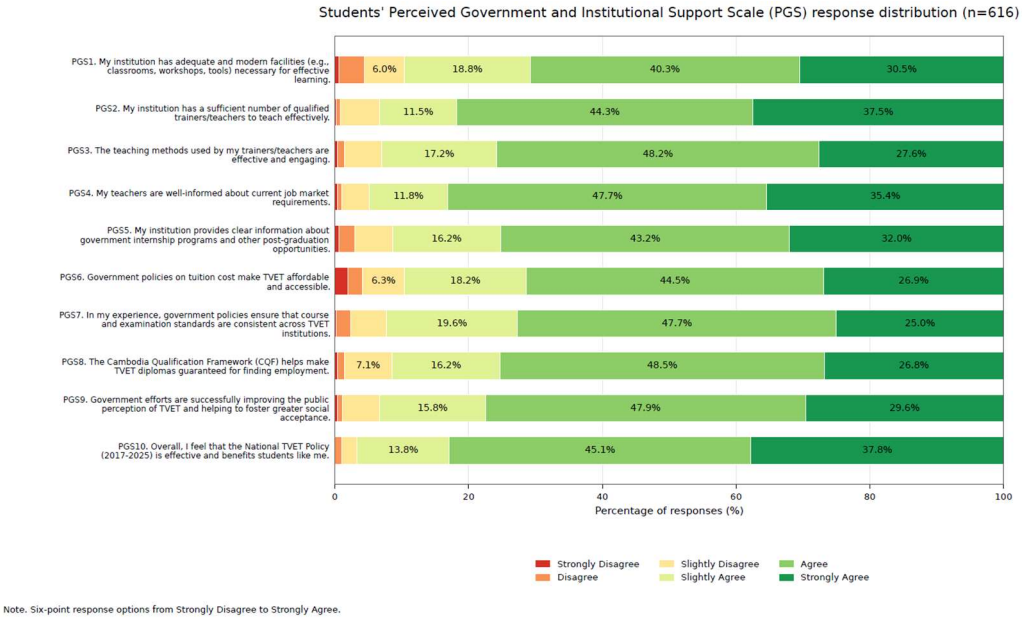


Figure 5. Item-level response distribution for the perceived government and institutional support scale (N = 616).

Table 7. Inter-construct correlation matrix (N = 616).

	SE	PSS	PGS	OE
Self-efficacy (SE)	1.00			
Perceived social support (PSS)	0.470 ***	1.00		
Perceived government & institutional support (PGS)	0.498 ***	0.662 ***	1.00	
Outcome expectations (OE)	0.571 ***	0.588 ***	0.771 ***	1.00

Note: *** $p < 0.001$.

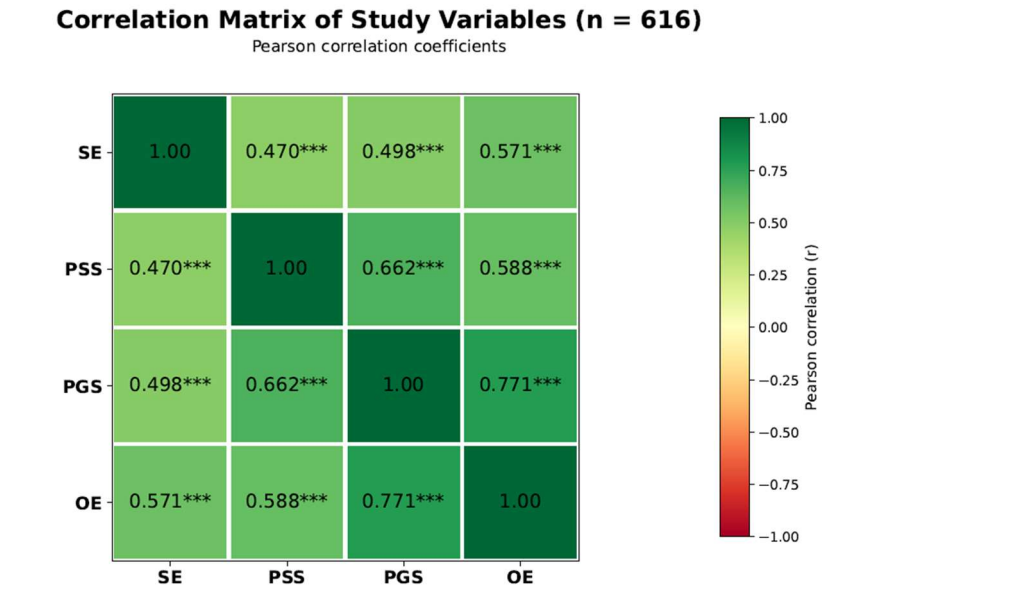


Figure 6. Correlations of self-efficacy, perceived social support, and perceived government and institutional support with outcome expectations (N = 616).

5.3. Hierarchical Multiple Regression

Table 8 reports six multiple regression models predicting outcome expectations. Model 1 included demographic controls only. Model 2 added self-efficacy, Model 3 included self-efficacy and perceived government and institutional support, Model 4 included self-efficacy and perceived social support, and Model 5 included perceived social support and perceived government and institutional support. Model 6 was the full model, including demographic controls and all three substantive predictors: self-efficacy, perceived social support, and perceived government and institutional support.

Table 8. Hierarchical multiple regression predicting outcome expectations (N = 616).

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6 (Full)
Demographic controls (age, gender)	Included	Included	Included	Included	Included	Included
Self-efficacy (SE)	–	0.517 *** (0.029)	0.227 *** (0.025)	0.349 *** (0.030)	–	0.214 *** (0.026)
Perceived social support (PSS)	–	–	–	0.361 *** (0.031)	0.125 *** (0.031)	0.073 * (0.030)
Perceived government & inst. support (PGS)	–	–	0.629 *** (0.028)	–	0.670 *** (0.034)	0.584 *** (0.034)
R	0.129	0.594	0.803	0.688	0.780	0.805
R^2	0.017	0.353	0.645	0.474	0.608	0.649
Adjusted R^2	0.014	0.350	0.643	0.470	0.606	0.646
Std. error of estimate	0.724	0.588	0.435	0.531	0.458	0.434

Note: Entries are unstandardized coefficients (B) with standard errors in parentheses. Dependent variable = outcome expectations; controls = age and gender. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The full model accounted for 64.9% of the variance in outcome expectations ($R^2 = 0.649$, adjusted $R^2 = 0.646$). In that model, all three predictors were positively and significantly associated with outcome expectations: perceived government and institutional support showed the strongest association (B = 0.584, $p < 0.001$), followed by self-efficacy (B = 0.214, $p < 0.001$) and perceived social support (B = 0.073, $p < 0.05$).

Two patterns merit comment and motivate the diagnostics in Table 9. The coefficient for perceived social support attenuated substantially from the bivariate correlation (r = 0.588) to the full-model coefficient (B = 0.073), and the self-efficacy coefficient declined from B = 0.517 (entered alone) to B = 0.214 (full model). Attenuation of this magnitude is consistent with shared variance among the predictors, which is why the predictor intercorrelations (Table 7) and the collinearity statistics (Table 9) are essential for interpretation.

Table 9. Full-model diagnostics.

Predictor (Full Model)	B (SE)	β (Standardized)	VIF	Tolerance
Self-efficacy (SE)	0.214 (0.026)	0.242	1.451	0.689
Perceived social support (PSS)	0.073 (0.030)	0.079	1.867	0.536
Perceived government & inst. support (PGS)	0.584 (0.034)	0.591	1.993	0.502

Note: Standardized coefficients (β), VIF, and tolerance are reported for each predictor; VIF below 5 (ideally below 3) and tolerance above 0.20 indicate acceptable collinearity.

5.4. Stratified Subgroup Analysis

To address RQ2, the regression was re-estimated within each sector-based subgroup (Table 10). Perceived government and institutional support was significant within all four

subgroups, and self-efficacy was significant within all four, with its largest coefficient in the Digital, Business and Service subgroup (B = 0.279, $p < 0.001$). Perceived social support reached significance only within the Engineering/Industrial Technical subgroup (B = 0.136, $p < 0.05$). Because the subgroups differ in size (n = 72 to 221) and therefore in statistical power, the non-significant within-group coefficients should not be read as evidence that an association is absent in those fields.

Table 10. Stratified (subgroup) regression by sector-based major group.

Predictor	Engineering/Industrial Technical (n = 221)	Construction/Architecture (n = 114)	Digital, Business and Service (n = 209)	Other/Unclassified (n = 72)
Self-efficacy (SE)	0.147 ** (0.050)	0.196 * (0.077)	0.279 *** (0.055)	0.223 * (0.086)
Perceived social support (PSS)	0.136 * (0.055)	0.085 (0.110)	0.096 (0.053)	−0.098 (0.119)
Perceived gov. & inst. support (PGS)	0.530 *** (0.074)	0.525 ** (0.184)	0.611 *** (0.072)	0.604 *** (0.142)
Controls (age, gender)	Included	Included	Included	Included

Note: Entries are unstandardized coefficients (B) with standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6. Discussion and Conclusions

6.1. Summary of Findings

This study examined the factors associated with students' outcome expectations in public TVET institutions in Phnom Penh, Cambodia. Three main findings emerged. First, outcome expectations were positively and significantly correlated with self-efficacy, perceived social support, and perceived government and institutional support. Among these factors, perceived government and institutional support had the strongest correlation with outcome expectations. Second, the hierarchical regression model, after adjusting for age and gender, explained 64.9% of the variance in students' outcome expectations. In the full model, all three predictors remained positively and significantly associated with outcome expectations. Perceived government and institutional support showed the strongest association, followed by self-efficacy and perceived social support. This result suggests that students' expectations of TVET are related not only to their own confidence, but also to how they evaluate the support provided by government and public TVET institutions. Third, the stratified subgroup analysis showed that self-efficacy and perceived government and institutional support were significant within all four sector-based major groups. Perceived social support was significant only within the Engineering/Industrial Technical subgroup. These results suggest that the factors associated with outcome expectations may vary across fields of study. However, because the subgroup analysis was exploratory and subgroup sizes differed, these patterns should be interpreted as descriptive rather than as evidence of confirmed differences between fields.

6.2. Interpretation

The findings are broadly consistent with Social Cognitive Career Theory (SCCT), which explains that educational and career-related expectations are shaped by both personal beliefs and contextual supports (Lent, 2020; Lent & Brown, 2019). In this study, students with higher self-efficacy tended to report more positive outcome expectations. This finding is theoretically expected because students who believe that they can succeed in TVET-related learning and career tasks are more likely to believe that TVET will lead to favorable outcomes, such as employment, income, career development, and social recognition. The result also supports previous studies showing that self-efficacy is linked to vocational

interest, career choice, and employability development (Abu Bakar et al., 2024; Azeem et al., 2021; Omar et al., 2023).

Perceived social support was also positively associated with outcome expectations, although its effect became smaller after self-efficacy and perceived government and institutional support were included in the model. This suggests that encouragement from family, teachers, peers, and other people remains relevant, but it may not be the main factor shaping students' expectations in this context. One possible explanation is that students in public TVET institutions may form their expectations more strongly from their own confidence and from their assessment of whether the TVET system can provide quality training and real employment opportunities. In other words, social support may help students view TVET more positively, but its influence may operate partly through students' self-efficacy and their perceptions of institutional credibility.

The strongest association was found for perceived government and institutional support. This finding is especially important in Cambodia, where TVET is closely connected to national development policy and public-sector reform. The government plays a central role in setting TVET policy, funding institutions, improving training standards, and linking TVET with labor-market needs. Therefore, students' expectations of TVET may depend strongly on whether they believe that government and public institutions can provide quality training, adequate facilities, competent teachers, career guidance, and employment-related support.

This pattern is understandable in the Cambodian context. Cambodia is trying to strengthen its skills-development system as part of its transition toward a more skill-intensive economy. However, the public TVET system still faces challenges related to institutional capacity, equipment, training quality, public image, and labor-market alignment (ASEAN, 2022; Ministry of Labour and Vocational Training, 2023; Veung, 2024; World Bank et al., 2023). Under these conditions, students may not automatically assume that TVET will lead to good employment outcomes. Instead, their expectations may depend on how strongly they perceive government and institutional support. If students believe that the government and their institutions are serious, capable, and well connected to the labor market, they may expect better outcomes from TVET. If they perceive weak support, outdated facilities, or unclear employment pathways, their expectations may be lower. This finding also helps explain how Cambodia may differ from countries with well-established vocational systems. In mature dual-model VET systems, such as those in Germany and Switzerland, vocational pathways are widely characterized by strong employer involvement, clear training standards, and well-recognized transitions from training to employment (Ratnata, 2013). Where institutional quality and labor-market linkage are comparatively stable and socially accepted, differences in students' expectations may depend more on individual factors, such as self-efficacy or career interest. By contrast, in a developing public TVET system, where vocational pathways are still often viewed as a second choice, perceived government and institutional support may carry greater weight, which may help explain why this factor emerged as the strongest correlate in the Cambodian sample.

The finding contributes to SCCT in two ways. First, it supports the theory's argument that contextual supports are important in shaping outcome expectations (Lent & Brown, 2019; Lent et al., 1994). In this study, contextual support was not limited to family, teachers, and peers. It also included students' perceptions of government policy, institutional quality, facilities, career guidance, and labor-market support. This broader form of support was highly relevant in the Cambodian public TVET context. Second, the results suggest that the relative importance of SCCT factors may depend on the wider institutional and development context. In settings where vocational education is still being strengthened,

structural and institutional support may be especially important for shaping students' beliefs about the value of TVET.

The stratified subgroup results provide additional exploratory insight. Self-efficacy and perceived government and institutional support were significant across all sector-based major groups, suggesting that these two factors may be broadly relevant across different fields of study. This means that students in engineering, construction, digital, business, service, and other fields may all form stronger outcome expectations when they feel capable and when they perceive strong institutional and government support. Perceived social support, however, was significant only in the Engineering/Industrial Technical subgroup. One possible explanation is that engineering and industrial technical fields may have clearer occupational identities and more visible links to specific jobs, such as electrical work, mechanical work, and industrial production. In these fields, advice and encouragement from family members, peers, teachers, or community members may be more concrete and easier for students to connect with future employment. For example, students may know people who work in related trades or may receive more direct encouragement to pursue technical careers that are seen as practical and employable. In contrast, fields such as digital, business, and service may involve more diverse career pathways, so students' expectations may depend more on their own confidence and on perceived institutional quality than on interpersonal encouragement.

6.3. Policy Implications

Because this study is cross-sectional, the findings should be interpreted as associations rather than causal effects. However, they offer several useful implications for improving students' expectations of public TVET in Cambodia, particularly in relation to participation and public perception challenges.

First, the strong association between perceived government and institutional support and outcome expectations suggests that students' views of TVET are closely linked to how they evaluate the quality and credibility of the public TVET system. Policy efforts should therefore focus not only on expanding access, but also on improving training quality and making that quality visible. Relevant agencies could continue to invest in facilities, equipment, learning resources, teacher development, curriculum improvement, and institutional capacity. These improvements may help students believe that TVET can provide real educational and employment benefits.

Second, the connection between TVET and employment should be communicated more clearly. Students may develop more positive expectations when they can see how TVET leads to actual job opportunities. Public TVET institutions and government agencies could strengthen employer partnerships, internships, apprenticeships, job-placement services, career guidance, and access to labor-market information. Evidence on graduate employment, employer satisfaction, and career progression could also help build public trust in TVET.

Third, institutions should strengthen students' self-efficacy. Practical learning, mentoring, career coaching, constructive feedback, and workplace-based tasks can help students gain confidence in their skills and future career potential. Fourth, social support should also be considered. Families, teachers, peers, and communities can influence how students view TVET. Outreach activities should therefore provide accurate information not only to students, but also to parents, schools, local communities, and employers.

Finally, support strategies may need to be tailored by field of study. Different TVET fields have different skill requirements, labor-market conditions, and occupational pathways. Field-specific strategies may therefore make TVET support more relevant and help students form more realistic and positive expectations.

6.4. Limitations and Future Research

Several limitations should be acknowledged. First, this study used a cross-sectional design. Therefore, the findings show associations among variables, but they cannot establish causal relationships. In particular, the strong association between perceived support and outcome expectations may be bidirectional. Students who perceive stronger government and institutional support may develop more positive outcome expectations, and students who already hold positive expectations may also evaluate the support they receive from their social environment, institutions, and government more favorably. Such reciprocal relations are consistent with the social cognitive perspective underlying SCCT, in which personal beliefs and perceptions of context can shape each other over time (Bandura, 2002; Lent & Brown, 2019). Longitudinal and cross-lagged panel designs are needed to clarify the direction of these relationships.

Second, all variables were measured through a self-reported questionnaire at a single point in time, which raises the possibility of common-method bias because the same respondents reported both the predictors and the outcome. We assessed this risk using Harman's single-factor test (Section 4.5), which did not indicate a dominant general factor. Because that test is a relatively weak diagnostic, future studies should apply more rigorous approaches, such as a marker-variable technique or a common latent factor, and, where possible, combine survey data with other sources, such as institutional records, employment outcomes, teacher assessments, or employer feedback.

Third, although perceived government and institutional support and outcome expectations satisfied the HTMT and Fornell–Larcker criteria, they did so by the narrowest margins in the measurement model, and their close empirical association suggests conceptual overlap between current institutional support and anticipated future outcomes. We regard the refinement of these instruments as a key area for future research. The priority is not the computation of additional validity indices, which this study already reports, but the targeted revision of the scales themselves. Future studies could revise or remove items that conflate evaluations of current institutional quality with beliefs about future benefits (e.g., by anchoring perceived-support items in present conditions and outcome-expectation items in anticipated outcomes), examine whether government-level and institution-level support function as distinct dimensions, and confirm the refined measures through confirmatory factor analysis on an independent sample.

Fourth, the sector-based analysis was exploratory. The study estimated separate regressions by field of study, but it did not formally test whether coefficients differed across groups. Future studies should use interaction terms or multigroup analysis to examine field differences more directly.

Fifth, the sample was limited to students in public TVET institutions in Phnom Penh. The findings may not represent students in private institutions, rural provinces, or other parts of Cambodia. The online, self-administered survey may also have introduced self-selection bias. Future studies should include broader samples and mixed data-collection modes.

Finally, age had limited variation because most respondents were 18–24 years old. Future research should include more diverse learners, including adult learners and workers returning to training, to examine how age and life stage shape outcome expectations.

6.5. Conclusions

This study examined the factors associated with students' outcome expectations in public TVET institutions in Phnom Penh, Cambodia. The findings show that self-efficacy, perceived social support, and perceived government and institutional support were each positively associated with outcome expectations. Among these factors, perceived

government and institutional support showed the strongest association in the regression model. This suggests that students' expectations of TVET are closely related to how they evaluate the quality, credibility, and labor-market relevance of the public TVET system. The study also found that self-efficacy and perceived government and institutional support were significant across all sector-based major groups, while perceived social support was significant only in the Engineering/Industrial Technical subgroup. These subgroup findings suggest that the factors associated with outcome expectations may vary across fields of study. However, because the analysis was exploratory, these patterns should be interpreted carefully and tested more directly in future research.

Overall, the study provides associational support for Social Cognitive Career Theory in a Southeast Asian, lower-middle-income public TVET context. It shows that students' expectations are associated with both personal beliefs and contextual supports. More specifically, the findings highlight the importance of perceived government and institutional support in a developing public TVET system. Strengthening the quality of public TVET, communicating its labor-market value clearly, and building students' self-efficacy may help promote more favorable expectations of TVET. By focusing on students' outcome expectations, this study contributes to the limited evidence on how young people evaluate TVET in Cambodia. It also provides a foundation for future longitudinal, comparative, and explanatory research that can better inform TVET policy, institutional improvement, and skills-development strategies.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Centre for Ethics in Human Research, Khon Kaen University, Thailand (Reference No. HE683420, approved on 2 October 2025).

Informed Consent Statement: Informed consent was obtained from all participants. A signed consent form was not required, as completion of the questionnaire was treated as consent by action, per the Khon Kaen University Ethics Committee for Human Research.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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