Role of Technopreneurial Self-Efficacy and Perceived Behavioral Control in Shaping Students' Entrepreneurial Intentions

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DOI: https://doi.org/10.47772/IJRISS.2026.1014MG0208

Received: 17 October 2026; Accepted: 23 October 2026; Published: 04 November 2026

ABSTRACT

The study aims to narrow a significant theoretical gap in the field of technopreneurship research, which focuses on the interaction between digital capabilities and entrepreneurial intentions in psychological and behavioral ways. The main goal is to investigate how digital readiness affects entrepreneurial intentions, with perceived behavioral control acting as a moderator and technopreneurial self-efficacy acting as a mediator. 400 convenience-sampled Bangladeshi university students provided the data for this cross-sectional, deductive (quantitative) study. The suggested conceptual model was examined using the PLS-SEM analysis tool SmartPLS 4.1. The findings show that the measurement is reliable and valid, and that the structural model can account for 47.3% of the variance in entrepreneurial intention (R^2 was equal to 0.473). Results showed that entrepreneurial intention (β was equal to 0.503, p-value was less than 0.001) and technopreneurial self-efficacy (β was equal to 0.611, p-value was less than 0.001) were significantly affected by digital readiness. Furthermore, the relationship between entrepreneurial intention and digital readiness is partially mediated by technopreneurial self-efficacy (β was equal to 0.150, p-value was less than 0.001), while perceived behavioral control positively strengthens the link between digital readiness and entrepreneurial intention (β was equal to 0.052, p was equal to 0.043). This study provides empirical evidence supporting the psychological model that relates digital readiness to entrepreneurial intention in technopreneurship.

Keywords - Technopreneurship, digital readiness, technopreneurial self-efficacy, perceived behavioral control, entrepreneurial intention.

INTRODUCTION

In the present global economy, old industrial development approaches are transforming into technology-based entrepreneurship, which is termed as technopreneurship (Sindhu et al., 2025). In order to achieve balance and sustainability in economic transformation, digital innovation, startup ecosystems, and eco-friendly economic structures are essential, and they also play a significant role in making nations more resilient and competitive over the long run (Zhang & Khaskheli, 2025). Higher education institutions are key to creating technologically competent human capital that can translate digital skills into entrepreneurial results. But technological infrastructure is not enough for innovation or entrepreneurial activities. Intrinsic motivation, entrepreneurial intention, and psychological readiness to do a technology-based business are to a greater extent responsible for the technopreneurial intention of an individual (Maziriri et al., 2025).

Although the importance of studying digital entrepreneurship and entrepreneurial intention in the literature has increased, there is still a significant theoretical gap that provides insight into the psychological mechanism that

transforms digital readiness into entrepreneurial behavior. Current research on the direct link between digital capability and entrepreneurial outcomes tends to offer little understanding of the underlying cognitive mechanisms that are influencing entrepreneurial commitment (Mir et al., 2023). Furthermore, the traditional models tend to ignore the relationship between external structural perceptions and internal confidence beliefs and their impact on entrepreneurial decision-making (Ay & Özdemir, 2025).

Based on this, the study provides answers to the following research questions:

1. Does digital readiness directly affect the entrepreneurial intentions of University students?
2. What is the effect of digital readiness on technopreneurial self-efficacy?
3. How strong is the relationship between technopreneurial self-efficacy and entrepreneurial intention?
4. Is there a mediating role of technopreneurial self-efficacy between the variables of digital readiness and entrepreneurial intention?
5. How does perceived behavioral control moderate the relationship between digital readiness and entrepreneurial intention?

The paper suggests an integrated conceptual framework with five hypotheses to fill this gap.

H1: Digital readiness has a positive direct effect on entrepreneurial intention.

H2: Digital readiness positively influences technopreneurial self-efficacy.

H3: Technopreneurial self-efficacy positively influences entrepreneurial intention.

H4: Technopreneurial self-efficacy mediates the relationship between digital readiness and entrepreneurial intention.

H5: Perceived behavioral control positively moderates the relationship between digital readiness and entrepreneurial intention, the positive effect of digital readiness on entrepreneurial intention is enhanced when there is a high level of perceived behavioral control.

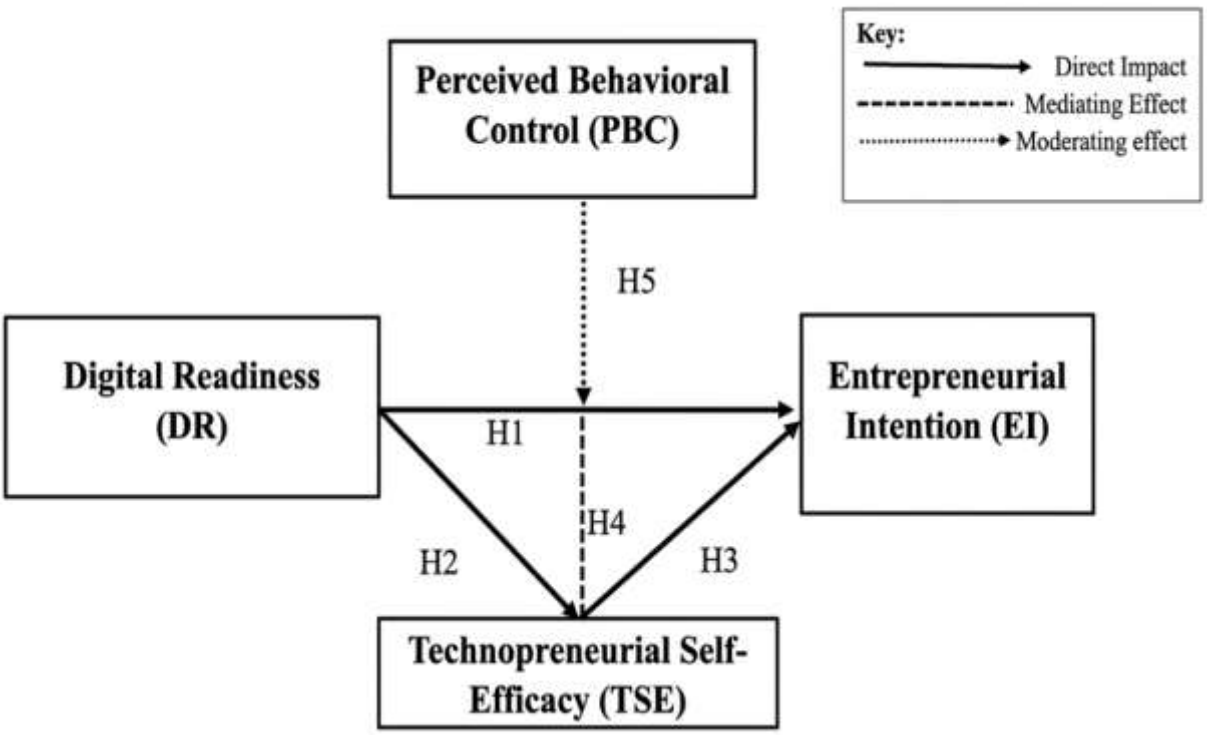


Fig. 1: Research model

This structure emphasizes both the direct, mediating, and moderating mechanisms of explaining entrepreneurial intention formation.

This research is theoretically underpinned by Ajzen's theory of planned behavior (TPB) (Esfandiar & Hadinejad, 2026), which is further enhanced by Bandura's self-efficacy theory (Ouyang et al., 2023). According to the theory of planned behavior, entrepreneurial intention (EI) is the primary outcome variable, and intentional action is explained by attitudes, subjective norms, and PBC. In the present work, the attention was directed towards the influence of the strength of the intention formation on the key boundary condition, perceived behavioral control (PBC). Yet the psychological aspects of technology entrepreneurship are not completely explained by TPB. Hence, Bandura's self-efficacy theory is used to account for the acquisition of entrepreneurial decision-making self-confidence (Ramos, 2024). Digital readiness (DR) is a technological capability, within this larger context, that serves to support cognitive confidence structures. This results in technopreneurial self-efficacy (TSE), a psychological mediator that converts digital competence into entrepreneurial intention (EI). This theory suggests that an extended TPB model should be presented to explore the interaction between external digital competence and internal psychological control mechanisms related to entrepreneurial intention in technology-based entrepreneurial contexts (Choi et al., 2026).

It is important to point out that this study examines entrepreneurial intention, rather than the actual results of sustainability and economic development, which therefore is a theoretical relationship and needs to be evaluated in future research that focuses on a longitudinal approach. Previous research has investigated digital competence and entrepreneurial intention separately, but few studies have tested direct effects and paid limited attention to the psychological mechanism, namely, technopreneurial self-efficacy, between digital competence and the entrepreneurial intention (Bachmann et al., 2024). Moreover, the relationship between digital readiness and intention to use is not often examined, especially in the context of universities in Bangladesh (Nguyen et al., 2024). This study overcomes these weaknesses by using the Theory of Planned Behavior (Ajzen, 1991) and the self-efficacy theory (Locke, 1997), in which the concept of technopreneurial self-efficacy is positioned as a mediator and the concept of perceived behavioural control as a moderator.

METHODOLOGY

Research Design and Sample Characteristics

This study examines the association between digital readiness, TSE, PBC, and entrepreneurial intention using a cross-sectional survey method, a quantitative research strategy, and a deductive research design. This method can be used to investigate complex mediation and moderation relationships in a systematic empirical framework (Maziriri et al., 2025). The target group is the students at the university—the future human capital of entrepreneurs. The data collection method employed was non-probability convenience sampling, and the sample size was N = 400 respondents.

Sample students were those currently studying the honours, masters, MPhil or PhD programmes at public and private universities in Bangladesh. The number of respondents from public universities represented about 60% and the private universities 40%. Data were gathered via the internet and in person over a 5 week period. The questionnaire was given using Google Forms and filled out by the students of the university. The students who had enrolled in different universities in Bangladesh from any academic background were invited to participate in this. The recruitment of the participants was done using non-probability convenience sampling technique (Etikan et al., 2016). Thus, results may not be fully generalizable to the larger student body at the university.

44.5% were female respondents (n = 178), and 55.5% were male respondents (n = 222). The majority belonged to the 19–22 age group (63.0%), followed by 23–26 (23.1%) and 27–30 (13.9%).

The respondents were mainly from Management Studies (39.25%, n = 157) and Tourism and Hospitality Management (18.00%, n = 72), and their distribution was even across other disciplines.

Measurement Instruments

Multi-item questionnaires modified from earlier studies, which included a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), were used to evaluate each concept. Digital readiness had been scaled and comprised 5 items (Hong & Kim, 2018).These five items were originally created to support academic engagement and were adapted in the present technopreneurship context by rewording references with relation to academic and digital learning to technopreneurial activities based upon technology. Two subject experts checked the content validity and a pilot test was undertaken with 30 students to validate clarity. The modified scale had the same five-point response scale as the original. Technopreneurial self-efficacy was measured using a 10-item scale (Salhieh & Al-Abdallat, 2022), while perceived behavioral control was measured using a six-item scale (Ajzen, 1991). The items were taken from a 5-item scale of Entrepreneurial Intention to measure entrepreneurial intention (Wathanakom et al., 2020). The instruments were adapted from previously published literature to confirm validity and reliability in every measurement.

Data Analysis Procedure

The hypothesized relations were tested using PLS-SEM, appropriate for complex predictive models that include mediation and moderation effects in the model (Shmueli et al., 2019). For the analysis, SmartPLS software was used. The evaluation has been done in two stages. The first check of the model for the measurement was the factor loading, Cronbach's alpha, composite reliability, and average variance extracted. The Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio were used to confirm this discriminant validity (Pieters et al., 2026).

Second, the standardized path coefficients, bootstrapping for significance testing, were used to evaluate the structural model, the coefficient of determination (R-square), and effect sizes (f-square), as well as predictive relevance (Q-square) (Batra, 2025).

Ethical issues were taken care of, including informed consent and maintaining confidentiality for all the respondents.

RESULTS AND DISCUSSION

To evaluate the proposed framework, the empirical evaluation was done in PLS-SEM using the SmartPLS 4.1 software. This method is suitable when investigating complex structural relationships of simultaneous mediation and moderation effects in an integrated conceptual framework (Changalima et al., 2026).

Measurement Model Evaluation

The reflective measurement model yielded satisfactory results for the reliability of the indicators, as well as for the internal consistency, convergent, and discriminant validation of four latent variables: digital readiness (DR), technopreneurial self-efficacy (TSE), perceived behavioral control (PBC), and entrepreneurial intention (EI).

To ensure the reliability of the indicators, they were standardized with factor loadings. As seen from Table I, the loading values of the measurement items varied from 0.702 to 0.847, which are higher than the recommended value of 0.70, demonstrating high item reliability (Wen et al., 2026). To assess internal consistency reliability, Cronbach's alpha was calculated, along with composite reliability. Cronbach's alpha and composite reliability were within acceptable limits of 0.775 to 0.917 and 0.847 to 0.931, respectively, which is considered acceptable at 0.70.

Convergent validity was established using AVE, which is the average score of variance accounted for by the instrument. AVE also showed that the constructs range between 0.525 and 0.653, surpassing the lower limit of the AVE of 0.50 as established by and showing that these constructs account for more than 50% of the variance of the associated indicators (Qureshi et al., 2025).

Table I. Item Loadings, Reliability, and Convergent Validity

	TSE	DR	EI	PBC	α	CR	AVE
TSE1	0.743				0.917	0.931	0.575

TSE2	0.747						
TSE3	0.713						
TSE4	0.790						
TSE5	0.703						
TSE6	0.703						
TSE7	0.829						
TSE8	0.771						
TSE9	0.784						
TSE10	0.789						
DR1		0.839			0.867	0.904	0.653
DR2		0.811					
DR3		0.744					
DR4		0.815					
DR5		0.827					
EI1			0.710		0.775	0.847	0.525
EI2			0.738				
EI3			0.753				
EI4			0.702				
EI5			0.719				
PBC1				0.818	0.875	0.906	0.617
PBC2				0.774			
PBC3				0.847			
PBC4				0.801			
PBC5				0.723			
PBC6				0.741			

The heterotrait-monotrait (HTMT) ratio and the Fornell–Larcker criterion were also used to verify the discriminant validity. The construct distinctiveness was confirmed by the square root of the AVE (0.758, 0.808, 0.725, and 0.785 for TSE, DR, EI, and PBC, respectively) being greater than the inter-construct correlations. Similarly, the highest value of HTMT was observed between DR and PBC (0.764), which was still below the conservative threshold of 0.90 (Ba Awain et al., 2025). Moreover, cross-loading analysis identified the highest loadings on the constructs supporting the discriminant validity.

Structural Model and Hypothesis Testing

After the model was validated, the structural relationships between the variables were explored using bootstrapping with 5,000 resamples. The model accounted for 47.3% variance in entrepreneurial intention (R^2 = 0.473) and 37.4% variance in technopreneurial self-efficacy (R^2 = 0.374), which were satisfactory (Maziriri et al., 2025).

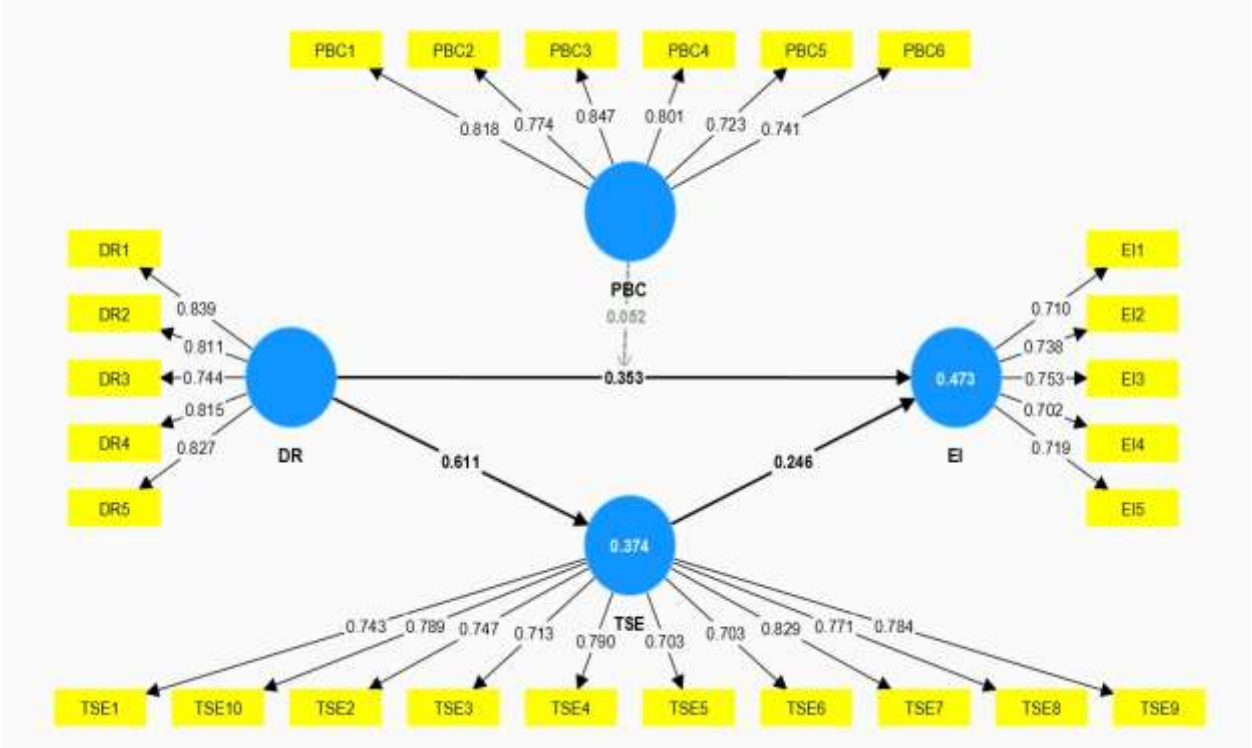


Fig. 2. Structural Path Model

The predictive relevance of the structural model was assessed using the Q^2 values. All of the Q^2 values of the indicators of the entrepreneurial intention (EI) ranged from 0.148 to 0.260, and those of the technopreneurial self-efficacy (TSE) indicators ranged from 0.145 to 0.278. The positive Q^2 values indicate predictive relevance for both endogenous constructs. Based on the effect size guidelines, Digital readiness had a significant effect on the technopreneurial self-efficacy ($f^2 = 0.597$), whereas the effect of DR → EI was moderate ($f^2 = 0.098$) and the effect of TSE → EI was moderate ($f^2 = 0.060$) (Maziriri et al., 2025). The small, but statistically significant effect size ($f^2 = 0.011$) was the moderating effect of PBC × DR → EI.

Table II. Hypothesis Testing Results

Hypothesized path	β	SD	f^2	*t*-value	*p*-value	Decision
H1: DR→ EI	0.503	0.064	0.098	7.814	< 0.001	Supported
H2: DR→ TSE	0.611	0.038	0.597	15.898	< 0.001	Supported
H3: TSE→ EI	0.246	0.059	0.060	4.173	< 0.001	Supported
H4: DR→TSE→EI	0.150	0.039	-	3.843	< 0.001	Supported (Partial mediation)
H5: PBC × DR→ EI	0.052	0.026	0.011	2.026	0.043	Supported

Table III. Indicator-Level Q^2 Values for Predictive Relevance

Construct	Indicator	Q^2 Value	Construct	Indicator	Q^2 Value
TSE	TSE1	0.270	EI	EI1	0.234
	TSE2	0.278		EI2	0.188
	TSE3	0.182		EI3	0.148
	TSE4	0.184		EI4	0.260
	TSE5	0.150		EI5	0.240
	TSE6	0.145			

	TSE7	0.267			
	TSE8	0.203			
	TSE9	0.199			
	TSE10	0.188			

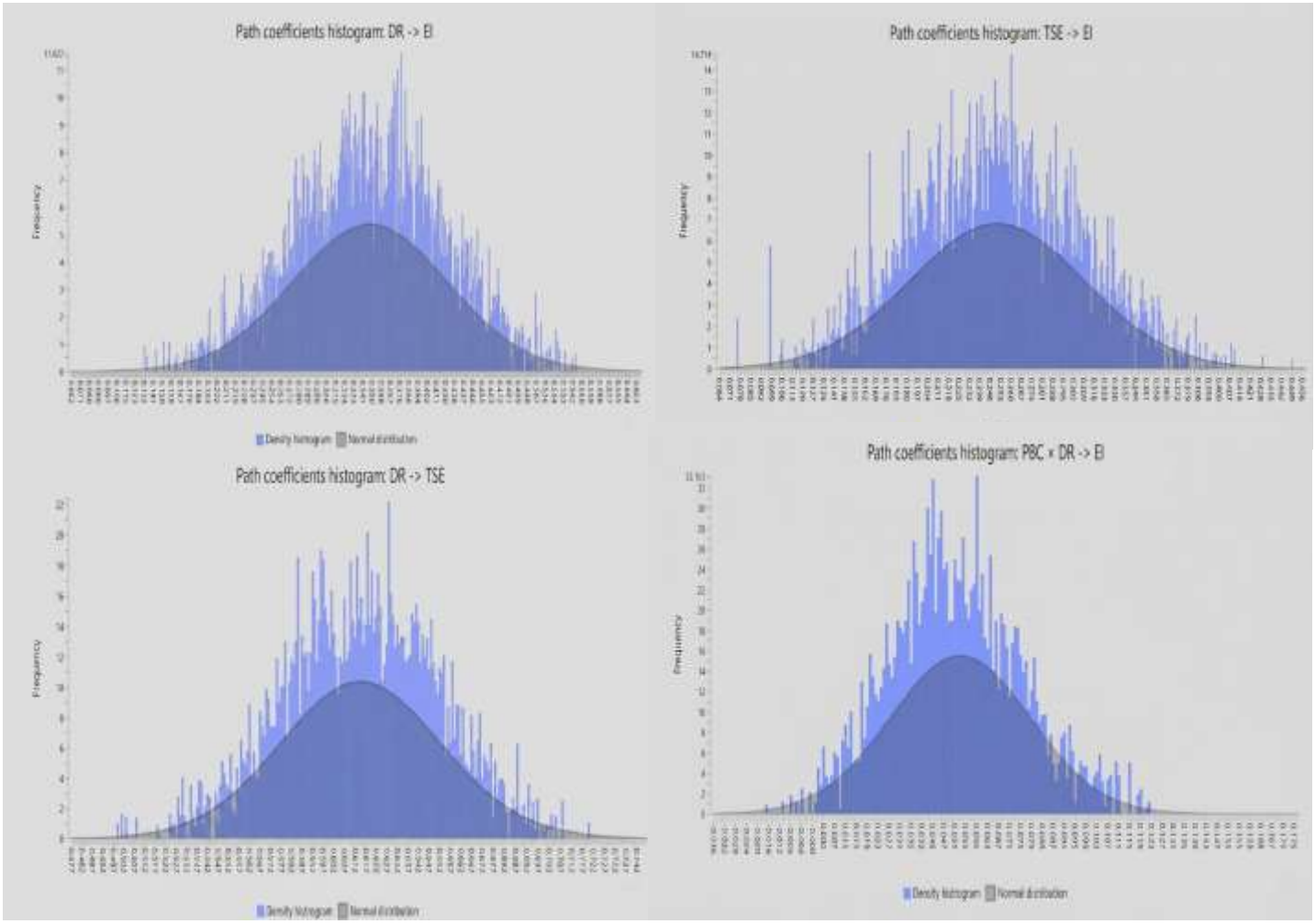


Fig. 3. Bootstrapping Histogram

All the proposed hypotheses are confirmed with the findings. The effect of digital readiness on entrepreneurial intention was significant and positive ($\beta = 0.503$, $p < 0.001$) while the effect of digital readiness on technopreneurial self-efficacy was significant and positive ($\beta = 0.611$, $p < 0.001$). Out of the two, a positive relationship was identified between technopreneurial self-efficacy and entrepreneurial intention, with $\beta = 0.246$ and $p < 0.001$. The mediation analysis showed that technopreneurial self-efficacy partially mediates the relationship between digital readiness and entrepreneurial intention. The direct effect of digital readiness on entrepreneurial intention remained significant ($\beta = 0.503$, $p < 0.001$) and the indirect effect of digital readiness on entrepreneurial intention mediated through technopreneurial self-efficacy was also significant ($\beta = 0.150$, $p < 0.001$). Both the direct and indirect effects are meaningful, thus supporting partial rather than full mediation.

Moreover, the relationship between digital readiness and entrepreneurial intention was found to be significantly moderated by perceived behavioral control; that is, the positive relationship between digital readiness and entrepreneurial intention is stronger the higher the perceived behavioral control is ($f^2 = 0.011$).

Model Fit Evaluation and Discussion

In PLS-SEM, global goodness of fit indices are not the primary indicators used to validate the model quality since PLS-SEM emphasizes in explaining variance and examining predictive power (Hair et al., 2019). Rather,

the evaluation of the models focuses on the reliability and validity of the measurement model, significance of structural path, coefficient of determination (R^2), effect size (f^2), and the predictive relevance (Q^2) (Hair et al., 2021). Thus, the model was evaluated based on these criteria and not based on covariance based global fit indices. Based on the structural model, the R^2 value for entrepreneurial intention (EI) was 0.473 and 0.374 for technopreneurial self efficacy (TSE). The Q^2 values of the indicators of TSE were in the range of 0.145 to 0.278, and those of EI ranged from 0.148 to 0.260. The positive Q^2 values for both endogenous constructs are in line with predictive relevance and the significant path coefficients further support the hypothesized relationships (Hair et al., 2019).

Results provide valuable information on the psychological and behavioral processes affecting technopreneurship. The partial mediation finding indicates that digital readiness has a direct significant effect on entrepreneurial intention (direct effect: $\beta = 0.503$, $p < 0.001$), and has indirect significant influence on entrepreneurial intention via technopreneurial self-efficacy (indirect effect: $\beta = 0.150$, $p < 0.001$). The results show partial not complete mediation, as the direct effect is still present after controlling for the mediator. This indicates that technological competence is not an enough factor to create entrepreneurial intention (Bachmann et al., 2024). We must also build confidence in the use of the Digital Skills to engage in entrepreneurship as an individual. The high direct effect, as well, indicates that there may be other factors apart from technopreneurial self-efficacy, which may mediate the influence of digital readiness on entrepreneurial intention (Maziriri et al., 2025).

Moreover, the moderating role of perceived behavioral control indicated that the institutional support, resources and perceived autonomy could positively influence the entrepreneurial intention (Akter et al., 2026). The interaction effect, however, was statistically significant but small ($\beta = 0.052$, $f^2 = 0.011$), suggesting that the perceived behavioral control had a small rather than significant effect on the relationship between digital readiness and entrepreneurial intentions. This small effect size should be taken into account when considering the practical implications of the findings.

The overall results indicate that the use of self-efficacy theory and the theory of planned behavior in entrepreneurial intention in technology-based context is supported.

CONCLUSION

This study contributes to the Theory of Planned Behavior by showing that technopreneurial self-efficacy partially mediates the relationship between digital readiness and entrepreneurial intention, while perceived behavioral control has a statistically significant but small moderating effect on the relationship between digital readiness and entrepreneurial intention. The results of this study reveal the significance of technopreneurial self-efficacy in converting digital readiness to entrepreneurial intention. Some limitations should be noted, however, such as the cross-sectional design and convenience sampling of university students. Longitudinal study design and the involvement of different demographical groups could be adopted in future research to further explore these relationships.

ACKNOWLEDGMENT

The author would like to thank all contributors for their valuable guidance, continuous support, and encouragement throughout the completion of this research work.

Conflict Of Interest

The authors declare no competing interests.

Ethics Declaration

This study was conducted in accordance with applicable ethical principles, ensuring voluntary participation and the confidentiality of respondents.

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