



Human competence beyond technology acceptance explaining digital entrepreneurial intention in widely adopted digital contexts

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ABSTRACT

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This study investigates the determinants of digital entrepreneurial intention among Generation Z in Vietnam by integrating the Theory of Planned Behavior (TPB), digital competence, and the digital entrepreneurial ecosystem. It challenges the continued relevance of the Technology Acceptance Model (TAM) in a digitally mature environment where digital technologies have become ubiquitous. A quantitative research design was employed using a cross-sectional survey of 2,559 Generation Z respondents. The proposed model was analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with a two-stage approach to estimate the higher-order constructs. The findings reveal that perceived usefulness and perceived ease of use no longer exert significant effects on digital entrepreneurial intention. Instead, digital competence emerges as the primary internal driver, shaping entrepreneurial attitudes and perceived behavioral control (PBC). Moreover, the digital entrepreneurial ecosystem and entrepreneurship education indirectly strengthen entrepreneurial intention by fostering favorable subjective norms, while the ecosystem positively moderates the relationship between digital competence and PBC. The integrated model explains 76.9% of the variance in digital entrepreneurial intention. These findings suggest a shift from technology-centered approaches toward human-centered capability development, highlighting the need to enhance digital competence, foster entrepreneurial mindsets, and cultivate supportive digital entrepreneurial ecosystems to promote digital entrepreneurship in an era of pervasive digitalization in Vietnam.

Contribution/Originality: This study contributes to the existing body of knowledge by demonstrating that, in a context where digital technologies have become widely adopted, human digital competence serves as a more fundamental determinant of digital entrepreneurial intention than technology acceptance.

1. INTRODUCTION

The Fourth Industrial Revolution has permanently redefined the structure of the global labor market. The rise of the gig economy and decentralized business models is gradually replacing the traditional stability of administrative jobs. In this context, digital startups are not only a tool for optimizing profits but also a macro solution to the social welfare problem in developing economies. Vietnam, with its booming telecommunications infrastructure and favorable demographic structure, has become an ideal experimental setting where Generation Z, the "digital natives," holds unprecedented opportunities to commercialize ideas in cyberspace. However, the psychological barrier between nurturing an idea and deciding to implement a digital business remains a "black box" that needs to be deciphered. Cross-country findings reinforce this argument. Drawing on a multi-country sample, Youssef, Boubaker, Dedaj, and

Carabregu-Vokshi (2021) report that economic digitalization carries a significant influence on entrepreneurial intention. The magnitude of that influence, however, is far from uniform, shifting noticeably with the institutional and educational landscape in which young people are embedded.

Many studies rely on the Technology Acceptance Model (TAM) to explain why users behave the way they do in relation to new technologies. At its core, TAM posits that ease of use and perceived usefulness are the two major determinants that influence the acceptance of technology. It's a very straightforward premise and, although valid, it was originally proposed in an era when the Internet and the web were in their infancy, and the first websites and applications were quite user-unfriendly. With all the progress made on user interfaces and user experiences (UI/UX) over the years, the model is no longer fully relevant to today's reality. This study argues that pervasive technological adoption has rendered digital tools virtually invisible and routine. Consequently, basic technical usability is no longer a primary barrier to entry, shifting the critical entrepreneurial bottleneck toward higher-order capabilities.

The paper suggests a shift towards the Theory of Planned Behavior (TPB) combined with the concept of "Digital Competence," the ability to assess and use information in the digital age, including the management of digital risk. In this context, digital competence is the skill that turns digital literacy into an effective tool for managing fear, promoting positive attitudes, and increasing the confidence of youth. From an ecological perspective, the digital startup ecosystem can be considered a control factor affecting the individual capacities of young people within the context of a coordinated policy and infrastructure framework.

With a survey sample of 2,559 young people in Vietnam, this paper aims at three core academic objectives.

1. To demonstrate that the operational characteristics of technology no longer determine digital entrepreneurship in the saturated era.
2. To establish the central role of digital competence as the core motivator triggering a chain of psychological responses according to the TPB mechanism.
3. To clarify how the macro environment intervenes in the relationship between individual skill capital and confidence in performing digital business behaviors.

2. THEORETICAL FOUNDATION AND HYPOTHESIS DEVELOPMENT

2.1. *Creating Motivation for Digital Entrepreneurship Through the Lens of Planned Behavior Theory (TPB)*

In reality, startup activities are inherently about making decisions that involve significant risks, which cannot be fully explained by traditional economic models. Such decisions are influenced by a large number of emotional and psychological biases, which are not explained in economic models. TPB, developed by Ajzen (1991), is a robust and widely used micro-theory for behavior that decomposes behavioral intentions into Attitude, Subjective Norms, and Perceived Behavioral Control (PBC). Based on the literature, digital entrepreneurship (Nambisan, 2017) is a new economic activity that differs from traditional entrepreneurship. It refers to the process of creating new economic value through digital entrepreneurship activities that are radically different from those associated with traditional entrepreneurship. As one of the manifestations of digital entrepreneurship, the borderless virtual space also supports TPB's continued strong explanatory power (Liñán & Chen, 2009).

In the context of the digital economy, attitudes towards behaviour are stable personality traits that include components of excitement and evaluations of profit expectations (related to, for example, low world market prices, low marginal costs, and flexibility in time). The positive internalisation of entrepreneurial opportunities on the internet is a significant factor in the intention to start an online business. However, humans are social beings. Subjective normative biases or the invisible pressure from family expectations, peer networks, and successful role models on the Internet create a significant anchoring effect (Ajzen, 1991). Support from the environment for an online business path not only directly affects intentions but also the PBC through the spillover effect from subjective normative bias.

Finally, the concept of self-efficacy (Bandura, 1977) can also be seen in PBC. PBC is a psychological coping mechanism for dealing with unusual and unpredictable uncertainties, which are highly situational and may occur during a digital start-up in the digital economy (e.g., the occurrence of a search engine algorithm change, the risk of Internet piracy, a virus attack, etc.). An actual intention to act will only emerge when an individual truly believes in being able to cope with digital adversity (i.e., has sufficient confidence in dealing with events that are difficult to control in the digital economy). Based on this logical sequence, the study reaffirms the foundational hypotheses of TPB.

H₁: Subjective norm has a positive impact on Perceived Behavioral Control.

H₂: Positive attitude has a positive impact on Digital Entrepreneurship Intention.

H₃: Subjective norm is directly proportional to Digital Entrepreneurship Intention.

H₄: Perceived Behavioral Control strongly shapes Digital Entrepreneurship Intention.

2.2. Technological Saturation and the Predictive Limits of the Technology Acceptance Model (TAM) for Digital Entrepreneurship Behavior

The Technology Acceptance Model (TAM), originally developed by Davis (1989), has tended to occupy the foreground in user behavior research on Information Systems (IS). The central variables of TAM are based on the premise that ease of use and use convenience are the two primary drivers of the determinants of system utilization, where ease of use, along with image, security, quality, and price, act as antecedents for influencing use convenience. As well as confirming the validity of this perspective, the fact that the more recent models derived from the TAM, for example, the UTAUT proposed by Venkatesh, Thong, and Xu (2012), which was also used by the same authors in subsequent studies, retain the same variables and objects as the initial TAM model, is highly significant. Following the traditional literary narrative, an intuitive (user-friendly) software interface enhances the perceived commercial performance (usefulness), thereby reinforcing personal confidence (PBC) and motivating individuals to adopt it for digital entrepreneurship. Based on this legacy, the study establishes the following hypotheses for empirical testing.

H₅: Perceived ease of use directly promotes the perceived usefulness of digital platforms.

H₆: Perceived usefulness positively impacts perceived behavioral control.

H₇: Perceived usefulness strongly promotes the intention to start a digital business.

Despite this, the study has argued that the findings that computer systems are a philosophical issue were based on a certain set of premises that appear not to hold in today's world, where the assumptions in hypotheses H6 and H7 are contested. For example, from Carr's strategic perspective in Carr (2003), arguing that IT does not matter, modern digital technology that has evolved over the years has been reduced to that of a commodity. For Generation Z, defined by Prensky (2001) as digital natives, system smoothness or automation features are no longer a competitive advantage but merely a minimum standard. Proficient use of an e-commerce application like Shopee or a social network like TikTok no longer provides individuals with any exclusive power. Therefore, recognizing a tool as easy to use or useful is simply insufficient to inspire the willingness to take risks in the online marketplace. Digital entrepreneurship requires more than smooth operation of good software; it requires the human capacity to create and seize real value.

2.3. Digital Literacy and the Human-Centered Shift

Starting from the limitations of TAM in predicting entrepreneurial behavior, the study proposes a shift in focus from System Characteristics to Human Literacy. In the volatile online business environment, Digital Literacy is not limited to mechanical operations. According to Eshet-Alkalai (2004), it is a complex survival mindset in the digital age, encompassing the ability to decode massive amounts of data to find market niches, skills in identifying risks in e-business security, and the ability to interact socially through virtual interfaces to build brand awareness.

Approaching from the perspective of Barney (1991)'s Resource-Based View, while foundational technology is something everyone can access, individual digital capabilities are rare, hard-to-replicate resources that create a core competitive advantage for digital startups. When an individual possesses solid digital capabilities, they no longer view cyberspace as a trap containing the risk of fraud but transform it into a lens of opportunity. A deep understanding of algorithmic mechanisms and the ability to overcome technical barriers will directly eliminate fear, cultivate an entrepreneurial spirit, and push the level of behavioral control awareness to its highest.

H₅: Individual digital capabilities positively impact attitudes toward digital entrepreneurship.

H₆: Digital capabilities significantly increase awareness of behavioral control (PBC) in the digital environment.

2.4. Macro-Reference Framework: Digital Entrepreneurial Ecosystem and Education Shaping Norms

Entrepreneurship research must focus on context-specific phenomena, as argued by Welter (2011). Based on the theory of Autio, Nambisan, Thomas, and Wright (2018), we refer here to the Digital Entrepreneurial Ecosystem (DiEE), which is composed of four dimensions, namely: infrastructure of telecommunications, e-commerce, legal framework of transparency, and digital market access. As we are all living in a transitioning economy that is moving at a very fast pace in terms of digital transformation, and it is the Government that is actively carrying out a project to implement broadband coverage across the country, in addition to implementing solutions that ease online payment transactions within the community, this therefore results in a more open society. The assurance from the macro infrastructure makes it easier for families and networks of friends to accept and encourage young people's decision to do "online business." At the same time, a smooth internet infrastructure directly reduces technical latency, making users feel that all operations on digital commerce platforms are much easier and more intuitive.

H₁₀: The digital ecosystem positively impacts the shaping of subjective standards for digital entrepreneurship.

H₁₁: The digital ecosystem increases the perceived ease of use of technology tools serving business.

In parallel with the macro environment, the micro-educational structure at universities plays a role in shaping thinking. Changing the values of students is a big barrier to the development of entrepreneurship education, and teaching the knowledge and skills of entrepreneurship education in the era of new information and communication technologies is a very different task from just teaching a business model from a textbook, requiring a fundamental change in the values of students. This study combines case studies of technology startup business models with digital innovation and develops digital entrepreneurship skills through critical thinking to achieve the goal of creating a new social space in line with the development of the four innovations, enabling young people to learn how to cope with failure from the digital environment, master their own digital lives, and finally strengthen the subjective norm.

H₁₂: Entrepreneurship education positively impacts young people's subjective norms regarding digital entrepreneurial behavior.

2.5. The Synergistic Effect: The Regulatory Mechanism of the Digital Ecosystem

It is necessary to take into account the boundary conditions for the relationship between the micro (individual) and the macro (digital environment). This means that a skillfully equipped young person may hesitate to act (low PBC) in relation to online transactions in the event of, for example, a strict legal framework that limits electronic commerce in some area or a disintegrated logistics infrastructure.

Conversely, when micro-level digital skills are unleashed within a complete macro-level digital ecosystem, a powerful synergistic effect will emerge. Teece (2014) Dynamic Capabilities Theory implicitly suggests that the perfect connection between intrinsic skills and the openness of the platform economy will create a huge psychological boost. The digital startup ecosystem now acts as an amplification machine, amplifying the power of each individual's digital capabilities many times over, pushing the limits of confidence to the maximum to be ready to face the fierce competition of the online market.

H₁₃: The digital ecosystem plays a positive regulatory role in the relationship between Digital Capabilities and Behavioral Control Awareness (PBC); the more developed the ecosystem.

2.6. Overall Research Model

From the synthesis of theoretical gaps and the system of 13 hypotheses developed through the integration of the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), Digital Competence, and Digital Ecosystem, the study proposes an overall theoretical model, visually described in Figure 1.

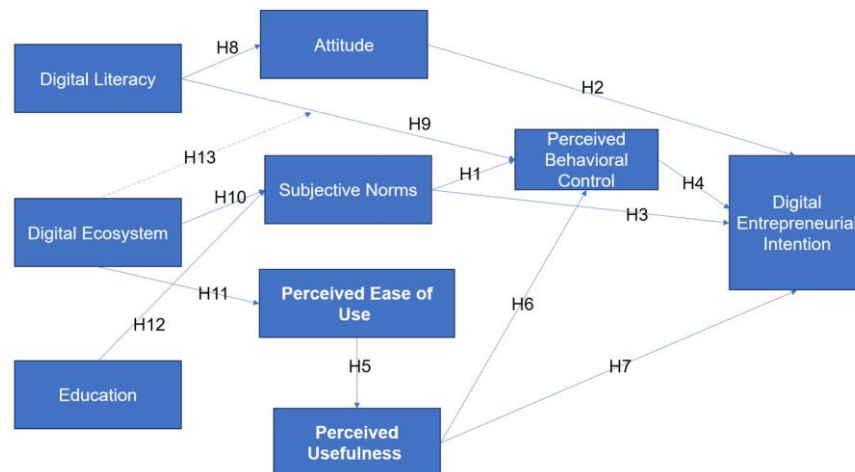


Figure 1. Proposed research model (Conceptual framework).

3. RESEARCH METHODOLOGY

3.1. Research Design and Data Collection Strategy

To address the research objectives and test the proposed 13 hypotheses, this paper applies a quantitative research method through a cross-sectional survey design. The target population is identified as young people and students in Vietnam, individuals belonging to Generation Z, possessing the characteristics of digital-native citizens, and facing the threshold of choosing a career path. A highlight of this research's implementation strategy is the application of a multi-channel data collection method, combining online surveys and direct questionnaire distribution (offline/face-to-face) to optimize sample representativeness. For the online channel, the questionnaire was digitized via the Google Forms platform and distributed using convenience sampling techniques combined with snowball sampling on social networks and student forums. This channel allowed the research to overcome geographical barriers and quickly reach a demographic highly engaged with the internet ecosystem (Datareportal, 2025).

For the direct channel, paper-based questionnaires were distributed directly to respondents on university campuses, co-working spaces, and entrepreneurship workshops. Direct implementation not only helped collect data from individuals less accustomed to online surveys but also provided a space for researchers to directly explain and clarify complex academic terminology (such as digital ecosystems or behavioral control cognition). This reduced the risk of bias due to misinterpreting the questions. It also helped maximize the reliability of the answers.

Raw data from the hard-copy surveys had to be keyed into the computer and matched with the information from Google Forms. After a rigorous data-cleaning process, including removing responses with missing information, straight-lining, or unusually short completion times, the final dataset was finalized at $N = 2,559$ valid observations.

The total measurement structure of the constructed structural model consists of 62 observed variables distributed across all first- and second-order constructs. With a sample size of $N = 2,559$, the resulting observation-to-item ratio is therefore about 41:1. This far exceeds the commonly cited rules of thumb that generally recommend at least ten observations per measured variable (Hair, Risher, Sarstedt, & Ringle, 2019) and is therefore clearly in the realm of complex multivariate analysis. In addition to the insights into the interwoven structural network, based on the

suggested procedure and Cohen (1988) guidelines, it is possible to derive a sample size for a model that provides reliable findings. We know from prior research that, in the case of an interwoven structural network and one dependent latent variable, which is explained by up to five independent latent variables (here, Entrepreneurial Intention), the final sample size substantially exceeded the minimum recommendations for complex PLS-SEM models. With such a large dataset, even the smallest effect sizes should be detected. The large sample size, supported by a multi-channel data collection strategy, not only minimizes standard errors in the analysis of moderating effects but also ensures representativeness of Vietnamese youth in the digital economy.

3.2. Measurement and Processing of Higher-Order Structures (Two-Stage Model)

To guarantee the content validity of the scales, the scales used in the study were inherited and adapted from the literature. The digital entrepreneurship scales were translated multidimensionally using the Brislin (1970) translation method to eliminate language ambiguity. All variables measured in the study were based on a 5-point Likert scale. Appendix A details the measurement items and the corresponding sources used. This study contributes to the literature by illustrating advanced data analysis procedures when dealing with complex measurement structures, namely first-order constructs (FOCs) and higher-order constructs (HOCs). While FOCs were applied to structures of TAM and TPB (Entrepreneurial Intention, Attitude, Subjective Norm, PBC, Perceived Ease of Use, Perceived Usefulness, and Education), the multidimensionality was fully captured through measuring Digital Literacy and Digital Ecosystem as higher-order reflective-reflective Type I (Becker, Klein, & Wetzels, 2012).

To estimate the structural model with high-order constructs in the PLS-SEM framework while preserving the significant values of the related paths, we adopted the two-stage approach suggested by Sarstedt, Hair, Cheah, Becker, and Ringle (2019). Specifically, the processing is carried out as follows:

Stage 1: Estimating low-order components. In Figure 2, the PLS algorithm was run with all first-order structural variables, including the subcomponents of Digital Competence (basic digital skills, technological communication skills, information processing skills, business safety awareness) and the pillars of the Ecosystem (digital infrastructure, market opportunities, supportive policies). The core objective of this phase was not hypothesis testing but rather to extract Latent Variable Scores (LVS) for each microcomponent.

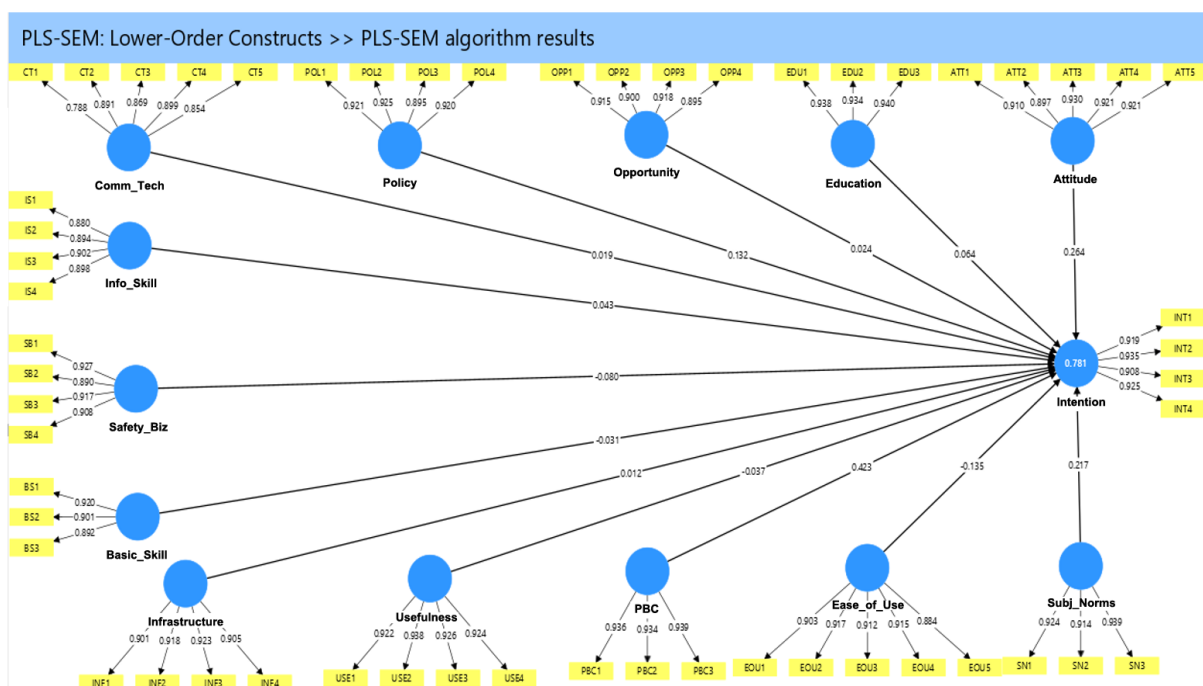


Figure 2. Micro-measurement structure and LVS extraction in Stage 1.

Stage 2: Estimating the overall structural model. The LVS scores obtained from Stage 1 are formally used as manifest variables/indicators to directly measure the two higher-order parent variables, Digital Capacity and Digital Ecosystem. In Figure 3, the research hypotheses H1–H13, including the new moderating effect, are tested.

PLS-SEM: Stage2_Higher-Order Estimation & Structural Model Testing >> PLS-SEM algorithm results

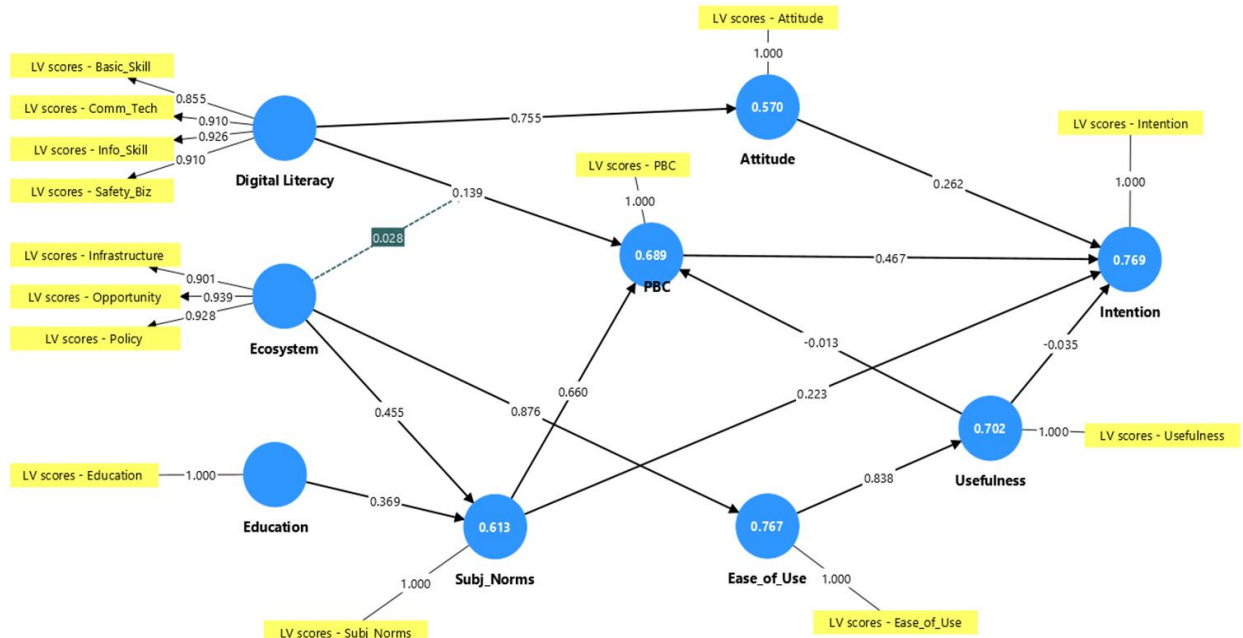


Figure 3. Estimating the overall structural model in Stage 2.

Separating the model into two stages eliminates the cumbersome nature of the measurement model, minimizes multicollinearity between indicators, and optimizes the explanatory power, R^2 , of the structural model.

3.3. Controlling Common Method Bias (CMB)

Although the multi-channel data collection strategy (online and in-person) has contributed to reducing stereotyping in respondents' responses, the risk of common method bias (CMB) due to the use of self-reported responses still needs to be carefully controlled (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Therefore, the study combines both design and statistical measures.

In terms of design, this part of the questionnaire is linked to a guarantee of complete anonymity. Each answer is thus merely a statement, without a right or wrong (or good or bad) answer, and is solely meant to take advantage of the anonymity to enable the most reliable response possible, while at the same time taking into account the psychological aspect to avoid, as far as possible, the phenomenon of social desirability.

In terms of statistics, to assess the potential for systematic bias, a full collinearity (VIF) test was performed. The criteria suggested by Hair et al. (2019) indicate that a VIF of < 5.0 ensures a factor safety level for all variables included in the model. VIF extracted from the model for all the potential constructs included ranged from 1.000 to 3.968, indicating that they are far from reaching the threshold of 5.0. The results show that common method bias and multicollinearity do not significantly affect the estimates.

4. RESEARCH RESULTS AND DISCUSSION

4.1. Descriptive Statistics

This section analyzes the descriptive statistics from the 2559 valid responses to the survey. The demographics are used to characterize the population of survey respondents and will be used to explain the responses to the questions that are analyzed in the subsequent steps.

Table 1. Statistical characteristics of the study sample (N = 2,559).

Indicator	Category	Frequency	Percentage
Gender	Male	759	29.66%
	Female	1,800	70.34%
Ages	18 - 22 years old	1,996	78%
	Over 22 years old	563	22%
Field of study (ind)	Economics and Management	1,893	73.97%
	Other fields	666	26.03%
Technology background (tech)	Very low / Basic	99	3.87%
	Low / Limited	63	2.46%
	Intermediate / Proficient	1,503	58.73%
	Good / Excellent / Advanced	894	34.94%

Table 1 reveals several characteristics of the research subjects as follows:

By referring to the age variable, 78.00% of the sample belongs to the 18–22 age group, which leaves a somewhat large gap in between, and only 22.00% of the sample in the 23–27 age group. Given our research target of young Gen Z digital citizens, who are digitally literate as the intended digital natives, and the fact that the high concentration of the sample in the 18–22 age group is slightly higher than expected, it is most likely that most of the sample members are members of the Gen Z group, the core group of digital natives of the future digital wave of young entrepreneurship. Having a high degree of homogeneity in terms of age, in this case, should also facilitate reducing intergenerational differences, which in turn can help to make the structural model proposed more reliable and stable.

Regarding gender and field of study, men and women, as well as economics and other fields of study, are evenly distributed across the samples. The spirit of digital entrepreneurship is no longer held by only one gender or students of economics but has spread across the multidisciplinary student body.

Regarding technological competence, students were asked to start with their own self-assessment of their learning ability. The self-assessment revealed that the vast majority of the students saw themselves as average or even superior learners. This self-assessment formed the basis for the students' individual digital competence.

4.2. Measurement Model Assessment

The measurement model assessment was conducted in two stages: Stage 1 focused on lower-order constructs (LOCs), and Stage 2 focused on higher-order constructs (HOCs).

4.2.1. Assessment of Lower-Order Constructs (LOCs)

To verify the reliability and convergent validity of the scales, Cronbach's alpha coefficient, composite reliability (CR), and average variance extracted (AVE) were calculated. Hair et al. (2019) stated that alpha and CR values should be above 0.70, and AVE values should be above 0.50.

Table 2. Reliability and convergence results of the low-order structure.

Latent Construct	Cronbach's Alpha	CR (ρ_c)	AVE
Digital Competence Components			
Basic Digital Skills (BS)	0.890	0.931	0.818
Communication and Collaboration (CT)	0.913	0.935	0.741
Information and Data Literacy (IS)	0.916	0.941	0.798
Safety and Security Awareness (SB)	0.931	0.951	0.829
Digital Ecosystem Components			
Technical Infrastructure (INF)	0.932	0.952	0.831
Market Opportunities (OPP)	0.928	0.949	0.822
Support Policies (POL)	0.935	0.954	0.838
Independent & Dependent Variables			
Entrepreneurship Education (EDU)	0.931	0.956	0.878
Perceived Ease of Use (EOU)	0.946	0.958	0.821

Latent Construct	Cronbach's Alpha	CR (ρ_c)	AVE
Perceived Usefulness (USE)	0.946	0.961	0.86
Attitude towards Entrepreneurship (ATT)	0.952	0.963	0.839
Subjective Norms (SN)	0.916	0.947	0.857
Perceived Behavioral Control (PBC)	0.930	0.955	0.877
Digital Entrepreneurial Intentions (INT)	0.941	0.958	0.85

From Table 2, it can be seen that the quality of all measurement structures is very high. The lowest Cronbach's Alpha and CR (ρ_c) values are 0.890 and 0.931, respectively, which are far greater than the minimum requirement of 0.70 and indicate that the scale has high internal consistency.

At the same time, the AVE of all variables recorded a minimum of 0.741 (far exceeding the standard of 0.50). In particular, the core structure, Digital Entrepreneurship Intention, has an AVE of 0.850, demonstrating that the observed variables converge extremely strongly, explaining 85% of the variation in the underlying structure. The results of the micro-measures (LOCs) are completely reliable and valid, providing a solid foundation for the analysis of higher-order structures (HOCs) and the overall structural model in the following steps.

4.2.2. Evaluation of Higher-Order Structures (HOCs)

In this study, Digital Literacy and Digital Ecosystem were established as reflective-reflective higher-order structures (HOCs). The evaluation process was carried out using the two-stage approach of Sarstedt et al. (2019). Specifically, the scores of latent variables obtained from Stage 1 (LOCs Model) were extracted and used as direct observed variables for the higher-order structure in Stage 2.

To confirm the degree of convergence and explanatory power of lower-order components on the higher-order structure, the study conducted an Outer Loadings test.

Table 3. Weights of the contribution of component variables to the higher-order structure.

Higher-Order Constructs (HOCs)	Low-Order Constructs (LOCs)	Outer Loading	P-values
Digital Competence	Basic Digital Skills	0.855	< 0.001
	Information and Data Literacy	0.926	< 0.001
	Communication and Collaboration	0.910	< 0.001
	Safety and Security Awareness	0.910	< 0.001
Digital Ecosystem	Technical Infrastructure	0.901	< 0.001
	Support Policies	0.928	< 0.001
	Market Opportunities	0.939	< 0.001

Table 3 shows that all component variables (LOCs) have loading coefficients λ that are significantly larger than the standard threshold of 0.70.

For the Digital Competence structure, Information Processing Skills $\lambda = 0.926$ is the component that most strongly reflects the overall competence of students, closely followed by Communication Competence and Safety Awareness, both at 0.910.

For the Digital Ecosystem, Market Opportunity $\lambda = 0.939$ and Support Policies $\lambda = 0.928$ are the most representative factors of the quality of the macro environment.

These excellent loading coefficients demonstrate that establishing Digital Competence and Digital Ecosystem as high-level concepts is entirely reasonable from a statistical and theoretical standpoint. This measurement model ensures quality for structural model analysis.

4.3. Discriminant Validity Assessment

To ensure that the latent constructs do not have overlapping concepts, the study applies the Heterotrait-Monotrait Ratio (HTMT) criterion proposed by Henseler, Ringle, and Sarstedt (2015).

Table 4. Results of discriminant validity assessment according to the HTMT criterion.

Variables	1	2	3	4	5	6	7	8	9	10
(1) Attitude										
(2) Digital Literacy	0.783									
(3) Ease_of_Use	0.768	0.857								
(4) Ecosystem	0.828	0.95	0.916							
(5) Education	0.757	0.792	0.719	0.84						
(6) Intention	0.822	0.67	0.61	0.713	0.697					
(7) PBC	0.851	0.706	0.645	0.723	0.711	0.85				
(8) Subj_Norms	0.848	0.753	0.718	0.785	0.735	0.802	0.818			
(9) Usefulness	0.775	0.838	0.838	0.93	0.732	0.632	0.649	0.721		
(10) ECO x DL	0.411	0.543	0.52	0.563	0.421	0.304	0.322	0.382	0.525	

According to the principle of Henseler et al. (2015), the ideal HTMT value should be below 0.85. However, for latent structures with deep conceptual overlap, the acceptance threshold can be extended to 0.90 and even up to 0.95, depending on the conceptual relationship between structures and the research context (Voorhees, Brady, Calantone, & Ramirez, 2016). The results in Table 4 show that the vast majority of structural pairs possess HTMT values below the 0.90 threshold. Three pairs slightly exceed the 0.90 threshold but remain within the maximum limit of 0.95, including Digital Ecosystem with Digital Capabilities, Usefulness, and Ease of Use, accurately reflecting the close relationship between the digital environment and technological characteristics. Therefore, the measurement model can be considered acceptable in meeting the discriminant validity requirements.

4.4. Structural Model Evaluation and Hypothesis Testing

After the measurement model met the requirements for reliability and convergent and discriminant validity, the study proceeded to evaluate the structural model to test the hypotheses. A bootstrapping process with 5,000 replicate samples was performed to determine the statistical significance of the path coefficients.

4.4.1. Multicollinearity Test (VIF)

The study used the Variance Inflation Factor (VIF) extracted from the Latent Variable Scores (LVS) in Phase 1 as the basis for evaluation. The analysis results showed that all VIF values of the measurement structure ranged from 1,000 to 3,968. Compared with the strict criteria of Hair et al. (2019), all these indices were below the maximum allowable threshold ($VIF < 5.0$). This evidence shows that multicollinearity is not a threat to the dataset.

4.4.2. Evaluating the Explanatory Power of the R^2 Model

The overall predictive power of the structural model was evaluated through the coefficient of determination R^2 . The bootstrapping analysis with 5,000 resamples showed that the structural model is reliable and has high predictability; most paths were statistically significant ($p < 0.001$), with the exception of H6 and H7. The R^2 of Digital Entrepreneurship Intention as the core dependent variable is 0.769, with a T-value of 45.122 and a p-value of < 0.001 . This research investigated the extent to which the Theory of Planned Behavior, Digital Capabilities, and Digital Ecosystems predicted the intention to start an online business. The results show that the relationship between TPB, Digital Capabilities, and Digital Ecosystems explained 76.9% of the intention to start an online business. The intermediate structures (usefulness, ease of use, and control over the behavior) have explanatory power: Perceived Ease of Use $R^2 = 0.767$; Perceived Usefulness $R^2 = 0.702$; Perceived Behavioral Control $R^2 = 0.689$.

4.4.3. Hypothesis Testing Results

The study used the bootstrapping technique ($N = 5000$) in SmartPLS with a standard significance level of $\alpha = 0.05$. Detailed results are presented in Table 5.

Table 5. Path Analysis Results and Hypothesis Testing.

Hypothesis	Structural Path	Path Coefficient (β)	T-value	P-value	Effect Size (f^2)	Decision
H1	Subjective Norms $\rightarrow$ PBC	0.660	29.519	< 0.001	0.564	Supported
H2	Attitude $\rightarrow$ Intention	0.262	6.501	< 0.001	0.050	Supported
H3	Subjective Norms $\rightarrow$ Intention	0.223	6.821	< 0.001	0.051	Supported
H4	PBC $\rightarrow$ Intention	0.467	15.567	< 0.001	0.226	Supported
H5	Perceived Ease of Use $\rightarrow$ Perceived Usefulness	0.838	84.820	< 0.001	2.358	Supported
H6	Perceived Usefulness $\rightarrow$ PBC	-0.013	0.399	0.690	0.000	Rejected
H7	Perceived Usefulness $\rightarrow$ Intention	-0.035	1.782	0.075	0.002	Rejected
H8	Digital Literacy $\rightarrow$ Attitude	0.755	54.795	< 0.001	1.323	Supported
H9	Digital Literacy $\rightarrow$ PBC	0.139	4.694	< 0.001	0.014	Supported
H10	Ecosystem $\rightarrow$ Subjective Norms	0.455	17.311	< 0.001	0.189	Supported
H11	Ecosystem $\rightarrow$ Perceived Ease of Use	0.876	113.476	< 0.001	3.286	Supported
H12	Education $\rightarrow$ Subjective Norms	0.369	13.309	< 0.001	0.125	Supported
H13	Ecosystem $\times$ Digital Literacy $\rightarrow$ PBC	0.028	5.890	< 0.001	0.008	Supported

Note: Bootstrapping with 5,000 subsamples in SmartPLS. Effect size (f^2) thresholds based on Cohen (1988): 0.02 = small, 0.15 = medium, 0.35 = large.

Applying TPB, the three components are Perceived Control, Attitude, and Subjective Norm. The results indicate that the EI of individuals is significantly influenced by PBC ($\beta = 0.467$, $p < 0.001$) > Attitude ($\beta = 0.262$) > Subjective Norm ($\beta = 0.223$). It should be noted that the phenomenon in the digital economy is changing; when entering the era of the digital economy and starting a business, entrepreneurs need not only to consider the control ability of technology but also their own resource endowment, and mastering the technology and resources is also an important factor in the confidence of the entrepreneur.

Hypotheses regarding the impact of Usefulness on PBC and Intention were rejected ($p = 0.690$ and $p = 0.075$, > 0.05). Although technology in the environment facilitates and improves the application, Gen Z's intention to start a digital business is not driven by their perception of technology's usefulness. In the 4.0 era, technology is taken as a matter of course. Young people need to develop trust in technology-use behavior, PBC, and feel comfortable with the social norms (Subj_Norms), rather than technology being seen as useful.

The originating role of the Ecosystem and Digital Literacy: Digital Literacy has an extremely powerful ability to shape attitudes ($\beta = 0.755$). Meanwhile, the Ecosystem will almost promote whether students perceive the technology as easy to use ($\beta = 0.876$).

The model also shows that there is a positive relationship between Education and Subjective Norms ($\beta = 0.369$) and that Subjective Norms have a positive and strong relationship with PBC ($\beta = 0.660$). Therefore, schools and society must create an environment that encourages high levels of Subjective Norms for Entrepreneurship.

The moderating effect of the Ecosystem on the Digital Literacy $\rightarrow$ PBC relationship (H13) was significant ($\beta = 0.028$, $p < 0.001$). Although the coefficient is not large, it indicates that the interaction between the macro and micro conditions has a certain synergistic effect, which is favorable to young people having more autonomy.

Beyond path significance, f^2 values (Cohen, 1988) reveal which relationships matter in practice. Four paths show large effects: H11 ($f^2 = 3.286$), H5 ($f^2 = 2.358$), H8 ($f^2 = 1.323$), and H1 ($f^2 = 0.564$), pointing to ecosystem, ease of

use, digital literacy, and subjective norms as the strongest factors here. Medium effects appear in H4 and H10, while H2, H3, and H12 show smaller yet meaningful contributions. The negligible f^2 of H6 and H7 reinforces that perceived usefulness no longer motivates digital entrepreneurship among young people. For H13, the small but significant effect ($f^2 = 0.008$) aligns with Aguinis, Beaty, Boik, and Pierce (2005), who note that interaction terms in field studies typically yield modest magnitudes yet remain meaningful in practice.

4.4.4. Analysis of Indirect Effects and Mediation Mechanisms

To systematically report the results, typical indirect pathways leading to Entrepreneurship Intention and Perceived Control (PBC) are summarized in Table 6.

Table 6. Results of testing specific indirect effects.

Mediation Paths	Path Coefficient(β)	T-statistics	P-values	Conclusion
Digital Literacy				
DL $\rightarrow$ Attitude $\rightarrow$ Intention	0.198	6.54	< 0.001	Supported
DL $\rightarrow$ PBC $\rightarrow$ Intention	0.065	4.475	< 0.001	Supported
Education				
EDU $\rightarrow$ Subj_Norms $\rightarrow$ Intention	0.082	5.551	< 0.001	Supported
EDU $\rightarrow$ Subj_Norms $\rightarrow$ PBC $\rightarrow$ Intention	0.114	9.481	< 0.001	Supported
Ecosystem				
ECO $\rightarrow$ Subj_Norms $\rightarrow$ Intention	0.102	6.76	< 0.001	Supported
ECO $\rightarrow$ Subj_Norms $\rightarrow$ PBC $\rightarrow$ Intention	0.140	10.886	< 0.001	Supported
ECO $\rightarrow$ Ease_of_Use $\rightarrow$ Usefulness $\rightarrow$ Intention	-0.026	1.776	0.076	Rejected
ECO $\rightarrow$ Ease_of_Use $\rightarrow$ Usefulness $\rightarrow$ PBC $\rightarrow$ Intention	-0.004	0.397	0.691	Rejected
Moderated Mediation				
ECO x DL $\rightarrow$ PBC $\rightarrow$ Intention	0.013	5.266	< 0.001	Supported

The serial mediation effects from both Education and Ecosystems show statistically significant results: ECO $\rightarrow$ Subj_Norms $\rightarrow$ PBC $\rightarrow$ Intention ($\beta = 0.140$, $p < 0.001$) and EDU $\rightarrow$ Subj_Norms $\rightarrow$ PBC $\rightarrow$ Intention ($\beta = 0.114$, $p < 0.001$). Infrastructure and education policies don't mechanically encourage Gen Z to start businesses; instead, they create an encouraging environment (Subj_Norms). This social support acts as a catalyst to increase self-confidence, ultimately leading to genuine intention. Digital competence affects intention through two parallel pathways, and Attitude has an indirect effect ($\beta = 0.198$). For Gen Z, using technology in digital entrepreneurship does not mean that they are happy or that they feel more cheerful about this activity. Technology skills affect Gen Z in such a way that they feel more excited and positive about this activity.

Paths through the mediator Perceived Usefulness were removed from the model because the direct-effect analysis was significant. The path ECO $\rightarrow$ Ease_of_Use $\rightarrow$ Usefulness $\rightarrow$ Intention is not significant ($p = 0.076 > 0.05$). It is confirmed that the ecosystem facilitates the ease of use and usefulness of technology for entrepreneurship ($\beta = 0.734$, $p < 0.001$). This behaviour change confirms that the motivation for entering entrepreneurship is not driven by the usefulness of digital tools. The model recorded a significant indirect moderating effect: ECO x DL had a significant indirect moderating effect on the path from ECO x DL $\rightarrow$ PBC $\rightarrow$ Intention ($\beta = 0.013$, $p < 0.001$). Although not large, the coefficient suggests that when these two variables are combined, the effects of a strong ecosystem and high digital literacy on PBC, and therefore on digital entrepreneurial intention, increase in magnitude relative to when each is considered separately.

4.5. Discussion

By placing the TPB and the TAM within a widely adopted digital context, the analysis yielded groundbreaking findings. These findings confirm a shift in focus from technology to people, demonstrating that individuals' core competencies extend beyond simply accepting new technology.

4.5.1. *The Rise of Human Competence: Perceived Control Plays a Central Role*

According to the literature, PBC is one of the attributes of human competence that has been referred to in several studies. The findings highlighted that PBC is the variable that has a significant and direct impact on DEI (Digital Entrepreneurial Intention) ($\beta = 0.467$, $p < 0.001$). Thus, the research supported the theory of planned behaviour as proposed by Ajzen (1991) but in a different way that suits Generation Z.

In the all-digital age, the key to whether something succeeds or fails is not technology but “human capability.” Since digital entrepreneurship is a subject in which students can fully realize their personal freedom, digital literacy and subjective norms (Subj_Norms) have a positive effect on PBC $\beta = 0.660$. In conclusion, PBC is the most significant factor, and digital entrepreneurship is a matter of human situational mastery.

4.5.2. *Beyond the Boundaries of Technological Acceptance: The Breakdown of the TAM Model*

One of the key theoretical contributions in this paper is the refutation of the hypotheses related to the effect of Perceived Usefulness (PU) on PBC and on Entrepreneurial Intention: the p-values are 0.690 and 0.075, respectively, thus providing one of the possible explanations for the limitation of the TAM model (Davis, 1989) and therefore explaining why the behaviour of youth goes far beyond the boundaries of technological acceptance.

This is largely due to the fairly recent digitalization of society. For Digital Natives, the ease of use and value of an application or technology is assumed to be as close to perfect as possible, no longer an opportunity to gain competitive advantage. In a digital utility (DU) environment, the acceptance of technology should be a hygiene factor, just something that exists, as it always has. And if what is now a standard platform for others seems useful but does not provoke high-risk behavior, such as digital entrepreneurship, this must mean that we have to rethink the assumptions underlying the TAM model, at least for today’s digitally socialized youth.

4.5.3. *The Digital Context Where Ecosystems Change Social Norms*

In a context where technology has become ubiquitous, a macro ecosystem does not directly impact individual intentions but rather alters a network of positive subjective norms ($\beta = 0.455$) and further promotes human capabilities and intentions.

This shows that Gen Z, while valuing independence, is sensitive to societal change. A favorable digital landscape exists if digital entrepreneurship is a socially recognized and supported trend. When combined with the guiding role of entrepreneurship education, it will successfully establish new thinking norms (Subj_Norms), transforming social pressures into positive motivations for action.

4.5.4. *The Interplay Between People and Context: The Synergistic Effect of Digital Literacy*

Furthermore, at the micro level, Digital Literacy directly impacts entrepreneurial attitudes ($\beta = 0.755$). More specifically, the indirect moderating effect of the interaction between the Digital Ecosystem x Digital Literacy on Intention through PBC has been confirmed ($p < 0.001$).

Therefore, it can be concluded that no matter how strong the development of digital platforms or technological contexts (ecosystems) is, they will only translate into action when exploited by individuals with sufficient digital literacy. Without human capabilities in a developing technological environment, it will be impossible to create a future generation of digital entrepreneurs.

5. CONCLUSION AND IMPLICATIONS

5.1. *Conclusion*

This study aims to understand the factors driving digital entrepreneurial intentions among young people in the context of the booming digital economy. Analysis of large-scale data from 2,559 young people in Vietnam shows that the proposed model has relatively good predictive ability, with $R^2 = 0.769$.

In an environment where digital technology has been widely adopted, technology is no longer the differentiating factor. Instead, human capabilities are the important driving force. Digital capabilities and PBC have emerged as the most dominant factors influencing digital entrepreneurship decisions. Furthermore, a good digital ecosystem or educational environment does not directly create intention; they play an indirect role in creating positive social norms, thereby fostering belief and self-confidence in young people.

5.2. Theoretical Implications

This paper provides empirical evidence that the TAM model is no longer suitable when applied to the digitally driven younger generation. The convenience of current technology is only a necessary condition, not a sufficient driving force. This explains high-risk decisions such as digital entrepreneurship.

The study places TPB in a more complex macro context. In addition to direct effects, the study found multilayered indirect and interactive regulatory effects, which are taken into account in the theory of autonomous business behavior. The intention to establish a digital business is a result of the combination of individual competence and environment (Digital Ecosystem x Digital Competence → TPB → Intention).

5.3. Practical and Policy Implications

The training model should be shifted from instruction in using tools to developing digital skills. In the context of digital entrepreneurship, training programs should prepare learning environments and social networks to foster the desired attitudes of experimentation and activeness. To fully benefit from digital tools, young people should be empowered with the digital competence required to use digital tools productively, moving away from the role of digital consumers.

Investing in infrastructure or macroeconomic policies will be ineffective without a national strategy for training and enhancing the digital skills of the population. The new wave of support measures should ensure the development of convergent ecosystems by providing young people access to the right networks of experts, mentors, and investors, in order to prepare them in the best possible way before they enter the labour market and to achieve the maximum possible level of preparedness of young people in relation to PBC before they enter the labour market.

5.4. Limitations and Future Research Directions

The research still has some limitations that can hopefully be overcome in the future. The survey data was collected using a cross-sectional method; therefore, it does not fully reflect the changes in digital entrepreneurship intentions over time. Future studies on this topic should be based on a longitudinal research design to track the process of changing from intention to actual behavior. This study focuses on digital entrepreneurial intention among young people in Vietnam, primarily in urban areas. This study recommends that future research extend this study to other cultures and economies at different levels of development.

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Appendix A. Detailed measurement items and scale sources.

This appendix presents the measurement items used in the study. All constructs and scales were adapted from prior validated studies and adjusted to fit the context of digital entrepreneurial intention among Vietnamese youth.

All items were translated and back-translated following Brislin (1970) procedure.

All measurement items were assessed using a five-point Likert scale:

1 = Strongly disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly agree

Construct	Item Code	Measurement Item	Adapted Source
Basic Digital Skills	BS1	I can use computers and smartphones confidently.	Eshet-Alkalai (2004)
	BS2	I can easily install and use new apps.	Eshet-Alkalai (2004)
	BS3	I can solve simple technical problems on digital devices.	Eshet-Alkalai (2004)
	BS4	I can use office software and digital tools effectively.	Eshet-Alkalai (2004)
	BS5	I feel comfortable using digital platforms.	Eshet-Alkalai (2004)
Information and Data Literacy	IS1	I know how to find accurate information online.	Eshet-Alkalai (2004)
	IS2	I can tell the difference between fake and reliable information.	Eshet-Alkalai (2004)
	IS3	I can collect information from different online sources.	Eshet-Alkalai (2004)
	IS4	I can judge whether an online business or website is trustworthy.	Eshet-Alkalai (2004)
	IS5	I use digital information to make better decisions.	Eshet-Alkalai (2004)
Communication and Collaboration	CT1	I use social media effectively for communication and work.	Eshet-Alkalai (2004)
	CT2	I can create digital content that attracts viewers.	Eshet-Alkalai (2004)
	CT3	I can use online teamwork tools effectively.	Eshet-Alkalai (2004)
	CT4	I understand how digital platform recommendations work.	Eshet-Alkalai (2004)
	CT5	I can build my personal image on digital platforms.	Eshet-Alkalai (2004)
Safety and Security Awareness	SB1	I understand online privacy and security risks.	Eshet-Alkalai (2004)
	SB2	I know how to protect my online accounts and data.	Eshet-Alkalai (2004)
	SB3	I understand the importance of digital copyright and intellectual property.	Eshet-Alkalai (2004)
	SB4	I follow ethical rules in online activities and transactions.	Eshet-Alkalai (2004)
Entrepreneurship Education	EDU1	My university provides useful knowledge about digital entrepreneurship.	Liñán and Chen (2009)
	EDU2	University courses help me understand how online businesses work.	Liñán and Chen (2009)
	EDU3	My university motivates me to think about entrepreneurship.	Liñán and Chen (2009)

Construct	Item Code	Measurement Item	Adapted Source
Technical Infrastructure	INF1	Internet access where I live is fast and stable.	Autio et al. (2018) and Nambisan (2017)
	INF2	Internet and digital services are affordable for me.	Autio et al. (2018) and Nambisan (2017)
	INF3	Online payment systems are convenient and reliable.	Autio et al. (2018) and Nambisan (2017)
	INF4	Smart devices are easy to access for work and business.	Autio et al. (2018) and Nambisan (2017)
Policy Support	POL1	Government policies encourage young people to start digital businesses.	Autio et al. (2018) and Nambisan (2017)
	POL2	Online business registration procedures are becoming easier.	Autio et al. (2018) and Nambisan (2017)
	POL3	I know about national digital transformation support programs.	Autio et al. (2018) and Nambisan (2017)
	POL4	The legal environment supports online business activities.	Autio et al. (2018) and Nambisan (2017)
Market Opportunities	OPP1	I see many business opportunities on digital platforms.	Autio et al. (2018) and Nambisan (2017)
	OPP2	Demand for online products and services is increasing.	Autio et al. (2018) and Nambisan (2017)
	OPP3	There are still many untapped opportunities in digital markets.	Autio et al. (2018) and Nambisan (2017)
	OPP4	Digital business makes it easier to reach customers.	Autio et al. (2018) and Nambisan (2017)
Perceived Usefulness	USE1	Digital platforms help improve business performance.	Davis (1989)
	USE2	Digital tools help businesses reach customers faster.	Davis (1989)
	USE3	Digital technology is useful for managing business activities.	Davis (1989)
	USE4	Technology provides important benefits for entrepreneurship.	Davis (1989)
Perceived Ease of Use	EOU1	Digital business applications are easy to learn and use.	Davis (1989)
	EOU2	Digital platforms are clear and easy to understand.	Davis (1989)
	EOU3	I do not need much effort to use these technologies.	Davis (1989)
	EOU4	Using digital systems is flexible and convenient.	Davis (1989)
	EOU5	I rarely experience technical difficulties when using digital applications.	Davis (1989)
Attitude	ATT1	Becoming a digital entrepreneur is attractive to me.	Ajzen (1991) and Liñán and Chen (2009)
	ATT2	I would like to start an online business if I had the opportunity.	Ajzen (1991) and Liñán and Chen (2009)
	ATT3	Digital entrepreneurship would make me feel satisfied.	Ajzen (1991) and Liñán and Chen (2009)

Construct	Item Code	Measurement Item	Adapted Source
	ATT4	Among career choices, I prefer digital entrepreneurship.	Ajzen (1991) and Liñán and Chen (2009)
	ATT5	I feel positive and excited about online business activities.	Ajzen (1991) and Liñán and Chen (2009)
Subjective Norms	SN1	My family would support my decision to start a digital business.	Ajzen (1991) and Liñán and Chen (2009)
	SN2	My friends and colleagues think positively about online business.	Ajzen (1991) and Liñán and Chen (2009)
	SN3	People important to me encourage digital entrepreneurship.	Ajzen (1991) and Liñán and Chen (2009)
Perceived Behavioral Control	PBC1	I believe I have enough skills to start a digital business.	Ajzen (1991) and Bandura (1977)
	PBC2	I believe I can manage online business activities successfully.	Ajzen (1991) and Bandura (1977)
	PBC3	If I wanted to, I could start a digital business right now.	Ajzen (1991) and Bandura (1977)
Digital Entrepreneurial Intention	INT1	I am willing to do whatever is necessary to become a digital entrepreneur.	Liñán and Chen (2009)
	INT2	Becoming a digital entrepreneur is one of my career goals.	Liñán and Chen (2009)
	INT3	I am preparing knowledge or financial resources for future entrepreneurship.	Liñán and Chen (2009)
	INT4	I am determined to start my own digital business in the future.	Liñán and Chen (2009)

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