

THE ROLE OF ENTREPRENEURSHIP EDUCATION AND DIGITAL LITERACY IN ENHANCING INNOVATION THROUGH MOTIVATION AS AN INTERVENING VARIABLE

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Article Info

Article history:

Received: 06 June 2026;

Accepted: 15 June 2026;

Published: 30 June 2026.

Keyword:

Entrepreneurship Education, Digital Literacy, Motivation, Innovation, PLS SEM

Abstract

The shift towards a digitally driven economy has transformed the way new ventures emerge and prompted universities to incorporate digital skills into their curriculum to prepare students for innovation. In this context the research focuses on the positive roles of entrepreneurship education and digital literacy in terms of innovation, as well as on the potential role of motivation as a mediator. Exploratory quantitative research approach was used; Data was collected using a 26 item questionnaire scored on a 5 point likert scale. The samples used was purposive with 50 students of Master of Management at Jakarta State University as the respondents. Partial Least Squares Structural Equation Modeling (PLS SEM) of the SmartPLS software was used in processing the responses. The results indicate that digital literacy has a positive and significant effect on motivation ($\beta = 0.291$) and innovation ($\beta = 0.442$), while motivation also has a positive and significant effect on innovation ($\beta = 0.501$). In contrast, entrepreneurship education had a positive but insignificant effect on motivation ($\beta = 0.387$) and a small, insignificant negative effect on innovation ($\beta = -0.100$). Mediation testing revealed that motivation partially mediated the effect of digital literacy on innovation, but did not mediate the effect of entrepreneurship education on innovation. While the sample size was limited, the results suggest that digital literacy, rather than theory based entrepreneurship education, was the stronger driving force behind innovation in this reinforcing group, exerting its influence both independently and by reinforcing motivation.

1. INTRODUCTION

For decades, entrepreneurship has been considered a key driver of a country's economic growth. Entrepreneurship education, in particular, nudges individuals toward economic self reliance, a goal that calls for creative and innovative thinking if the businesses they start are to endure and stay competitive. In Indonesia, this drive has been institutionalized, among others, through the Wirausaha Merdeka (WMK) program facilitated by the Ministry of Education, which aims to provide practical out of class experience recognized within the semester credit system.

Nevertheless, there is a great empirical disconnect between institutional incentives and what goes on in the world. However some problems still exist to discourage young entrepreneurs to innovate, such as:

- According to The 2022 Indonesian Millennial and Gen Z Report by the IDN Research Institute, as cited by the Deputy Minister of MSMEs Helvi Moraza, 64% of Indonesian Gen Z respondents are interested in becoming entrepreneurs, driven mainly by flexible working time and the support of digital technology (Warta Ekonomi, 2025). Data SMERU shows that entrepreneurship has a high level of interest among young people in Indonesia,

in which about 73% of youth are interested in entrepreneurship (ANTARA, 2025). In Indonesia, however, the entrepreneurship ratio is still quite low, just 3.5%, and is still low compared to the average of around 8% that happens in developed countries (ANTARA, 2025). This demonstrates a distinct mismatch between expectations and the core digital skills expected of pupils to achieve these.

- Research shows that Micro, Small, and Medium Enterprises (MSMEs) struggle to grow due to three main factors: limited access to capital, low digital/technological literacy, and weak human resource management (Tempo, 2024, citing the Mastercard Small Business Barometer Report by 60 Decibels and Mercy Corps Indonesia).
- Micro and Small Enterprise (MSE) actors tend not to make full use of entrepreneurship training programs or classes. The main causes are the limited relevance of the material and the lack of field practice; many training programs are considered too theoretical and fail to address the practical daily needs of business actors (Beritabernas, 2024).
- The Deputy Minister of MSMEs has highlighted the phenomenon of students who remain afraid to start their own business and prefer to become employees. Psychological barriers such as fear of failure and low self confidence remain a central issue, even though these students have better access to knowledge (Warta Ekonomi, 2025).

Conceptually, the emphasis of entrepreneurship education has moved away from conventional managerial themes toward building digital entrepreneurial intention and technopreneurship (Hasan et al., 2025; Liang et al., 2025). Embedding literacy digital matters here because digital competence is seen as the basis on which entrepreneurs adjust to, and create within, a fast moving digital economy (Shatila & Hernandez Lara, 2026; Udekwe & Iwu, 2024). Digital literacy has been shown not only to improve business performance technically but also to strengthen the critical thinking capacity required for the sustainability of innovation (Angkhasakulkiat et al., 2025).

Earlier studies repeatedly report that hands on, practice based entrepreneurship education lifts students' creativity and their willingness to innovate (Rahmi et al., 2025; Liang et al., 2025). What stays unclear at the theoretical level, however, is the inner pathway linking educational exposure to innovation results, especially how motivation functions as a mediator. Within the Theory of Planned Behaviour, motivation is commonly read as the psychological link that turns knowledge into innovative behaviour (Rosangela et al., 2026; Udekwe & Iwu, 2024).

A research gap emerges from the recent finding of Prabandari et al. (2026), which reveals that entrepreneurial motivation, in fact, has no significant mediating influence on the relationship between education and digital entrepreneurial intentions in a particular context. This finding contradicts other studies that position motivation and learner autonomy as keys to entrepreneurial success (Deilami, 2025; Lam et al., 2025). This inconsistency suggests the need for qualification in the cognitive process. students who need further research.

Based on the gaps identified above, this research was conducted on Master of Management (MM) students at Jakarta State University as the data for analysis for three reasons. MM students are in a career transition stage, and most already have work experience or have owned a business, meaning the decision about whether to start a business is much easier to understand than for the typical undergraduate respondent. Second, most previous literature on digital entrepreneurial intentions has concentrated on undergraduate samples (e.g., Hasan et al., 2025; Liang et al., 2025), leaving the postgraduate level under researched despite its strategic relevance for the development of technology entrepreneurship. Third, MM curricula at public universities in Indonesia have recently begun integrating disparate digital and entrepreneurship modules, creating a suitable environment to test whether theoretical entrepreneurship education or applied digital literacy is a stronger driver of innovation. This focus differs from previous studies that examined undergraduate or vocational students, and allows this research to provide more detailed insights into how motivations drive more innovative education at the postgraduate level.

Therefore, this research aims to examine how entrepreneurship education and digital literacy innovate, and motivation as a mediating variable. The guiding question is: how do entrepreneurship education and digital literacy influence innovation, both directly and through motivation, among graduate management students? The specific objectives are (1) to examine the influence of entrepreneurship education and digital literacy on motivation; (2) to examine the influence of entrepreneurship education, digital literacy, and motivation on innovation; and (3) to examine the role of motivation in mediating the influence of both independent variables on innovation. This conference is expected to bring both theoretical perspectives as it relates to when and how motivation can act as a mediating factor in the graduate environment and practical ones, with recommendations for designing the curriculum for learning entrepreneurship in the digital era.

2. LITERATURE REVIEW

2.1. Entrepreneurship Education

Entrepreneurship education can be understood as an organised learning experience through which students acquire the conceptual understanding, hands on abilities, attitudes, and way of thinking required to spot opportunities and operate a business. Its core dimensions span foundational knowledge and entrepreneurial theory, applied skills developed via active learning, the surrounding learning setting, and the institutional backing behind it, contact with

mentors and practitioners, and personal growth elements such as self efficacy and entrepreneurial attitudes (Hasan et al., 2025; Rahmi et al., 2025). Empirical evidence indicates that being exposed to entrepreneurship education, particularly when taught through practice based approaches, can sharpen both the intention and the ability of students to innovate. Several scholars nonetheless warn that this effect is largely captured only by short term and somewhat subjective measures.

2.2. Digital Literacy

Digital literacy denotes a person's capacity to reach, comprehend, assess, and apply information technology in a way that is both effective and responsible. The dimensions it encompasses include conceptual knowledge alongside operational know how, the capability to produce content and handle software, matters of access, privacy, and security, socio emotional competencies and digital citizenship, and digital well being (Angkhasakulkiat et al., 2025; Lam et al., 2025). Especially in entrepreneurship, digital literacy is considered a basic competency that enables entrepreneurs to keep up with the ever changing digital economy, and it is a determining factor for the sustainability of innovation. (Shatila & Hernandez Lara, 2026).

Table 1. Conceptual Dimensions of Entrepreneurship Education and Digital Literacy

Dimension Category	Entrepreneurship Education (X1)	Digital Literacy (X2)
Core Knowledge	Educational content, entrepreneurial theory	Theoretical knowledge, operational skills
Practical Skills	Practical training, active learning	Content creation, software management
Environment	Learning environment, institutional support	Access, privacy, and security
Social Interaction	Expert interaction, subjective norms	Socio emotional skills, digital citizenship
Personal Development	Self efficacy, entrepreneurial attitudes	Digital well being, higher order competencies

Source: Authors (2026)

2.3. Motivation

Motivation in entrepreneurship drives individuals to initiate and maintain entrepreneurial behavior. Based on the Theory of Planned Behavior and social cognitive theory, this motivation serves as a mechanism that transforms knowledge and competence into concrete actions. (Udekwe & Iwu, 2024). In this research, motivation is an intermediary variable that influences entrepreneurship education and digital literacy in innovation. Mediation can be summarized as the knowledge gained from entrepreneurship education and the skills developed through digital literacy do not automatically translate into innovative behavior. Both need to be understood first as personal drives for self confidence, perceived opportunities, and the willingness to act. before it materializes as the generation of new ideas, products, or processes. When motivation is weak, even well designed learning content tends to remain dormant knowledge; when motivation is strong, it reinforces any competencies that learners already possess. This conceptualization is consistent with previous empirical findings reporting motivation as a key mediator in the education innovation relationship (Deilami, 2025; Lam et al., 2025), while also allowing for context specific exceptions as documented by Prabandari et al. (2026).

2.4. Innovation

In this context, innovation means the ability to develop novel ideas, goods, services and/or processes that generate value in entrepreneurial activity. This is the result of knowledge related factors, digital competence and motivation acting together. Previous research indicates that external and internal factors, such as creativity, digital innovation and others, are good predictors for students' performance in entrepreneurial innovation (Rosangela et al., 2026; Liang et al., 2025).

2.5. Conceptual Framework and Hypotheses

Based on the theoretical review above, this research constructs a model with two independent variables (entrepreneurship education and digital literacy), one intervening variable (motivation), and one dependent variable (innovation). The conceptual framework in Figure 1.

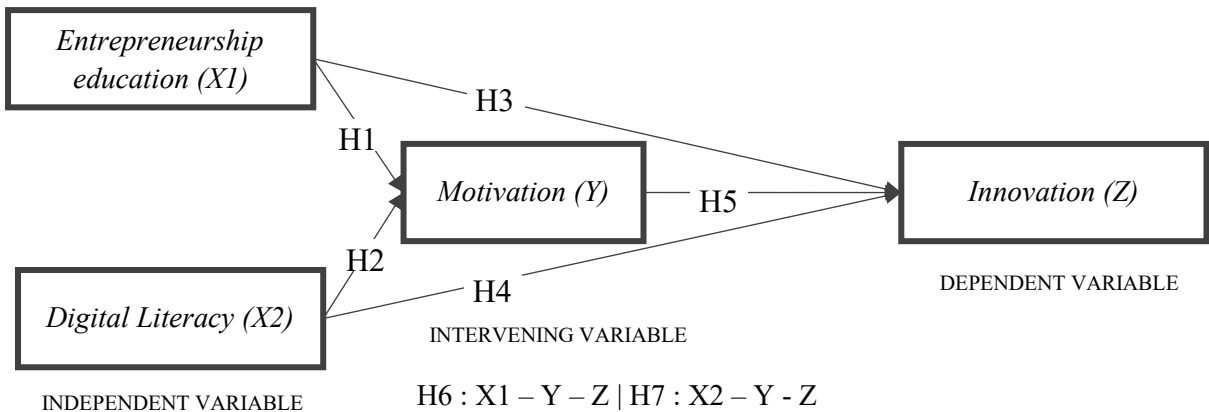


Figure 1. Research Conceptual Framework

Based on this framework, the research hypothesis proposed is as follows:

- H1: Entrepreneurship education has a positive and significant effect on motivation.
- H2: Digital literacy has a positive and significant effect on motivation.
- H3: Entrepreneurship education has a positive and significant effect on innovation.
- H4: Digital literacy has a positive and significant effect on innovation.
- H5: Motivation has a positive and significant effect on innovation.
- H6: Motivation mediates the effect of entrepreneurship education on innovation.
- H7: Motivation mediates the effect of digital literacy on innovation.

3. RESEARCH METHODOLOGY

The design of this research was exploratory quantitative which was intended to explain the causal relationship between the variables explored. They were asked to complete an online questionnaire with their answers, and primary information was gathered from individual answers, through the public distribution of this questionnaire. All items on the instrument were evaluated on a 5 point Likert type scale from 1 (strongly disagree) to 5 (strongly agree).

All was the students in class 2025 of the Master of Management Program at Jakarta State University who are currently active in attending classes as a population in the study constitute this research.The population of this research was all students of the Master of Management Program at Jakarta State University who actively attend classes in the Class 2025, approximately 95 students. Out of this 50 respondents were selected using purposive sampling technique. The requirements for inclusion were that the respondents had to be taking (or at least completed) at least one entrepreneurship related course, workshop or training or learning session, both as part of their MM coursework and extracurricular activities related to entrepreneurship. Questionnaires were sent out via the class coordinators and the program WhatsApp groups, of which 50 valid questionnaires were received, yielding an approximate response rate of 52.6% of the 95 questionnaires sent. The sample size of 50 does not appear to be that small as it aligns with the principle of tenfold rule in PLS SEM (Hair et al., 2019) where the minimal sample size is 10 times the maximum number of structural paths to a construct. For this model, the maximum number of predictors is 3 so the minimum number of observations necessary is 30 observations, so 50 sample size is acceptable for the exploratory and predictive nature of this research, albeit still recognized as limiting generalisability.

Research instruments consist of 26 items with four variables, namely Entrepreneurship Education (7 items), Digital Literacy (6 items), Motivation (6 items) and Innovation (7 items). The items were all adapted from existing validated instruments (Hasan et al. 2025; Angkhasakulkiat et al. 2025; Udekwe & Iwu, 2024; Liang et al., 2025) and succumbed to the context of this study, that is, the postgraduate program context in Indonesia. A brief pilot test was carried out with 10 students not included in the main sample to test the clarity and ambiguity of the items and the average completion time, and minor changes were made to the wording of the items in light of the pilot test feedback before the instrument fully commenced use. Ethical procedures were also followed: participants received an introductory page outlining the purpose of the research, voluntary participation, anonymity, and the right to withdraw at any time, with submission of the form considered a record of Informed consent. No information that can identify individuals is collected, and data is reported. only at the aggregate level. The operational definition of each variable and its indicator items is presented in Table 2.

Table 2. Variable Operationalization and Questionnaire Items

Code	Statement Item
ENTREPRENEURSHIP EDUCATION (X1)	
EE1	Through entrepreneurship education, I learned how to recognize and seize business opportunities around me.
EE2	Entrepreneurship education made me braver to try new things, even when there is a possibility of failure.
EE3	The entrepreneurship education I received encouraged me to keep thinking creatively in finding new ideas.
EE4	Support from lecturers and campus facilities in entrepreneurship made me increasingly interested in developing my own business.
EE5	Entrepreneurship activities on campus, such as business exhibitions, competitions, or incubators, broadened my insight and network in the business world.
EE6	Guidance from mentors or entrepreneurship lecturers helped me see my own potential as an entrepreneur.
EE7	Overall, the entrepreneurship education I received prepared me well to start or develop a business in the future.
DIGITAL LITERACY (X2)	
DL1	I feel quite confident in using various digital devices and applications to support my daily activities.
DL2	I am able to use social media effectively to introduce products or business ideas to a wider audience.
DL3	I am able to use e commerce platforms or marketplaces to sell products or services online.
DL4	My digital skills help me to keep learning and updating my knowledge independently through online education platforms.
DL5	I am able to use digital data and analytics, such as social media insights or online sales reports, to make better business decisions.
DL6	Overall, my current digital skills are sufficient to support me in building and developing a business in the digital era.
MOTIVATION (Y)	
MOT1	My desire to make a positive impact on society is one of the main reasons I am interested in entrepreneurship.

Code	Statement Item
MOT2	Seeing the success stories of other entrepreneurs, whether from my surroundings or the media, motivates me even more to try entrepreneurship.
MOT3	I am driven to pursue entrepreneurship because I see real opportunities I can seize in my surroundings.
MOT4	Support from family, friends, or the community makes me feel more confident and motivated to start a business.
MOT5	I do not give up easily, even when facing obstacles, because I believe the business I build will succeed if I keep trying.
MOT6	Overall, I feel I have a strong enough motivation to start or continue my journey as an entrepreneur.
INNOVATION (Z)	
INO1	I often generate new ideas that have never been thought of before, for both academic and business purposes.
INO2	I have created or developed new products, services, or methods, even if only on a small scale or as a prototype.
INO3	When it comes to ideas that I am unsure of, I am willing to accept and welcome ideas that are brought to my attention through input and criticism, even if it means it makes my ideas better and develops them for me
INO4	All the innovations I do arise from my experiences with real needs that exist in society or by observing my environment.
INO5	I put in the effort to share my new ideas with other friends and lecturers or communities and help them grow and develop.
INO6	Always attempt to stay informed of current knowledge and skills, and keep ideas fresh and competitive.
INO7	Overall, I feel actively engaged in innovating and continually strive to produce something new and valuable in my field.

Source: Authors (2026)

Note: The initial instrument consisted of 26 items (EE: 7; DL: 6; MOT: 6; INO: 7), as shown in Table 5.

The analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS SEM), operated through the SmartPLS application, and took place in two phases. The first phase evaluated the measurement (outer) model to check the instrument's validity and reliability, while the second phase evaluated the structural (inner) model in order to test the proposed hypotheses. Significance testing used a two tailed test (two tailed) at a significance level (α) of 5%, with a sample of 50 respondents and degrees of freedom (df) of 48, so that the T table value is 2.010.

4. RESULT AND DISCUSSION

4.1 Respondent Characteristics

This research involved 50 respondents, all of whom are postgraduate students with a bachelor's (S1) educational background and who had attended an entrepreneurship program through their campus. The respondents' demographic profile is presented in Table 3.

Table 3. Respondent Demographic Profile (n = 50)

Category	Group	Number
Gender	Male	28
	Female	22
Age	20–29 years	23
	30–39 years	27
Education Level	Bachelor's degree (S1)	50
Entrepreneurship Training	Attended (via campus)	50

Source: Authors (2026)

In addition to the demographic profile, this research also mapped the respondents' business experience and digital activity, as presented in Table 4. The majority of respondents are classified as active users of digital technology and use social media as their primary platform for both business and personal development purposes.

Table 4. Respondents' Business Experience and Digital Activity (n = 50)

Category	Description	Number
Business Ownership Status	Do not own yet, but plan to start	18
	Do not own, and no plan to start yet	17
	Own a currently running business	9
	Previously owned a business, no longer running	6
Digital Usage Intensity	Often (4–8 hours per day)	26
	Sometimes (1–3 hours per day)	13
	Rarely (less than 1 hour per day)	11
Primary Digital Platform	Social media (Instagram, TikTok, Facebook, etc.)	40
	Marketplace (Tokopedia, Shopee, Lazada, etc.)	10

Source: Authors (2026)

4.2. Measurement Model Evaluation (Outer Model)

The measurements were evaluated through convergent validity, reliability, and discriminant validity tests. The outer loading (factor loading), mean, and standard deviation for each item, together with Cronbach's Alpha and AVE for each construct, are summarized in Table 5.

Table 5. Factor Loading, Cronbach's Alpha, AVE, Mean, and Standard Deviation

Item	Mean	Std. dev.	Factor loading	Cronbach's alpha	AVE
Entrepreneurship Education (X1)				0.926	0.694
EE1. Through entrepreneurship education, I learned how to recognize and seize business opportunities around me.	4.040	0.692	0.827		
EE2. Entrepreneurship education made me braver to try new things, even when there is a possibility of failure.	3.980	0.648	0.788		
EE3. The entrepreneurship education I received encouraged me to keep thinking creatively in finding new ideas.	4.080	0.627	0.835		
EE4. Support from lecturers and campus facilities in entrepreneurship made me increasingly interested in developing my own business.	4.000	0.693	0.881		
EE5. Entrepreneurship activities on campus, such as business exhibitions, competitions, or incubators, broadened my insight and network in the business world.	4.060	0.645	0.876		
EE6. Guidance from mentors or entrepreneurship lecturers helped me see my own potential as an entrepreneur.	3.940	0.858	0.789		
EE7. Overall, the entrepreneurship education I received prepared me well to start or develop a business in the future.	4.180	0.767	0.832		
Digital Literacy (X2)				0.875	0.617
DL1. I feel quite confident in using various digital devices and applications to support my daily activities.	4.280	0.634	0.771		
DL2. I am able to use social media effectively to introduce products or business ideas to a wider audience.	4.040	0.799	0.794		
DL3. I am able to use e commerce platforms or marketplaces to sell products or services online.	4.160	0.674	0.793		
DL4. My digital skills help me to keep learning and updating my knowledge independently through online education platforms.	4.260	0.626	0.766		
DL5. I am able to use digital data and analytics, such as social media insights or online sales reports, to make better business decisions.	4.040	0.720	0.722		
DL6. Overall, my current digital skills are sufficient to support me in building and developing a business in the digital era.	4.080	0.688	0.858		
Motivation (Y)				0.888	0.642
MOT1. My desire to make a positive impact on society is one of the main reasons I am interested in entrepreneurship.	4.180	0.910	0.784		
MOT2. Seeing the success stories of other entrepreneurs, whether from my surroundings or the media, motivates me even more to try entrepreneurship.	4.360	0.686	0.780		
MOT3. I am driven to pursue entrepreneurship because I see real opportunities I can seize in my surroundings.	4.300	0.854	0.822		
MOT4. Support from family, friends, or the community makes me feel more confident and motivated to start a business.	4.320	0.786	0.736		
MOT5. I do not give up easily, even when facing obstacles, because I believe the business I build will succeed if I keep trying.	4.320	0.760	0.822		

Item	Mean	Std. dev.	Factor loading	Cronbach's alpha	AVE
MOT6. Overall, I feel I have a strong enough motivation to start or continue my journey as an entrepreneur.	4.220	0.672	0.856		
Innovation (Z)				0.870	0.566
INO1. I often generate new ideas that have never been thought of before, for both academic and business purposes.	3.880	0.711	0.763		
INO2. I have created or developed new products, services, or methods, even if only on a small scale or as a prototype.	3.639	0.975	0.793		
INO3. I am open to input and criticism from others because I see it as an opportunity to improve and develop my ideas.	4.260	0.594	0.702		
INO4. The innovations I develop stem from my understanding of the real needs that exist in society or my surroundings.	3.980	0.547	0.860		
INO5. I actively collaborate with other friends, lecturers, or communities to develop and refine my innovative ideas.	3.920	0.744	0.707		
INO6. I continually update my knowledge and skills so that the ideas I produce remain relevant and competitive.	4.100	0.608	0.796		
INO7. Overall, I feel actively engaged in innovating and continually strive to produce something new and valuable in my field.	4.160	0.674	0.623		

Source:Authors (2026)

Note: n = 50. An item is considered valid if its factor loading > 0.50; a construct is considered reliable if Cronbach's alpha > 0.70 and meets convergent validity if AVE > 0.50.

All retained indicators seem to have high factor loading as indicated in Table 5 with the lowest loading value being 0.623 for INO7, hence declared as valid. All constructs also have Cronbach's Alpha values higher than 0.70 and AVE values higher than 0.50 which mean that they are reliable and have convergent validity and are suitable for analysis onward.

Build Reliability and convergent Validity. Reliability and Convergent validity of the instruments used were assessed by Cronbach's Alpha, rho_a coefficient, rho_c (composite reliability) and AVE (Average Variance Extracted). In line with the findings of Hair et al. (2019), the Cronbach's Alpha and composite reliability values greater than 0.70 are considered satisfactory for the internal consistency of the construct, while the AVE values > 0.50 are considered good for convergent validity. All constructs had Cronbach's Alpha values between 0.870 and 0.926, rho_a values between 0.878 and 0.928, and composite reliability (rho_c) values between 0.901 and 0.941 with all above threshold of 0.70 as seen in Table 6. Additionally, a range of AVE values were between 0.566 and 0.694, which were all higher than 0.50. The findings support the understanding of each constructs in the modelling model as well as the convergent validity of the model is acceptable.

Table 6. Construct Reliability and Validity

Construct	Cronbach's Alpha	rho_a	Composite Reliability (rho_c)	AVE
Entrepreneurship Education (X1)	0.926	0.928	0.941	0.694
Digital Literacy (X2)	0.875	0.878	0.906	0.617
Motivation (Y)	0.888	0.890	0.915	0.642
Innovation (Z)	0.870	0.878	0.901	0.566

Source:Authors (2026)

Note: All Cronbach's Alpha, rho_a, and composite reliability (rho_c) values > 0.70; all AVE values > 0.50, confirming reliability and convergent validity (Hair et al., 2019).

Discriminant Validity (HTMT). To complement the Fornell Larcker criteria, discriminant validity was further assessed using the Heterotrait Monotrait correlation ratio (HTMT), as a more sensitive and stringent criterion in variance based SEM (Henseler et al., 2015). HTMT values below the conservative threshold of 0.85 indicate that two constructs are empirically distinct. As shown in Table 7, all HTMT values ranged from 0.325 to 0.714, with the highest value (0.714) for the outcome of Motivation–Innovation, followed by Digital Literacy–Innovation (0.700). Since each HTMT value was clearly below 0.85, discriminant validity was established for all constructs, confirming that each latent variable captures a distinct phenomenon from the others in the model.

Table 7. Discriminant Validity — HTMT ratio

Construct	Z	X2	Y	X1
Innovation (Z)				
Digital Literacy (X2)	0.700			
Motivation (Y)	0.714	0.471		
Entrepreneurship Education (X1)	0.325	0.345	0.521	

Source: Authors (2026)

Discriminant validity was tested using the Fornell Larcker criteria, namely by comparing the square root of the AVE (diagonal value) of each construct with its correlation with other constructs. The results are presented in Table 8.

Table 8. Discriminant Validity — Fornell Larcker Criterion

Construct	Z	X2	Y	X1
Innovation (Z)	0.753			
Digital Literacy (X2)	0.614	0.785		
Motivation (Y)	0.631	0.401	0.801	
Entrepreneurship Education (X1)	0.262	0.286	0.470	0.833

Source: Authors (2026)

Note: Diagonal values (in bold) are the square roots of AVE; values below the diagonal are inter construct correlations. Because each square root of AVE is greater than its correlations with other constructs, discriminant validity is satisfied.

Internal Model Collinearity. Collinearity in the structure was determined by the internal VIF with the aim of avoiding the effect of collinearity between the predictors on the path coefficients. Based on Hair et al., (2019) a VIF value less than 5.0 (best less than 3.3) is considered not to be in critical collinearity. All of the internal VIF values were between 1.089 and 1.425 (Table 9) and the highest value was below the most conservative threshold of 3.3. Such low values mean there is no collinearity, and indicate that bias is likely to be a less serious problem in this study. The estimated path coefficients, therefore, can be easily interpreted. The results are shown in Table 9.

Nevertheless, there is a great empirical disconnect between institutional incentives and what goes on in the world. However some problems still exist to discourage young entrepreneurs to innovate, such as:

The interest of youth in entrepreneurship in Indonesia was also found very high with 73% of youth interested in entrepreneurship as per data SMERU (ANTARA, 2025). The entrepreneurship ratio, however, is still relatively low, being 3.5%, in Indonesia, while the average entrepreneurship ratio is around 8% as it can be seen in developed countries (ANTARA, 2025). There is a clear mismatch between expectations and the fundamental digital skills which pupils are expected to use to achieve these.

This conference will include presenting both theoretical and practical views on where and when motivation can act as a mediator in the world of Graduate Studies and how it can impact curriculum design for students learning entrepreneurship in the digital era. In this perspective, the innovation is the capacity to create new ideas, products, services and/or processes which create value in entrepreneurship. It is, due to the combination of knowledge related factors, digital competence and motivation. Some studies have been conducted about students' performance in Entrepreneurial Innovation which show that the external factors and internal factors (creativity, digital innovation and others) are good predictors.

The type of the research was an exploratory quantitative where the research was designed to explain the causal relationship between variables that have been explored. They were requested to answer the questionnaires online, and primary information was received from individual answers, publicized by handing out this questionnaire. All items on the instrument were evaluated on a 5 point Likert type scale (1=strongly disagree 5=strongly agree).

This research is carried out by all students in the class of Master of Management, University of Indonesia, Jakarta students who are actively attended class, as a population of the study. This research was conducted to explore the population in the form of all of the students of the program of Master of Management who are actively taking classes from the Class of 2025 in Jakarta State University as many as 95 students were involved in the research as they were the potential victims in the situation in which they were required to take part in the research. Out of this 50 respondents were selected using purposive sampling technique. There were some conditions for respondents to be included such as respondents are engaged in at least one entrepreneurship related course, workshop or training or learning session as part of MM study program and in extracurricular activities related to entrepreneurship. Completed questionnaires were sent out through the class coordinators with an approximate response rate of 52.6% (50 valid questionnaires were received out of 95 questionnaires sent out via the program WhatsApp Groups). The sample size of 50 does not appear to be that small as it aligns with the principle of tenfold rule in PLS SEM (Hair et al., 2019) where the minimal sample size is 10 times the maximum number of structural paths to a construct. The number of predictors is limited (3 predictors) and it requires 30 observations or more, which is what is usually considered acceptable for study purposes with an exploratory/predictive nature, however still be aware of limitations for generalisability with this model.

Research instrument consists of 26 items with four variable which are Entrepreneurship Education (7 items), Digital Literacy (6 items), Motivation (6 items), and Innovation (7 items). All items used were adapted from some

already validated ones (Hasan et al., 2025; Angkhasakulkiat et al., 2025; Udekwe and Iwu, 2024; Liang et al., 2025); and faced a context adapted to this study, namely the context of postgraduate programs in Indonesia. Ten students were not part of the main sample, but a brief pilot test was conducted to check the clarity of the items and the ambiguity, and the average completion time, and based on the results of the pilot tests, some minor changes were suggested regarding the wording of items in the instrument which was not implemented fully. At times, when I am skeptical as to ideas that I am not sure about, I am willing to accept and welcome ideas that I get through input and criticism, even if it makes my idea better and even help develop it for me. All the innovations I do arise from my experiences with real needs that exist in society or by observing my environment. I worked hard to introduce other lecturers, my own friends, other communities to my new ideas and assist them in growing and developing. Seek to be updated on the latest knowledge and skills at all times, and maintain ideas that are new and competitive.

It is noted from the table 5 all the indicators retained show high factor loading with the minimum factor loading of 0.623 for indicator INO7 which declare all as valid. All constructs also have Cronbach's Alpha values higher than 0.70 and AVE values higher than 0.50 which mean that they are reliable and have convergent validity and are suitable for analysis onward.

Develop Reliability and convergent Validity. The instruments used were tested for reliability, convergent validity and both were acceptable, as Cronbach's Alpha=0.80, rho_a=0.70, rho_c=0.80 and the AVE was 0.80. As per the outcomes of the Hair et al. (2019), the Cronbach's Alpha and Composite reliability values with more 0.70 were defined satisfactory for internal consistency of the construct and values more 0.50 were good for the convergent validity of the instrument. The Cronbach's Alpha, rho_a, and composite reliability (rho_c) of all constructs were between the range of 0.870-0.926, 0.878-0.928 and 0.901-0.941 respectively, which are all above threshold of 0.70 as shown in Table 6. In addition, there were a variety of AVE ranges from 0.566 to 0.694 all of which were greater than 0.50. The findings support the understanding of each constructs in the modelling model as well as the convergent validity of the model is acceptable.

Note: Cronbach's alpha values for all of the scales exceeded 0.70 (Hair et al., 2019) and all values for the rho_a and rho_c values exceeded 0.50 indicating reliability and convergent validity.

Internal Model Collinearity. The structure was checked for collinearity using the internal VIF with the aim of eliminating the collinearity among the predictors on the path coefficients. Based on Hair et al., (2019) a VIF value less than 5.0 (best less than 3.3) is considered not to be in critical collinearity. None of the internal VIFs exceeded 1.425 and the maximum was not as high as the most conservative internal VIF of 3.3 (Table 9). Such low values mean there is no collinearity, and indicate that bias is likely to be a less serious problem in this study. The estimated path coefficients, therefore, can be easily interpreted. Table 9 results reveal that there are no problems with the collinearity structure and that bias is not likely to be a significant problem in this study. Thus the estimated path coefficients are easily interpretable. Table 9 shows the results.

Table 9. Collinearity Statistics (VIF) — Inner Model

Structural Path	VIF
Digital Literacy (X2) → Innovation (Z)	1.210
Digital Literacy (X2) → Motivation (Y)	1.089
Motivation (Y) → Innovation (Z)	1.425
Entrepreneurship Education (X1) → Innovation (Z)	1.302
Entrepreneurship Education (X1) → Motivation (Y)	1.089

Source: Authors (2026)

Note: All inner VIF values < 3.3, indicating no collinearity among predictor constructs and a low likelihood of common method bias (Hair et al., 2019).

Collinearity Assessment is Outer Model VIF. To check for the collinearity among indicators within the measurement model, Variance Inflation Factor (VIF) was checked prior to interpreting the structural relationships. Hair et al. (2019) suggests a cut off score of VIF < 5.0 as an indicator of the absence of critical collinearity issue. All of the 26 indicators presented had VIF values between 1.857 (INO3) and 3.725 (PK4) that are below the conservative limit of 5.0 as shown in Table 10. This indicates that there are no serious levels of collinearity among the indicators of any construct, and that each indicates a unique amount of information for the relevant constructs. The measurement model is therefore free from the phenomenon of the multicollinearity and the phenomenon is appropriate for the structural analysis. These answers are available in Table 10.

Table 10. Collinearity Statistics (VIF) — Outer Model

Indicator	VIF	Indicator	VIF
INO1	3.683	MOT1	1.985
INO2	3.166	MOT2	2.253
INO3	1.857	MOT3	2.588
INO4	3.534	MOT4	1.891
INO5	2.128	MOT5	2.942
INO6	2.808	MOT6	3.538
INO7	1.882	PK1	2.794
LD1	2.047	PK2	2.085
LD2	3.220	PK3	2.760
LD3	2.558	PK4	3.725
LD4	2.034	PK5	3.512
LD5	2.245	PK6	2.727
LD6	3.311	PK7	3.113

Source: Authors (2026)

Note: All VIF values < 5.0 (Hair et al., 2019), indicating no critical collinearity. EE = Entrepreneurship Education; DL = Digital Literacy; MOT = Motivation; INO = Innovation.

To complement, model fit indices (Model fit) were explored, and are included in Table 11.

Table 11. Model Fit Indices

Index	Value	Threshold
SRMR	0.129	< 0.08 (conservative)
NFI	0.435	Approaching 1
d_ULS	5.874	
d_G	5.869	

Source: Authors (2026)

Both the SRMR value (0.129) and the NFI value (0.435) exceed the conservative limits and are not very close to the limits. Viewed literally, these values are not ideal in the strict sense of the SEM's covariance sense of the global model fit. This is however a methodological consideration that should be taken into account for this to be interpreted as lack of validity for the model. PLS SEM is a variance based, prediction oriented technique, and its developers have repeatedly emphasised that goodness of fit indices such as SRMR and NFI were originally designed for covariance based SEM and should be interpreted with caution in a PLS context (Hair et al., 2019; Henseler et al., 2016). They are diagnostic indicators, not primary acceptance criteria. The modest sample size of 50, while sufficient for exploratory PLS SEM, naturally inflates residual covariances and therefore the SRMR value; this is a sample related artefact rather than a structural misspecification. Evaluation of PLS SEM models is expected to lean more heavily on the quality of the measurement model (loadings, AVE, CR, HTMT) and on the predictive performance of the structural model (R^2 , f^2), all of which in this research fall within acceptable ranges. The model is therefore considered adequate for the exploratory and prediction oriented purposes of the present research, with the caveat that future studies using larger samples are expected to improve the global fit indices.

4.3. Structural Model Evaluation (Inner Model)

The structural model was validated based on the coefficient of determination (R^2) and effect size (f^2). The coefficient of determination, R^2 is considered good at 0.67, fair at 0.33, and poor at 0.19 according to Chin's categories (1998). The R^2 results are presented in Table 12.

Table 12. R square Values

Construct	R^2	Adjusted R^2	Category
Motivation (Y)	0.298	0.268	Weak-moderate
Innovation (Z)	0.561	0.533	Moderate-strong

Source: Authors (2026)

Overall, the R^2 of 0.561 indicates that Variance in Innovation is explained 56.1% by Variables in the Model and 43.9% by Variables not in the Model. The R^2 value for Motivation was found to be 0.298, indicating that together, the linear combination of Entrepreneurship Education and Digital Literacy accounted for 29.8% of the variance in Motivation. However, there is only a slight difference between the R^2 and adjusted R^2 , which means that the model has good stability and will not be overfit.

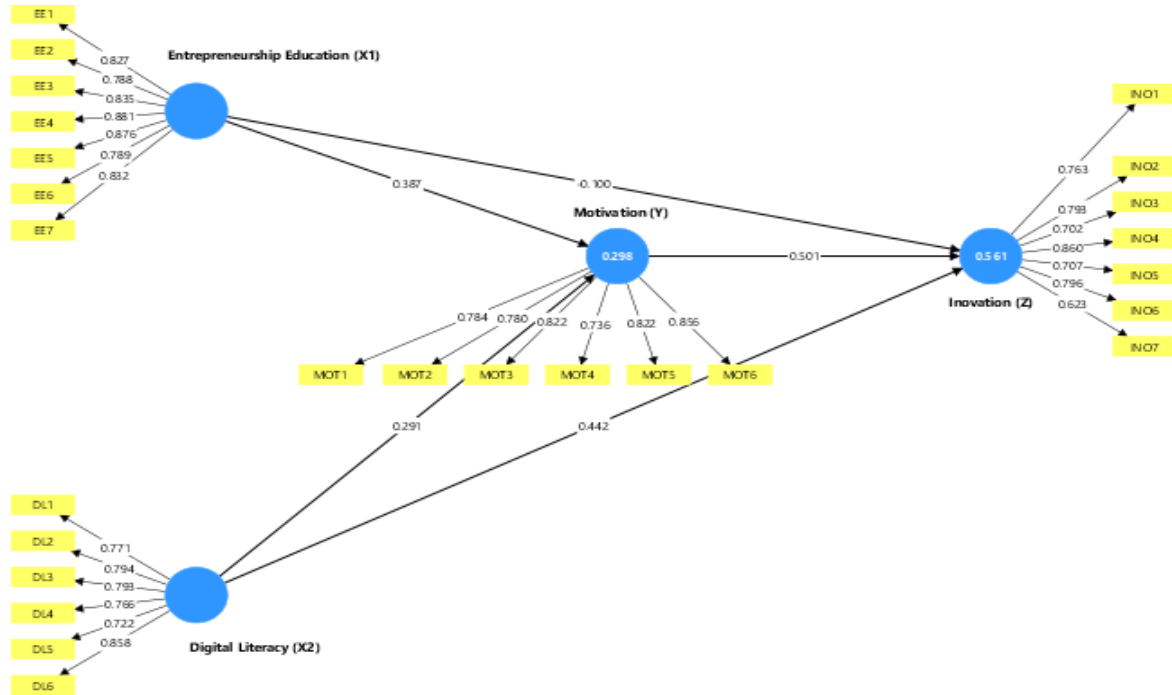
The effect size (f^2) represents the amount that the independent variable influences the dependent variable. In terms of Cohen's (1988) categories, a score of 0.02 is small, 0.15, medium, and 0.35, large. An example of the results obtained is detailed in Table 13 and is called an f^2 result.

Table 13. Effect Size (f square)

Path	f ²	Category
Digital Literacy (X2) → Innovation (Z)	0.368	Large
Motivation (Y) → Innovation (Z)	0.401	Large
Entrepreneurship Education (X1) → Innovation (Z)	0.017	Negligible
Entrepreneurship Education (X1) → Motivation (Y)	0.196	Medium
Digital Literacy (X2) → Motivation (Y)	0.111	Small–medium

Source: Authors (2026)

The largest effects in the model are Motivation on Innovation ($f^2 = 0.401$) and Digital Literacy on Innovation ($f^2 = 0.368$). In contrast, the effect of Entrepreneurship Education on Innovation is very weak ($f^2 = 0.017$) and can therefore be considered negligible. The structural model diagram and its coefficients are presented in Figure 2.

**Figure 2.** Structural Model and Path Coefficients

Source: Authors (2026)

4.4. Hypothesis Testing (Direct Effects)

Direct effect hypothesis testing was carried out by comparing the value of the T test with the value of the table (2.010) and the value of p with 0.5. The results for the tests are summarised in Table 14.

Table 14. Direct Effect Hypothesis Testing Results

H	Relationship Path	Koef. (O)	T Stat	P Value	Description
H1	Entrepreneur. Education (X1) → Motivation (Y)	0.387	1.773	0.076	Rejected
H2	Digital Literacy (X2) → Motivation (Y)	0.291	2.464	0.014	Accepted
H3	Entrepreneur. Education (X1) → Innovation (Z)	-0.100	0.549	0.583	Rejected
H4	Digital Literacy (X2) → Innovation (Z)	0.442	3.463	0.001	Accepted
H5	Motivation (Y) → Innovation (Z)	0.501	4.450	0.000	Accepted

Source: Authors (2026)

Based on Table 14, three hypotheses are accepted (H2, H4, H5), and two are rejected (H1, H3). The structural model can be expressed in the following two sub structure equations:

Sub structure 1 (on Motivation): $Y = 0.387 X_1 + 0.291 X_2 + e_1$

Sub structure 2 (on Innovation): $Z = -0.100 X_1 + 0.442 X_2 + 0.501 Y + e_2$

4.5. Mediation Effect Testing (Indirect Effects)

Mediation effect testing was conducted to assess the role of motivation (Y) in channeling the influence of the independent variables on innovation (Z). The results are presented in Table 15.

Table 15. Mediation Effect Testing Results

H	Mediation Path	Koef. (O)	T Stat	P Value	Description
H6	Entrepreneur. Education → Motivation → Innovation	0.194	1.675	0.094	Rejected
H7	Digital Literacy → Motivation → Innovation	0.146	2.106	0.035	Accepted

Source: Authors (2026)

Motivation partially mediates the effect of digital literacy on innovation, positively and significantly (coefficient 0.146; $P = 0.035$), so that H7 is accepted. In contrast, motivation does not mediate the effect of entrepreneurship education on innovation (coefficient 0.194; $P = 0.094$), so that H6 is rejected.

4.6. Discussion

Taken as a whole, the results display a consistent pattern in which digital literacy emerges as the main driver for these postgraduate students, acting both on its own and by bolstering motivation. Its direct path to innovation ($\beta = 0.442$) qualifies as strong and is accompanied by a large effect size ($f^2 = 0.368$). This result is consistent with the view that digital competence is the foundation enabling individuals to adapt and innovate within a dynamic digital economy (Shatila & Hernandez Lara, 2026; Angkhasakulkiat et al., 2025).

Motivation proved to be the strongest factor in innovation ($\beta = 0.501$; $f^2 = 0.401$). This research is grounded in the Theory of Planned Behavior (Udekwe & Iwu, 2024) which explains firstly with a thought that makes a competent to be innovative. Based on the findings of the hypothesized model, the result of the digital literacy on the dimension of innovation stood out as a partial mediation in which some of the impact of digital literacy was translated through the dimension of motivation, and the rest through the direct pathway.

It is important to note the negative and insignificant direct effect of entrepreneurship education on innovation ($\beta = -0.100$; $p = 0.583$), which still needs to be explored. The result did not match with the results of the previous research which found that entrepreneurship education was no different to get innovative behavior and match with the result of Prabandari et al. (2026) in other higher education settings which showed that entrepreneurship education did not indeed become an intention. There are a number of reasons to explain this difference. Many modules of entrepreneurship taught in Indonesia within the framework of MM are still based on a method of delivering the concepts through lectures rather than leaving space for prototyping or doing projects in the field, or engaging with real businesses. Thus, it is the condition identified by Rahmi et al. (2025) as important to the education innovation translation process. Entrepreneurship classes face difficulties of adequate coverage because students' prior activities are often related to theory while concrete skills such as feasibility analysis, writing a business plan, and budgeting are required for entrepreneurship, so theory classes may not have significant value or even negatively affect creative exploration for MM students. Digital literacy in this sample was a more direct and translated way to spark innovation, somewhat taking off the place of what entrepreneurship education is supposed to deliver on theory. Overall, these patterns contribute to nuancing the quality innovation relationship described by Prabandari et al. (2026) between education and innovation outcomes.

5. CONCLUSION

This research is a descriptive correlation study conducted to examine how entrepreneurship education and digital literacy affect innovation with motivation as a mediating variable using Partial Least Squares Structural Equation Modeling (PLS SEM) techniques in this study, the data respondents were obtained by purposive sampling, namely 50 students from Master The Program of Management at Jakarta State University. Using the hypothesis test, the following patterns emerged. H1: Entrepreneurship education does not significantly increase entrepreneurial motivation was not supported, which suggests that respondents received little theory oriented knowledge and understanding of entrepreneurship on their way to being entrepreneurial. Support given for H2 digital literacy motivation. A negative coefficient, while the entrepreneurship education $\rightarrow$ innovation coefficient was about to go in the opposite direction, was not supported in the case of H3. Both H4(digital literacy: innovation) and H5(motivation: innovation) had been very well accepted; where motivation turned out to be the top predictor in the model. The results of the mediation hypotheses revealed partial mediation in the relationship between education and innovation in the case of H7 (motivation partly explains the link between digital literacy and innovation) and H6 (motivation partly explains the link between education and innovation) was not confirmed. The study overall indicates that pupils' innovative capacity has been developed more from either a direct link to digital competences, or through a motivational route, rather than theory based entrepreneurship education, in this context, a postgraduate level.

As for entrepreneurship education programs in management schools, these aspects indicate several practical implications. Institutions are encouraged to restructure their courses around four learning facilitators connected to hands on practice: project based learning, developing a venture idea and taking that through the process of ideation, validation and prototype of a minimum viable product (MVP) in one semester; business incubation links students to entrepreneurs and mentors, seed funding pathways and concepts, and incubator facilities to enable course based project developed ventures and hold them through to becoming a real venture; digital marketing analytics, where emphasis is on prototype development and reading and acting on real customer data by teaching the students to utilize platforms such as Meta Business Suite, Google Analytics, and market dashboards; and prototype development workshops, developing project ideas into actual products, in the form of prototypes or mockups or MVPs (minimum viable products) with a view of relevance for the student for their future commercialization of the project. They deeply tackle these four aspects of practical skills that the data emerging on them required strengthening, as well as acting to boost motivation and innovativeness. Thus, it is recommended that higher education institutions embed

digital skills into entrepreneur programmes in a deeper manner and plan learning experiences that are practice leaning and move away from the lecture podium.

There are several limitations in this research; these are offered as suggestions for continued research. The sample consists of 50 samples representing one single program at one university, so the external validity should be enhanced by having a larger sample, including more universities in other parts of Indonesia, that can be compared and analyzed. The overall indices of the model fit are not optimal, and can be further enhanced by duplication with samples of 150-250 respondents, which would provide better opportunities for structural testing. By using the cross sectional research design, causal inferences are set aside and longitudinal materials that have been gathered at two or possibly a few time points, would help in order to clarify the temporal order of the relationship among education, motivation, and innovation. The quantitative method used in this study is not enough to fully shed light on the question that the non significant effect between entrepreneurship education and entrepreneurship is the result of what? This question should be answered by conducting interviews with students of MM and their entrepreneurship instructors, both qualitative and quantitative approaches; the former would serve to provide deeper insight into the curricular and motivational factors that lead to a non significant effect. For future research, the model could be expanded to include moderators that might include variables such as self efficacy, the entrepreneurial environment, background in business activity, or industry sector, which would be used to look at boundary conditions.

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