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Digital competence and digital entrepreneurial intention: A social cognitive approach

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ABSTRACT

Objective: This article aims to investigate how digital competence moderates the relationship between entrepreneurial education and digital entrepreneurship intention among university students within the framework of social cognitive career theory.

Research Design & Methods: We employed a quantitative approach, utilising a structured questionnaire to collect data from 327 university students over two months. We analysed the data gathered from a diverse sample of students across different academic years using partial least squares structural equation modelling (PLS-SEM) to test the proposed hypotheses and examine the moderating effect of digital competence on the relationships between entrepreneurial education, self-efficacy, outcome expectations, and digital entrepreneurship intention.

Findings: Digital competence has a dual moderating effect on digital entrepreneurship intention. It positively moderates the relationship between outcome expectations and entrepreneurial intention, enhancing students' confidence in achieving entrepreneurial success. However, it negatively moderates the link between self-efficacy and intention, suggesting that high digital competence may reduce reliance on educationally developed self-efficacy. These findings underscore the nuanced role of digital competence in shaping entrepreneurial intention, challenging the conventional assumption that higher competence unilaterally strengthens entrepreneurial drive.

Implications & Recommendations: The study's limitations include a relatively small sample size and a focus on the role of entrepreneurial education without exploring the mediating effects of cognitive structures like self-efficacy and outcome expectations. Future research should consider larger samples and examine other contextual factors, such as cultural and environmental influences on digital entrepreneurship intention. Educational programs should integrate real-world experiences, adapt content to students' digital competence, and focus on the entrepreneurship intention process while allowing students to self-develop.

Contribution & Value Added: This study is the first to explore the moderating role of digital competence within the social cognitive career theory framework on forming digital entrepreneurship intention among university students. This study advances theoretical understanding and offers practical insights for enhancing digital entrepreneurship education by revealing how digital competence interacts with self-efficacy and outcome expectations. These findings have broader implications for academia and policymakers, emphasising the need for adaptive educational approaches that align with the evolving digital landscape.

Article type:	research article
Keywords:	digital competence; digital entrepreneurship intention; entrepreneurial education; self-efficacy; outcome expectation
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INTRODUCTION

Student entrepreneurial intention is a concept of significant interest because it reflects the potential of the younger generation to become entrepreneurs (Listyaningsih *et al.*, 2023). Consequently, entrepreneurial education has grown substantially to meet the demand for student training (Dabbous &

Boustani, 2023). In the current landscape, where technology plays a pivotal role in the economy, entrepreneurial education (EE) has gained prominence as digital entrepreneurship becomes an increasingly attractive career path (Wibowo *et al.*, 2023). It encompasses a range of programs and courses designed to impart knowledge and skills related to digital entrepreneurship, combining theoretical instruction with practical exposure to entrepreneurial activities (Wibowo *et al.*, 2023). This approach enhances students' attitudes, thinking, and digital entrepreneurship intention (DEI). Given the distinct characteristics of digital entrepreneurship, EE also focuses on providing work-based learning experiences to facilitate a smoother transition from education to career (Dabbous & Boustani, 2023). However, while the impact of education on fostering traditional entrepreneurial intention remains a topic of debate (Pham & Le, 2023), the influence of EE on DEI is even less clear, as technology has altered many of the traditional measures of entrepreneurial intention. Therefore, investigating the relationship between EE and DEI is crucial for advancing entrepreneurial research in the digital era.

Social cognitive career theory (SCCT) is one of the leading theories in explaining behavioural intentions, especially in career choice and entrepreneurship (Duong *et al.*, 2024). This theory emphasises the role of personal, environmental, and behavioural factors in starting a business (Vu *et al.*, 2024). The two core elements of SCCT are self-efficacy and outcome expectation. Self-efficacy strongly influences whether an individual dares to perform a behaviour, while outcome expectation determines the level of motivation by predicting the benefits or consequences of that behaviour (Ip *et al.*, 2021). Since EE is not only a contextual effect but also represents an individual's learning experience, SCCT is the perfect choice when assessing the relationship between EE and entrepreneurial intentions in general because it presents a full basis to explain these interactions. In addition, this is an addition to the theoretical system when there is little research applying SCCT to explain entrepreneurial intention in the context of digitalisation.

Unlike traditional startups, digital entrepreneurship has flourished during rapid technological advancement that coincided with the rise of mass media (Leong *et al.*, 2022). As a result, students are not solely reliant on formal EE to engage in startups (Nguyen & Nguyen, 2024). Instead, they can independently self-study, acquire, and develop business skills (such as digital marketing, e-commerce, etc.) and management knowledge (such as information systems management, customer relationship management, etc.) (Dabbous & Boustani, 2023). The Internet makes accessing and acquiring this knowledge relatively easy, and as students develop these skills, they build digital competence (DC) to a significant level (Pedaste *et al.*, 2023). Elnadi and Gheith (2023) emphasised that DC is a crucial factor in the success of digital entrepreneurs. DC represents an individual's capability and understanding of effectively applying digital skills to the startup process (Majeed & Hamed, 2023). For undergraduate students, DC significantly influences how information from EE is processed, leading to changes in internal psychological interactions and DEI (Triyono *et al.*, 2023). At the same time, higher DC helps students gain more self-confidence while promoting optimistic expectations about entrepreneurship and enhancing DEI.

Despite its importance, the role of DC has not been thoroughly investigated (Elnadi & Gheith, 2023). Most research has focused on the education outcomes of DEI (Dabbous & Boustani, 2023; Wibowo *et al.*, 2023) but ignored the individual's inherent capacity in forming DEI. Secondly, scholars argue that DC is the result of EE (Mawson *et al.*, 2023), while the arguments here clearly show that DC is primarily formed from the individual's will to develop. Therefore, DC in this study separates EE (external source of capacity stimulation) and DC (internal source of capacity) to specify the influence of these two constructs on DEI. Thirdly, when approaching SCCT, ability only plays the role of the source of subjective cognition (self-efficacy and outcome expectation). In other words, it only describes a unidirectional causal relationship and ignores the subsequent influence of ability in transforming from cognition to intention (Bachmann *et al.*, 2024). This study addresses this gap by exploring the moderating effect of DC on the relationships between EE, subjective cognition, and DEI, thereby offering a more comprehensive understanding of these dynamics. This is a powerful addition to SCCT, as no studies have examined the role of DC as a moderating factor in shaping individual cognition related to DEI. Based on that, we formulated the following research questions (RQs):

RQ1: Based on the SCCT framework, do university students' subjective cognitive constructs significantly influence DEI?

RQ2: Does EE significantly influence university students' subjective cognitive constructs?

RQ3: Does DC significantly moderate the relationships between subjective cognitive constructs and DEI?

This article is structured into five main parts. The first part introduced the research context, highlighted the importance of studying DC in digital entrepreneurship, and identified the study's main objectives. The second, theoretical foundation, will present an overview of the underlying theories and previous studies on digital competence, entrepreneurial education, and digital entrepreneurship intention. The methodology will describe the method used in detail, including the research design, survey subjects, and data collection process. Finally, we will present the results of the data analysis, test the research hypotheses, and discuss them. Finally, the conclusion will summarise the main findings, provide practical implications, and suggest future research directions.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Digital Entrepreneurship Intention

Currently, there are very few specific definitions to explain DEI. Many scholars identify DEI with e-entrepreneurial intention (Mohammed *et al.*, 2023) or even attach traditional entrepreneurial intention to digital entrepreneurship instead of describing its characteristics (Nguyen *et al.*, 2024a). It was not until the study of Xin and Ma (2023) that the literature considered DEI to have its definition when they described it as a mental state that motivates individuals to conduct entrepreneurial activities and create digital value. Based on that, Duong *et al.* (2024) proposed a more precise concept: the intention to pursue entrepreneurial activities in the digital space, taking advantage of technology platforms to practice entrepreneurial behaviour. When approaching entrepreneurship in students, entrepreneurship is considered a career choice. Therefore, according to Vu *et al.* (2024), DEI 'refers to the cognitive predisposition of an individual to actively opt for and pursue a career in digital entrepreneurship.' Combining perspectives, as viewed in this study, DEI constitutes a state of mind geared toward pursuing digital entrepreneurship as a career choice through establishing a business on a digital technology platform and creating digital value.

Social Cognitive Career Theory

Social cognitive career theory (SCCT) is the leading theory representing the process of forming general career behaviour and entrepreneurial behaviour (Cui & Gu, 2024). It describes career behaviours through two aspects, including endogenous psychological interactions and the mechanism of environmental influence on individual cognition. Two core psychological constructs, self-efficacy (representing the assessment and belief in the individual's ability when performing a behaviour) and outcome expectation (the consequence that the individual believes can occur when performing a behaviour), will interact with each other to balance the individual's ability and desire, thereby determining the ability to form behaviour (Ip *et al.*, 2021). At the same time, the environment will continuously intervene in these interactions and affect behavioural intention (Chiu *et al.*, 2023). This combination makes SCCT superior to other theories in representing long-term psychological constructs instead of short-term motivations (such as the attitude of Ajzen, 1991), as well as deepening the relationship between people and the environment.

Hypothesis Development

Self-efficacy refers to an individual's perception of their ability to apply personal competencies to perform specific behaviours (Wardana *et al.*, 2024). Yeh *et al.* (2021) define self-efficacy as a 'belief in her/his own ability to accomplish a goal or outcome.' Similarly, entrepreneurial self-efficacy is the degree of confidence in one's ability to execute entrepreneurship-related tasks (Pham *et al.*, 2023a). Self-efficacy encompasses an individual's orientation and attitude towards entrepreneurial behaviour, making entrepre-

neurial intentions more concrete (Saoula *et al.*, 2023). According to SCCT, the more efficacious an individual performs a behaviour, the stronger the intention to execute it (Vu *et al.*, 2024). Therefore, high self-efficacy enhances individuals' confidence in their ability to undertake entrepreneurial actions and reinforces their entrepreneurial intentions (Pham *et al.*, 2023a). This relationship is evident in the studies by Yousaf *et al.* (2022) and Wardoyo *et al.* (2025). The study proposes the following hypothesis:

H1: Entrepreneurial self-efficacy positively impacts DEI.

Outcome expectation refers to an individual's beliefs about the possible outcomes of a particular action, including both the benefits and consequences of performing that behaviour (Luc, 2024). In entrepreneurship, outcome expectation reflects what an individual expects to achieve when engaging in entrepreneurial activity (Ilonen & Hytönen, 2023). During the decision-making process, individuals evaluate the behaviour's perceived value and feasibility. Individuals are more inclined to pursue the behaviour when anticipated outcomes are favourable. Blaese *et al.* (2021) assert that when the expected benefits of entrepreneurship surpass those of traditional paid employment, individuals are more likely to develop entrepreneurial intentions. Moreover, SCCT shows that outcome expectation is the motivation that urges individuals to pursue behaviours to achieve positive values. Luc (2023) demonstrated that higher outcome expectations significantly enhance entrepreneurial intentions. Lee Chin and Lee Chee (2024) and Zaman *et al.* (2024) also support this positive relationship. Accordingly, we hypothesised:

H2: Outcome expectation positively impacts DEI.

Entrepreneurial education encompasses all programs, courses, and educational activities designed to develop entrepreneurial competencies, aiming to instil in students the essential knowledge, skills, attitudes, and mindset required to embark on entrepreneurial ventures (Khalil *et al.*, 2024). This educational approach is instrumental in fostering students' motivation and intentions to pursue entrepreneurship by providing practical tools and insights into the entrepreneurial process (Chahal *et al.*, 2024; Wardana *et al.*, 2020). Beyond merely imparting knowledge, entrepreneurial education seeks to nurture a proactive mindset and the ability to identify and exploit opportunities, which are critical traits for successful entrepreneurs.

According to SCCT, contextual factors such as education significantly influence the development of individual cognitions, including self-efficacy and outcome expectations (Adebusuyi *et al.*, 2022). Mainly through targeted learning experiences, education plays a fundamental role in enhancing an individual's self-efficacy, which is the belief in one's ability to succeed in specific tasks (Wu *et al.*, 2022). By delivering a concrete and specific competency framework, education empowers individuals to develop the confidence needed to navigate the complexities of entrepreneurship effectively (Pham *et al.*, 2023a). Furthermore, educators play a crucial role in developing students' opportunity recognition skills by sharing successful entrepreneurial stories, fostering aspirations for achievement, and guiding students to envision the future of entrepreneurial behaviour. Consequently, it shapes students' outcome expectations, leading to a stronger entrepreneurial intention, as evidenced by studies conducted by Pham *et al.* (2023a) and Otache *et al.* (2024):

H3: EE positively impacts entrepreneurial self-efficacy.

H4: EE positively impacts outcome expectations.

Digital competence represents an individual's capability to develop attitudes, knowledge, and skills related to digital platforms, enabling them to achieve their goals effectively (Bachmann *et al.*, 2024). This competence is a crucial asset in the technology-driven era, offering entrepreneurs a competitive edge when entering the market (Nguyen *et al.*, 2024b). This study examines DC through the lens of ability outlined in SCCT, which significantly impacts the development of self-efficacy and outcome expectations. Specifically, individuals with high DC are more confident in the potential success of their startups, anticipating that their strong digital skills will facilitate the creation and operation of a business. This optimism is expected to enhance DEI.

Furthermore, DC significantly strengthens self-efficacy, which is the belief in one's capacity to achieve specific goals (Wardana *et al.*, 2020). Higher DC levels enhance individuals' confidence in their ability to succeed and serve as a critical motivator by promoting a more optimistic outlook on their entrepreneurial

endeavours (Triyono *et al.*, 2023). Moreover, individuals with strong DC tend to have a more accurate and comprehensive understanding of their abilities (Triyono *et al.*, 2023). This awareness allows them to set realistic expectations and avoid the dangers of overconfidence, thereby improving their chances of sustained success in digital entrepreneurship. Based on these considerations, we hypothesised:

H5: DC positively moderates the relationship between self-efficacy and DEI.

H6: DC positively moderates the relationship between outcome expectations and DEI.

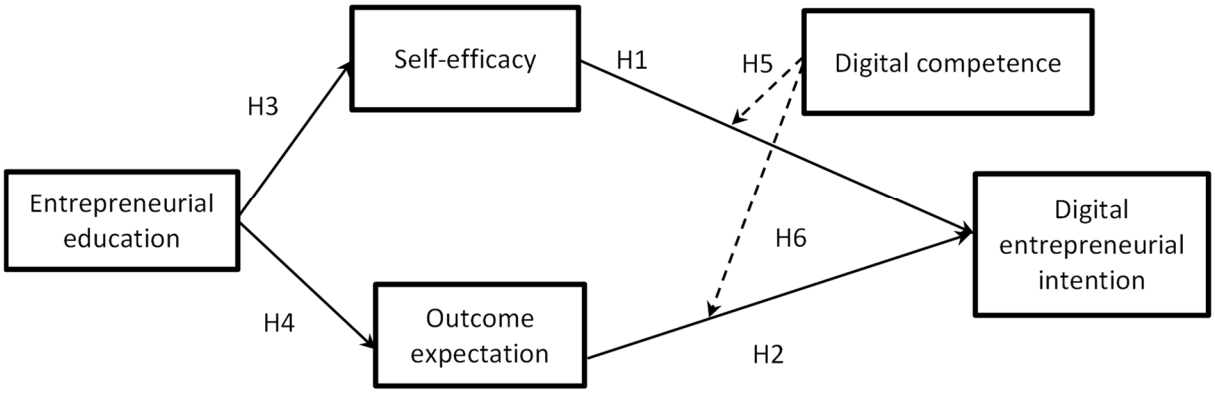

Figure 1. Research model
Source: own elaboration.

RESEARCH METHODOLOGY

Data Collection

Based on the proposed research model, we carefully selected measurement scales for each construct from established studies to ensure validity and reliability. We adopted the scale for entrepreneurial education (EE) from the work of Saoula *et al.* (2023), providing a robust framework for assessing how educational interventions influence entrepreneurial competencies. For self-efficacy (SE) and outcome expectation (OE), we derived the scales from Pham *et al.* (2023a) and adopted DEI from the research of Pham *et al.* (2023b), offering well-validated tools for capturing these constructs' impact on entrepreneurial intentions and behaviours. We measured DC using the Triyono *et al.* (2023) scale, accurately reflecting individuals' abilities to navigate and leverage digital platforms effectively.

We used a convenience sampling method to gather data, targeting a sample that was easily accessible and willing to participate in the study. We used a Likert scale for all observed variables, ranging from 1 (strongly disagree) to 5 (strongly agree), allowing for a nuanced understanding of respondents' attitudes and perceptions. Moreover, the final section of the questionnaire collected demographic information, which provides insights into the characteristics of the sample population and allows for further analysis based on demographic variables.

We constructed the questionnaire using Google Forms, providing a user-friendly platform for respondents and ensuring ease of data collection. This study emailed the link to students with a greeting, a description of the content, the survey purpose, and a commitment to confidentiality. Respondents answered filtered questions stating that they were students studying at a university in Vietnam and had completed at least one business-related training course. Finally, after completing the survey, they received some foreign language learning materials as a thank-you note.

The study collected responses from 327 participants, comprising 183 females (56%) and 144 males (44%). Regarding fields of study, 51.07% of students were from economics and business, 18.65% from social sciences and humanities, and 30.28% from natural sciences and engineering. Most participants were enrolled in public universities (65.75%), while 34.25% studied at private institutions. Moreover, 47.71% of students had a family business background, whereas 52.29% did not. Table 1 presents detailed demographic information.

Table 1. Sample description

Category		Frequency	Percentage (%)
Gender	Female	183	56.00
	Male	144	44.00
Students	First-year	98	29.97
	Second-year	87	26.61
	Third-year	89	27.22
	Final-year	53	16.20
Majors	Economics – Business	167	51.07
	Social sciences and Humanities	61	18.65
	Natural sciences and engineering	99	30.28
Type of university	Public	215	65.75
	Private	112	34.25
Family business background	Yes	156	47.71
	No	171	52.29

Source: own study.

Data Analysis

We utilised the partial least squares structural equation modelling (PLS-SEM) technique and executed it using SmartPLS 4 software. This analytical approach involves two primary stages: evaluating the measurement and structure models.

In the first stage, we evaluated the measurement model through several essential criteria. We tested the scales' reliability using Cronbach's α (CA) and composite reliability (CR). Next, we determined the convergence of the scales using the average variance extracted (AVE) and outer loading (λ). To ensure the discrimination between variables, we applied the heterotrait-monotrait ratio (HTMT), requiring that HTMT be less than or equal to 0.85.

In the second stage, we tested the structural model to assess the validity and strength of the relationships between the constructs. We assessed multicollinearity using the variance inflation factor (VIF). We measured the explanatory and predictive ability of the model using the coefficient of determination (R^2) and the Q^2 coefficient. Finally, we checked the research hypotheses and the impact relationships between variables using the bootstrapping method with a sample size of 5000 to determine the path coefficient and test statistical significance. The quantitative analysis followed the procedure proposed by Hair *et al.* (2019).

In the first step, we checked the Cronbach's α (CA) and composite reliability (CR) of the scale. According to Hair *et al.* (2017), CA > 0.6 and CR > 0.7 ensure the scale's reliability. As shown in Table 2, the outcome expectation scale had the lowest CA and CR values of 0.783 and 0.860, respectively. Therefore, the scale ensured reliability. Next was the assessment of outer loadings. Hair *et al.* (2017) state that outer loadings must be greater than or equal to 0.7. Based on Table 2, all outer loadings were more significant than 0.7. The average variance extracted (AVE) values were all greater than 0.5, meeting the conditions specified by Hair *et al.* (2017). The outcome expectation scale had the lowest AVE value at 0.606.

This study used the heterotrait-monotrait ratio of correlations (HTMT) matrix to assess discriminant validity. As shown in Table 3, all values were less than 0.85 (Hair *et al.*, 2019), thus meeting the conditions for discriminant validity as proposed by Hair *et al.* (2019).

Table 2. Reliability tests summary

Construct	CA	CR	AVE	Item	λ
DC	0.862	0.900	0.644	I realised the need to improve my knowledge of digital technology continuously	0.809
				I can access digital applications or programs for work or daily activities	0.791
				I can develop and manage social media for business or personal activities	0.796
				I can develop innovative new products or services using digital technology	0.820
				I can evaluate and analyse information from various digital sources	0.797
DEI	0.846	0.891	0.643	My professional goal is to become an entrepreneur on digital platforms	0.792
				I have very seriously thought of starting a digital business	0.767
				I am determined to create a digital business in the future	0.749
				I will make every effort to start and run my own digital business	0.815
				I am ready to do anything to be an entrepreneur on digital platforms	0.810
EE	0.805	0.865	0.644	Knowledge about the entrepreneurial environment	0.741
				Greater recognition of the entrepreneur's figure	0.780
				The preference to be an entrepreneur	0.769
				The necessary abilities to be an entrepreneur	0.751
				The intention to be an entrepreneur	0.705
OE	0.783	0.860	0.606	Digital entrepreneurship will help me become an independent person	0.789
				Digital entrepreneurship will help me improve my income	0.788
				Digital entrepreneurship gives me a higher status	0.807
				Digital entrepreneurship helps me to be respected by others	0.728
SE	0.871	0.903	0.608	I am confident in digital entrepreneurship	0.799
				I can control the creation process of digital entrepreneurship	0.793
				I know the necessary practical details for digital entrepreneurship	0.760
				I would have a high probability of succeeding in digital entrepreneurship	0.757
				Digital entrepreneurship would be easy for me.	0.805
				I can become a digital entrepreneur when I want	0.763

Source: own study.

Table 3. HTMT

Construct	DP	DEI	EE	OE	SE
DP	–	–	–	–	–
DEI	0.763	–	–	–	–
EE	0.666	0.650	–	–	–
OE	0.767	0.659	0.743	–	–
SE	0.787	0.661	0.761	0.817	–

Source: own study.

Evaluating the Structure Model

Table 4. VIF and R^2

Concept	VIF (min-max)	R^2
DC	1.774 – 1.978	–
DEI	1.605 – 2.009	0.483
EE	1.356 – 1.671	–
OE	1.315 – 1.729	0.355
SE	1.749 – 2.009	0.413

Source: own study.

After evaluating the measurement model, we proceeded to assess the structural model. Firstly, the variance inflation factor (VIF) had to be below 3 to reflect the relationships accurately. As shown in Table 4, all VIF values were less than 3, meeting the requirement according to Hair *et al.* (2020).

Moreover, we also had to perform testing for common method bias (CMB), which is a phenomenon that explains the variation in research data due to the common measurement method rather than the variables that the process is intended to measure. Noteworthy, CMB can lead to bias in parameter estimates of the relationship between two factors in a model. This bias can increase or decrease the estimate of the relationship between the two factors (Antonakis, 2017). Kock (2017) suggested that if VIF < 3.3, CMB does not substantially impact the results of data analysis. According to Table 4, the largest VIF is 2.009, which satisfies the above condition. Moreover, the R^2 value is 0.483, indicating that the model explains 48.3% of the formation of DEI.

Discussion

Testing the structural model with bootstrap (N=5000) shows that all hypotheses are significant at 95% (P_value<0.05). Firstly, DEI is significantly influenced by SE (β=0.170) and OE (β=0.147). According to SCCT, high SE is a prerequisite for behavioural solid intention (Neneh, 2022). In parallel, the more optimistic and specific the visualisation of entrepreneurial outcomes through OE is, the more solidly based and stronger DEI becomes (Luc, 2023). Thus, we accepted H1 and H2. Continuing with the role of education on individual cognition, EE strongly affected SE (β=0.642). Individuals who received EE had higher SE and enough self-confidence to perform entrepreneurial behaviour (Wardana *et al.*, 2020). Next, EE positively affected OE (β=0.596), indicating that EE plays a vital role in shaping students' expectations towards entrepreneurship (Otache *et al.*, 2024). Hence, we accepted H3 and H4.

Digital competence showed a solid moderating effect on the relationship between individual cognition and DEI. Specifically, digital competence positively moderated the relationship between OE and DEI (β=0.178). Under the influence of digital competence, individuals can better understand themselves, increase their confidence, and have a deeper understanding of what they want to achieve (Bachmann *et al.*, 2024). We accepted H6. Surprisingly, digital competence negatively moderated the relationship between SE and DEI (β=-0.144). Accordingly, we rejected H5. See the summary results in Table 5.

Table 5. Hypothesis testing

Hypotheses		β	p-value	Result
H1	SE -> DEI	0.170	0.006	Accepted
H2	OE -> DEI	0.147	0.013	Accepted
H3	EE -> SE	0.642	0.000	Accepted
H4	EE -> OE	0.596	0.000	Accepted
H5	DP x SE -> DEI	-0.144	0.023	Rejected
H6	DP x OE -> DEI	0.178	0.008	Accepted

Source: own study.

The test results have demonstrated that EE powerfully shapes SE and OE, stimulating and constraining DEI simultaneously. According to Vu *et al.* (2024), higher SE makes individuals more optimistic about their entrepreneurial tasks, promoting stronger entrepreneurial tendencies. Moreover, SE helps students reduce fear and gain confidence when starting a business. This result is consistent with Yousaf *et al.*'s (2022) and Wardoyo *et al.* (2025) findings. Similarly, OE manifests expectations when performing entrepreneurial behaviour, which is also the desire that individuals pursue. The results of Lee Chin and Lee Chee (2024) and Zaman *et al.* (2024) also demonstrate and agree with this view.

Next, EE showed a significant impact on SE and OE. Wardana *et al.* (2020) and Otache *et al.* (2024) also demonstrate that EE helps students better visualise entrepreneurial tasks, making a more objective assessment of their abilities. Similarly, through EE, scholars view students' expectations in a more scientific and grounded way to limit unrealistic entrepreneurial goals (Listyaningsih *et al.*, 2023). Further analysis shows that EE tends to stimulate SE more than OE. This result is consistent with Cui and Gu (2024) and Duong *et al.* (2024), because they believe that EE is mainly designed to train entrepreneurial capacity. However, the slight difference between these two relationships shows the balance in the content of EE in Vietnam. Therefore, universities should invest more in student experiential activities. Practical entrepreneurial activities create a balance between self-efficacy and outcome expecta-

tion. Exposure to reality creates an environment for students to apply knowledge and evaluate their capacity. Accordingly, this study once again demonstrates the vital role of EE in shaping students' perceptions of entrepreneurship and promoting entrepreneurial intentions (Thomas, 2023).

DC positively moderates the relationship between OE and DEI. High DC makes students more confident in their ability to achieve entrepreneurial achievements. As SCCT stated, more substantial competence leads to individuals believing in the likelihood of future behaviour success (Lent *et al.*, 1994; Cui & Gu, 2024). Understanding digital skills helps students better assess expectations and filter goals that are more suitable for their abilities (Zhao *et al.*, 2021). Because of the influence of the same culture, most OEs generated from EE will be compatible with the general social expectations of becoming entrepreneurs (Pham *et al.*, 2024). Therefore, while the relationship between SE and DEI is weakened, OE is strongly stimulated and promotes students' entrepreneurial aspirations. Combining these results creates a new understanding of students' entrepreneurial thinking. Accordingly, the program needs to create more autonomous spaces for students to practice their abilities, promote self-learning, and develop themselves in a direction that suits them. From this perspective, lecturers also play a good role in guiding and suggesting instead of using the traditional passive educational method.

The surprising finding of this article is that DC negatively moderates the relationship between SE and DEI. This unexpected finding contradicts the view of Triyono *et al.* (2023) because DC makes individuals more confident in their abilities and more optimistic about future expectations, thus stimulating entrepreneurial intention. Elnadi and Gheith (2023) also reported that DC promotes innovativeness and alertness, which are vital in promoting DEI in their research. However, programs provide few opportunities for hands-on learning, so students lack experience and market awareness (Kabonga & Zvokuomba, 2021). In contrast, DC is formed from learning and personal development, and they trust their experiences more than theoretical visualisation (Yin *et al.*, 2022). Students do not have enough experience and resources to combine many advantages. Therefore, in the early stage, focusing on DC makes them pay less attention to EE. Consequently, higher DC leads to less dependence on SE generated by EE. In addition, DC and EE can only be balanced when individuals have enough awareness and determination in their entrepreneurial orientation. Thus, in the short term, DC will cause SE to decrease and lead to lower DEI. Therefore, in this context, negative DC regulation is not a negative influence, but it is the way individuals automatically balance ability and self-efficacy. This result contradicts most previous studies, showing that higher competencies lead to higher entrepreneurial tendencies (Somia *et al.*, 2024) or entrepreneurial behaviour (Narmaditya *et al.*, 2024). This exciting result also broadens Generation Z's understanding of the entrepreneurial mindset.

CONCLUSIONS

Building on the SCCT, this study explores the relationship between EE and university students' DEI. Unlike previous research, which often directly linked EE to the creation of DEI (*e.g.*, Pham & Le, 2023), this study focuses on how EE influences the cognitive structures of individuals, leading to the formation of DEI. This study proved that SE and OE significantly influence DEI. At the same time, EE enhances SE and OE. Hence, we answered RQ1 and RQ2 and deeply explained the mechanism of the concepts. Next, we also encountered interesting findings with regard to RQ3. We found that DC positively moderates the relationship between outcome expectations and DEI, aligning with educational program designers' broader social expectations. However, as students often lack practical experience, DC can reduce their reliance on EE, negatively moderating the relationship between self-efficacy and DEI. These findings offer valuable insights for both theoretical understanding and practical applications within digital entrepreneurship systems. Thus, we fulfilled all the objectives.

Theoretical Implications

Following the trend of digital entrepreneurship, this is one of the few pioneering studies that applied SCCT to explore entrepreneurial intentions in a digital context. Accordingly, this study brings some crucial contributions to entrepreneurship theory. Firstly, this article has approached EE as a representative factor for both objective impacts and subjective perceptions. This perspective more clearly

demonstrates the connection between people and the environment and better promotes the core idea of SCCT. In parallel, to our best knowledge, in the past five years, scholars have only assessed the relationship between EE and SE (*e.g.,* Yeh *et al.*, 2021; Soomro & Shah, 2022; Oulhou & Ibourk, 2023; Al-Qadasi *et al.*, 2024). This is a rare study that fully revisits the two core constructs of SCCT and provides a more comprehensive view of these relationships.

The second contribution is to explore the moderating role of DC on the relationship between SCCT and DEI. DC is how this study visualises the source of self-efficacy and outcome expectation according to the SCCT framework and evaluates how DC further intervenes in transforming cognition into intention. The analysis further highlights the possible conflict between information dimensions (Xu & Allan, 2024). In the context of technological development, EE is no longer the only approach to entrepreneurship courses (Leong *et al.*, 2022). Based on the result, this article confirmed the more decisive influence of technology on human thinking, especially in entrepreneurship.

Finally, the study has explained the self-balancing and neutralising mechanism in individuals' entrepreneurship perception when DC and EE disagree, thereby changing the relationship between SE and DEI. This finding shows that negative influence does not mean adverse outcomes but may be a stage of information regulation and restructuring in cognition. It also opens new and unique approaches to how scholars and educators approach student entrepreneurship.

Practical Implications

The results also provide a foundation for proposing managerial implications aimed at helping educators more effectively promote DEI. Firstly, EE must update and equip students with digital skills and acumen to strengthen their business capabilities in a globalised context. Simultaneously, educational programs should prioritise creating opportunities for students to gain real-world business experience (Wasim *et al.*, 2024). Transforming entrepreneurial intention into natural behaviour requires significant expertise, making work-based learning a critical component (Wasim *et al.*, 2024). Such experiences allow students to accumulate the necessary knowledge and skills, thus better preparing them for future entrepreneurial endeavours (Dabbous & Boustani, 2023). Therefore, a close connection between universities and businesses is necessary. Universities should optimise policy support to expand student support resources. Moreover, educators must acknowledge the growing strength of students' DC. EEs should adjust their approach by blending comprehensive teaching content with customised material to address this. If DC and EE content are not well-aligned, students may become distracted and lose direction without timely support.

Moreover, universities must focus on the entire process of DEI formation rather than merely concentrating on the initial stages of awareness-building, such as self-efficacy and outcome expectations (Vuorio *et al.*, 2023). While EE plays a significant role in shaping self-efficacy and outcome expectations, the direct impact of these constructs on DEI is notably lower (as indicated in Table 5). This suggests that the practical application of knowledge gained through EE is insufficient, potentially destabilising DEI if the influence of EE is not thoroughly integrated. Finally, it is essential to respect and nurture students' capacities by allowing them the space to develop their abilities rather than confining them strictly to the framework of the training program (Wardana *et al.*, 2020). Therefore, this article aims to provide educators and scholars with a more nuanced perspective on the interplay between EE and DEI.

Limitations and Future Research

Although the study has contributed to the DEI theoretical system, some limitations remain. Firstly, the time limit made us stop at a sample size sufficient to apply the SEM. However, the small sample reduced the generalisation level, and the representativeness was not high. Therefore, future studies should develop a larger sample size to examine DEI formation better. Secondly, the study did not analyse the mediating effect of EE on DEI through endogenous cognitive structures (SE and OE). Future research should explore how cognition mediates the interaction of objective influences on DEI. In addition, this study focused too profoundly on the mechanism of education. Other contextual factors, such as business environment, culture, or barriers, may intervene in these relationships. These limitations, if overcome, would bring more profound results.

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Use of Artificial Intelligence

This study did not use AI tools to generate any content.

Conflict of Interest

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