



## Innovation and Internationalization in MSMEs: The Influence of Digital Literacy

Achmad Basofitrah<sup>1\*</sup>, Sudarmiati<sup>2</sup>, Heri Pratikto<sup>3</sup>

Universitas Negeri Malang

**Corresponding Author:** Achmad Basofitrah

[achmad.basofitrah.2504139@students.um.ac.id](mailto:achmad.basofitrah.2504139@students.um.ac.id)

---

### ARTICLE INFO

*Keywords* : Innovation, Digital Literacy, Internationalization, Msmes, Market Expansion

*Received* : 2 February

*Revised* : 20 March

*Accepted*: 20 April

©2026 Basofitrah, Sudarmiati,

Pratikto : This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0

International.



### ABSTRACT

This study examines the effects of innovation and digital literacy on the internationalization of micro, small, and medium enterprises (MSMEs). The study is motivated by the increasing importance of internal capabilities in helping MSMEs expand beyond domestic markets in a rapidly digitalizing business environment. Using a quantitative explanatory approach, this research was conducted among MSMEs associated with PT Setera' Ebumi Sumekar. Data were collected from 80 respondents through questionnaires and analyzed using multiple linear regression, supported by validity, reliability, and classical assumption tests. The results show that innovation has a positive and significant effect on MSME internationalization. Digital literacy also has a positive and significant effect, with a slightly stronger contribution than innovation. Simultaneously, both variables significantly influence internationalization, indicating that innovation and digital literacy are important drivers of broader market expansion. These findings suggest that MSME internationalization depends not only on the ability to create business value through innovation but also on the capability to use digital technologies effectively for communication, information access, and market development. This study contributes to the literature by emphasizing the complementary role of innovation and digital literacy in supporting MSME internationalization

---

## **INTRODUCTION**

In the contemporary global economy, micro, small, and medium enterprises (MSMEs) play a strategic role in employment generation, income distribution, local economic empowerment, and national competitiveness (Vasani, & Abdulkareem. 2024). However, the sustainability and growth of MSMEs are no longer determined solely by production capacity or market presence in domestic contexts, but increasingly by their ability to innovate and expand beyond national boundaries (Widiarty. 2023). This issue is socially significant because the internationalization of MSMEs contributes not only to export growth and foreign exchange earnings, but also to broader community welfare through business resilience, market diversification, and inclusive economic development (Inegbedion, et al., 2024). At the same time, innovation alone is often insufficient to produce international competitiveness unless it is supported by adequate digital capabilities (Kreiterling. 2023;Hoang, et al., 2025). In this regard, digital literacy becomes a critical enabler that allows firms to convert innovation into market access, strategic communication, and cross-border adaptability (Kastelli, et al., 2024;Torres, & Godinho. 2025). Therefore, investigating this relationship is both theoretically relevant and socially important.

A major problem faced by society today is the limited ability of many MSMEs to transform local potential into sustainable participation in international markets (Suyatna, et al., 2026). Although numerous MSMEs possess distinctive products, valuable local resources, and entrepreneurial commitment, they frequently encounter obstacles related to innovation management, digital technology adoption, online promotion, market intelligence, and compliance with international standards (Purnomo, & Purwandari. 2025). As a consequence, their economic potential often remains underutilized and fails to generate broader benefits such as export expansion, international partnerships, or stronger value-chain integration (Nasiri, et al., 2023; Hans, & Sastry. 2025). This problem is particularly important because MSMEs serve as the backbone of regional economies and absorb a substantial share of the labor force. When barriers to internationalization persist, communities lose significant opportunities for income growth, business sustainability, and resilience against fluctuations in domestic demand (Judijanto, et al., 2024). Accordingly, understanding the factors that facilitate or hinder MSME internationalization is essential for addressing a broader socioeconomic challenge faced by developing economies, including Indonesia.

The empirical phenomenon observed in the field indicates that many MSMEs have initiated innovation through product diversification, packaging improvement, and digital-based promotion; however, such efforts have not always translated into successful international market penetration. This condition is relevant to PT Setera' Ebumi Sumekar, which represents a business entity rooted in local economic potential while simultaneously facing the demands of an increasingly digital and globally connected business environment. The company is required to continuously innovate in order to maintain product relevance and competitiveness, yet it also needs sufficient

digital capability to support promotion, communication, market analysis, and access to international opportunities. In practice, innovation does not automatically lead to internationalization when digital literacy among organizational actors remains uneven or limited. This gap can be identified in the use of digital platforms, understanding of online market dynamics, and interpretation of global business information. Such conditions suggest that digital readiness substantially shapes the effectiveness of innovation outcomes. Previous studies have consistently demonstrated that innovation contributes positively to firm performance, competitive advantage, and the internationalization prospects of MSMEs (Kurniasih, et al., 2023). Other scholars have emphasized the importance of digital literacy in improving efficiency, information access, communication quality, and market engagement through digital platforms (Ha, & Kim. 2024). Nevertheless, much of the existing literature tends to examine innovation and digital literacy as separate determinants rather than as interrelated constructs that may jointly shape internationalization outcomes (Polizzi. 2025;Wang, J. 2025). Furthermore, prior research has often focused on general MSME populations, specific industrial sectors, or broader regional contexts, thereby providing limited insight into the firm-level dynamics of locally embedded enterprises such as PT Setera' Ebumi Sumekar. The main research gap, therefore, lies in the insufficient examination of digital literacy as a moderating variable in the relationship between innovation and MSME internationalization. Addressing this gap is important because it may explain why innovation yields different internationalization outcomes across firms operating under unequal digital capability conditions.

The novelty of this study lies in its analytical positioning of digital literacy as a moderating variable in the relationship between innovation and the internationalization of MSMEs, specifically within the case of PT Setera' Ebumi Sumekar. Unlike many prior studies that focus primarily on direct relationships among variables, this research proposes that the effect of innovation on internationalization is contingent upon the firm's level of digital literacy. In this sense, the study advances the state of the art by offering a more nuanced explanation of how organizational capabilities interact to shape international expansion. Moreover, by adopting a case study approach in a company grounded in regional economic potential, this research provides context-sensitive empirical insights that are highly relevant to the realities of MSME development in local Indonesian settings (Wang, & Si. 2024; Rumanti, et al., 2025). The issue is important to resolve because its findings may inform managerial strategy, institutional support programs, and policy interventions aimed at strengthening internationally oriented MSMEs in the digital era.

Based on the foregoing discussion, the central research problem concerns how innovation influences the internationalization of MSMEs and to what extent digital literacy moderates this relationship in PT Setera' Ebumi Sumekar. The preliminary argument advanced in this study is that innovation exerts a positive influence on internationalization; however, the strength and effectiveness of this influence depend significantly on the level of digital literacy within the organization (Gong, et al., 2024). Firms with stronger digital literacy are expected to be more capable of translating innovative efforts into broader market access, more effective global communication, and more informed strategic decision-making (Coco, et al., 2024; Ben Ghrbeia, & Alzubi. 2024). Conversely, when digital literacy is weak, innovation may fail to generate meaningful international expansion despite its internal potential. Therefore, digital literacy should be understood not merely as a complementary capability, but as a strategic mechanism that conditions the success of innovation in international contexts. This study is expected to contribute both theoretically and practically to MSME internationalization research.

## **LITERATURE RIVIEW**

### **Innovation Variable**

Innovation in the context of MSMEs is generally understood as a company's ability to create or update products, services, processes, or business practices to better align with changing market needs and competitive pressures (Aggarwal, & Joshi. 2024; Sudirjo, et al., 2025). In the international literature, innovation is positioned as a strategic capability that helps small companies overcome resource constraints and build market differentiation (Probohudono, et al., 2025). Several studies support the positive effect of innovation on the internationalization of MSMEs (Susanti, et al., 2023; Soesetio, et al., 2024). A study by Ramdani, Belaid, and Goutte showed that small and medium-sized companies that innovate especially product innovation are more likely to export than less innovative companies. This finding is reinforced by Loo, et al., (2023), who found that product innovation capability contributes to the competitive advantage of exporting SMEs, which in turn supports international performance (García-Vidal, et al., 202; Rizkita, et al., 2025). Based on this synthesis, in this study, innovation can be understood as the ability of PT Setera' Ebumi Sumekar to make relevant updates to products, processes, or business approaches to increase competitiveness and open access to international markets. The existing literature tends to support that innovation is an important antecedent of internationalization, but its effects are not always automatic.

H1: Innovation has a positive effect on MSME internationalization.

### Digital Literacy Variables

Digital literacy refers to the ability of individuals or organizations to understand, use, evaluate, and effectively utilize digital technology in business activities (Ojobo, et al., 2023; Ibrahim, & Aduah. 2025). Recent literature on the digital transformation of SMEs positions digital literacy as a critical component of digital inclusion and digital capability, as without it, companies tend to struggle to translate technology adoption into tangible business benefits (Kabakus, et al., 2025). Several empirical studies support the importance of digital literacy for the development of MSMEs. Tinmaz, et al., (2023) demonstrated that managers' digital literacy influences the digital transformation of SMEs through the use of digital technology. These results are important because they demonstrate that the quality of decision-makers' digital literacy can determine the extent to which a company is able to leverage technology for organizational change (Marín, & Castaneda. 2023; Reddy, et al., 2023). In this study, digital literacy is positioned as the organizational ability of PT Setera' Ebumi Sumekar to understand and utilize digital technology to support business activities, market information retrieval, business communication, and cross-border opportunity management.

H2: Digital literacy has a positive effect on MSME internationalization.

The conceptual framework of this study illustrates that innovation (X1) and digital literacy (X2) are the independent variables that influence the internationalization of MSMEs (Y). Innovation reflects the ability of MSMEs to develop new ideas, products, and business processes, while digital literacy reflects the ability to effectively use digital technologies in business operations and market expansion. Both variables are expected to contribute to the internationalization process of MSMEs, either individually or simultaneously.

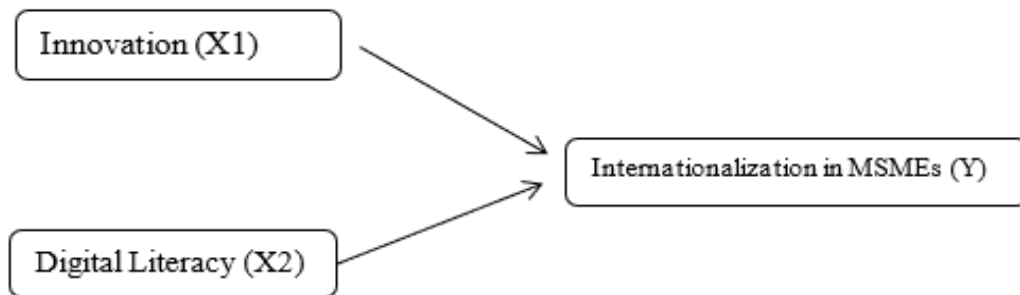


Figure 1. Conceptual Framework

## **METHODOLOGY**

### **Design of Research**

This study employs a quantitative approach using an explanatory research design (Lim. 2025; Haynes-Brown. 2023). The purpose of this design is to examine the causal relationship between the independent variables, namely innovation (X1) and digital literacy (X2), and the dependent variable, namely internationalization in MSMEs (Y). The study is cross-sectional in nature because data are collected at one point in time from respondents who represent the MSME actors associated with PT Setera' Ebumi Sumekar. A quantitative design is considered appropriate because this study seeks to test hypotheses systematically, measure the magnitude of influence among variables, and provide empirical evidence regarding the contribution of innovation and digital literacy to the internationalization of MSMEs (Rakib. 2024).

The research model is developed based on the theory that innovation and digital literacy are strategic capabilities that can improve the international orientation and market expansion of MSMEs (Yuwono, et al., 2025). Innovation reflects the firm's ability to introduce product, process, or business improvements, while digital literacy reflects the ability to understand and use digital technologies for communication, information access, and market development (Naayif, et al., 2025; Rosyidiana, & Narsa., 2024). In this study, both variables are assumed to influence the internationalization of MSMEs either partially or simultaneously. Therefore, the research model can be expressed in the following equation:  $Y = a + b_1X_1 + b_2X_2 + e$ , where Y represents internationalization in MSMEs, X1 represents innovation, X2 represents digital literacy, a is a constant, b1 and b2 are regression coefficients, and e is the error term.

### **Population and Sample**

The population in this study consists of all MSME actors who are associated with PT Setera' Ebumi Sumekar and are actively involved in business operations. In order to obtain accurate and relevant data, the population is limited to respondents who understand their business development process, especially in relation to innovation practices, the use of digital technology, and market expansion efforts. In practical terms, the respondents may include business owners, managers, or individuals directly involved in strategic decision-making, production development, marketing, and digital business activities. This population is considered relevant because the unit of analysis in this research is the MSME actor as the party who experiences and implements innovation and digital literacy in business practice.

The sample is determined using purposive sampling, namely a sampling technique based on specific criteria in accordance with the objectives of the study. The criteria used in this research are: (1) respondents are owners, managers, or key personnel of MSMEs; (2) the business has been operating for at least one year; (3) the respondent is involved in decision-making related to product development, marketing, or technology utilization; and (4) the respondent is willing to complete the questionnaire. Purposive sampling is considered suitable because not all members of the population possess the information needed to answer the research variables. Through this technique, the study is expected to

obtain respondents who are truly able to provide valid information on the influence of innovation and digital literacy on the internationalization of MSMEs.

**Data Collection Procedure**

The data collection procedure in this study begins with a preliminary study to identify the research problem, define the variables, and understand the characteristics of the MSMEs associated with PT Setera' Ebumi Sumekar. After that, the researcher develops the research instrument in the form of a structured questionnaire based on the operational indicators of each variable. The questionnaire is then reviewed and refined to ensure clarity and relevance of the statements. Data are collected directly from respondents through questionnaire distribution, either in printed form or through an online form, depending on field conditions. In addition to questionnaires, the researcher may use observation and documentation as supporting techniques to strengthen the contextual understanding of the MSMEs' business conditions. After the data have been collected, the responses are coded, tabulated, and prepared for statistical analysis.

Table 1. Data Collection Procedure

Step	Procedure	Description
1	Preliminary Study	Identifying the research problem, determining the object of research, and understanding MSME conditions
2	Instrument Development	Preparing questionnaire items based on variable indicators
3	Instrument Review	Checking clarity, relevance, and consistency of questionnaire statements
4	Data Collection	Distributing questionnaires to selected respondents
5	Supporting Data	Collecting observation notes and relevant documentation
6	Data Processing	Coding, tabulating, and preparing data for analysis

**Measurement of Variables**

The measurement of variables in this study is based on the operational definitions derived from the theoretical concepts of each construct. Each variable is translated into several measurable indicators in order to ensure that the abstract concepts can be empirically examined through the research instrument. The indicators are formulated to reflect the dimensions of innovation, digital literacy, and internationalization in MSMEs as discussed in the relevant literature. All items are measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree, to capture the respondents' perceptions of each statement. The use of this scale is considered appropriate because it allows the researcher to quantify attitudes, opinions, and experiences in a systematic and comparable manner. The operational measurement of each variable is presented in the following table

Table 2. Variable Measurement

Variable	Code	Operational Definition	Indicators	Scale
Innovation	X1	The ability of MSMEs to create or improve products, processes, and business practices to enhance competitiveness	1) Product development, 2) Process improvement, 3) Service/business improvement, 4) Adaptation to market change, 5) Creation of competitive value	Likert 1-5
Digital Literacy	X2	The ability of MSME actors to access, understand, evaluate, and use digital technology effectively in business activities	1) Ability to access digital information, 2) Ability to use digital platforms/tools, 3) Ability to communicate digitally, 4) Ability to evaluate digital information, 5) Ability to use digital technology for business decisions	Likert 1-5
Internationalization in MSMEs	Y	The extent to which MSMEs develop market orientation and business activities beyond domestic boundaries	1) Market expansion orientation, 2) Ability to reach wider/non-local markets, 3) Business networking beyond domestic area, 4) Product/service adaptation for broader markets, 5) Readiness for international market entry	Likert 1-5

**Data Analysis Technique**

The data in this study are analyzed using quantitative statistical techniques with the assistance of SPSS. The analysis begins with descriptive statistics to describe the profile of respondents and the tendency of responses for each variable. Next, the research instrument is tested using validity and reliability tests to ensure that all questionnaire items properly measure the intended constructs. After the instrument meets the required standards, the data are analyzed using multiple linear regression to examine the effect of innovation (X1) and digital literacy (X2) on internationalization in MSMEs (Y). Prior to regression analysis, the data are also tested through classical assumption tests, including normality, multicollinearity, and heteroscedasticity. Hypothesis testing is conducted through the t-test for partial effects, the F-test for simultaneous effects, and the coefficient of determination (R<sup>2</sup>) to assess how much the independent variables explain the dependent variable.

## RESULT AND DISCUSSION

### *Characteristics of Respondents*

A total of 80 valid questionnaires were collected and analyzed. The demographic characteristics of respondents are presented in Table 2.

Table 3. Demographic Characteristics of Respondents

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	42	52.5
	Female	38	47.5
Age	21-30 years	18	22.5
	31-40 years	27	33.8
	41-50 years	22	27.5
	> 50 years	13	16.2
Education	Senior High School	24	30.0
	Diploma	14	17.5
	Bachelor's Degree	34	42.5
	Postgraduate Degree	8	10.0
Business Duration	< 3 years	17	21.3
	3-5 years	25	31.2
	6-10 years	23	28.8
	> 10 years	15	18.7
Position	Owner	46	57.5
	Manager	19	23.8
	Staff/Admin/Marketing	15	18.7

Table 3 shows that the respondents were relatively balanced by gender, with male respondents accounting for 52.5% and female respondents 47.5%. Most respondents were in the productive age group of 31-40 years (33.8%), followed by those aged 41-50 years (27.5%). In terms of education, the majority held a bachelor's degree (42.5%), indicating that most respondents had adequate educational backgrounds to understand the questionnaire items. Based on business duration, most MSMEs had been operating for 3-5 years (31.2%) and 6-10 years (28.8%), suggesting that the respondents had sufficient business experience. Furthermore, most respondents were business owners (57.5%), implying that the collected data largely reflected strategic perspectives regarding innovation, digital literacy, and internationalization in MSMEs.

### **Validity Test**

Table 4. Validity Test Results

Item	Variable	Corrected Item-Total Correlation	r-table (n=80; $\alpha=0.05$ )	Sig.	Decision
X1.1	Innovation	0.621	0.220	0.000	Valid
X1.2	Innovation	0.684	0.220	0.000	Valid
X1.3	Innovation	0.701	0.220	0.000	Valid
X1.4	Innovation	0.655	0.220	0.000	Valid
X1.5	Innovation	0.734	0.220	0.000	Valid

Item	Variable	Corrected Item-Total Correlation	r-table (n=80; $\alpha=0.05$ )	Sig.	Decision
X2.1	Digital Literacy	0.612	0.220	0.000	Valid
X2.2	Digital Literacy	0.691	0.220	0.000	Valid
X2.3	Digital Literacy	0.746	0.220	0.000	Valid
X2.4	Digital Literacy	0.668	0.220	0.000	Valid
X2.5	Digital Literacy	0.719	0.220	0.000	Valid
Y1.1	Internationalization	0.598	0.220	0.000	Valid
Y1.2	Internationalization	0.644	0.220	0.000	Valid
Y1.3	Internationalization	0.706	0.220	0.000	Valid
Y1.4	Internationalization	0.671	0.220	0.000	Valid
Y1.5	Internationalization	0.728	0.220	0.000	Valid

Table 4 indicates that all questionnaire items have corrected item-total correlation values higher than the r-table value of 0.220 and significance values below 0.05. This means that all items used to measure innovation, digital literacy, and internationalization are statistically valid. Therefore, each statement item is considered capable of measuring the intended construct and can be used for further analysis.

**Reliability Test**

Table 5. Reliability Statistics

Variable	Cronbach's Alpha	N of Items	Decision
Innovation (X1)	0.842	5	Reliable
Digital Literacy (X2)	0.857	5	Reliable
Internationalization (Y)	0.831	5	Reliable
Overall Instrument	0.903	15	Highly Reliable

Table 5 shows that all variables have Cronbach's Alpha values above 0.70. Innovation has an alpha of 0.842, Digital Literacy 0.857, and Internationalization 0.831. The overall instrument also records an alpha value of 0.903, indicating excellent internal consistency. These results confirm that all items in the questionnaire are reliable and consistently measure the variables under study.

**Multicollinearity Test**

Table 6. Coefficientsa (Multicollinearity Statistics)  
Dependent Variable: Internationalization in MSMEs

Model	Variable	Tolerance	VIF
1	Innovation	0.624	1.603
1	Digital Literacy	0.624	1.603

As shown in Table 6, the tolerance values for Innovation and Digital Literacy are 0.624, which are higher than 0.10, while the VIF values are 1.603, which are below 10. These findings indicate that there is no multicollinearity among the independent variables. Therefore, the regression model is considered appropriate and feasible for further analysis

**Normality Test**

Table 7. One-Sample Kolmogorov-Smirnov Test  
 Unstandardized Residual

Statistic	Value
N	80
Mean	0.0000000
Std. Deviation	0.3542167
Most Extreme Differences - Absolute	0.072
Most Extreme Differences - Positive	0.072
Most Extreme Differences - Negative	-0.056
Test Statistic	0.072
Asymp. Sig. (2-tailed)	0.200

As shown in Table 7, the tolerance values for Innovation and Digital Literacy are 0.624, which are higher than 0.10, while the VIF values are 1.603, which are below 10. These findings indicate that there is no multicollinearity among the independent variables. Therefore, the regression model is considered appropriate and feasible for further analysis.

**Heteroscedasticity Test**

Table 8. One-Sample Kolmogorov-Smirnov Test  
 Unstandardized Residual

Statistic	Value
N	80
Mean	0.0000000
Std. Deviation	0.3542167
Most Extreme Differences - Absolute	0.072
Most Extreme Differences - Positive	0.072
Most Extreme Differences - Negative	-0.056
Test Statistic	0.072
Asymp. Sig. (2-tailed)	0.200

According to Table 8, the significance values for Innovation (0.396) and Digital Literacy (0.482) are both greater than 0.05. This indicates that the independent variables do not significantly affect the absolute residual values. Thus, the model does not suffer from heteroscedasticity and satisfies the assumption of homoscedasticity.

Testing the Direct Influence Between Variables with Multiple Linear Regression

Table 9. Coefficientsa  
Dependent Variable: Internationalization in MSMEs

Model	Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	0.978	0.401		2.439	0.017
1	Innovation	0.352	0.081	0.389	4.346	0.000
1	Digital Literacy	0.421	0.087	0.433	4.839	0.000

The regression equation is formulated as follows:

$$Y = 0.978 + 0.352X_1 + 0.421X_2 + e$$

Table 9 indicates that Innovation and Digital Literacy both have positive and significant effects on Internationalization in MSMEs. Innovation has a regression coefficient of 0.352 and a significance value of 0.000, while Digital Literacy has a regression coefficient of 0.421 and a significance value of 0.000. This means that an increase in Innovation and Digital Literacy will significantly increase the level of Internationalization in MSMEs. Among the two variables, Digital Literacy has a slightly stronger standardized coefficient, indicating that it contributes more strongly to internationalization than Innovation.

**Hypothesis Testing: t-test and F-test**

Table 10. ANOVA<sup>a</sup>  
Dependent Variable: Internationalization in MSMEs

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	9.946	2	4.973	54.040	0.000
Residual	7.085	77	0.092		
Total	17.031	79			

Table 11. Summary of Hypothesis Testing

Hypothesis	Relationship	Beta	t / F	Sig.	Decision
H1	Innovation → Internationalization	0.389	4.346	0.000	Accepted
H2	Digital Literacy → Internationalization	0.433	4.839	0.000	Accepted
H3	Innovation and Digital Literacy → Internationalization	–	54.040	0.000	Accepted

The t-test results in Table 11 show that Innovation significantly affects Internationalization in MSMEs, as indicated by a t-value of 4.346 and a significance value of 0.000. Digital Literacy also significantly affects Internationalization in MSMEs, with a t-value of 4.839 and a significance value of 0.000. Since both significance values are below 0.05, H1 and H2 are accepted. Furthermore, the F-test result in Table 8 shows an F-value of 54.040 with a significance value of 0.000, meaning that Innovation and Digital Literacy simultaneously have a significant effect on Internationalization in MSMEs. Therefore, H3 is also accepted.

**Coefficient of Determination (R<sup>2</sup>) Test**

Table 12. Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.764	0.584	0.573	0.303

Table 12 shows that the R Square value is 0.584. This means that 58.4% of the variation in Internationalization in MSMEs can be explained by Innovation and Digital Literacy. The remaining 41.6% is explained by other factors outside the model. The Adjusted R Square value of 0.573 further indicates that the model has good explanatory power even after adjustment for the number of independent variables included in the regression model.

Overall, the results of this study indicate that the research instrument is valid and reliable, and that the regression model fulfills all classical assumption tests, including normality, multicollinearity, and heteroscedasticity. The multiple linear regression analysis further reveals that Innovation and Digital Literacy have positive and significant effects on Internationalization in MSMEs, both partially and simultaneously. Moreover, the coefficient of determination confirms that the two independent variables provide substantial explanatory power in predicting the internationalization of MSMEs.

**H1. Innovation positively affects the internationalization of MSMEs**

The results support H1, indicating that innovation has a positive and significant effect on the internationalization of MSMEs. This finding suggests that MSMEs with stronger innovation capabilities are more likely to expand beyond domestic markets. Innovation allows firms to improve products, refine processes, and respond more effectively to changing market demands, thereby strengthening their competitive position. In the context of MSMEs, such capability is important because internationalization often requires flexibility, differentiation, and adaptation to broader market expectations. Therefore, innovation can be interpreted as a strategic resource that enhances the readiness of MSMEs to enter and compete in wider markets.

This result also implies that internationalization is not merely driven by external opportunities, but by the internal ability of firms to create and deliver value. MSMEs that continuously innovate are more likely to identify market opportunities, adjust to consumer preferences, and build stronger business competitiveness. Thus, the significant effect of innovation confirms its role as an important driver of international business expansion among MSMEs.

**H2. Digital literacy positively affects the internationalization of MSMEs**

The findings also support H2, showing that digital literacy has a positive and significant effect on the internationalization of MSMEs. This indicates that the ability to access, understand, and utilize digital technologies contributes directly to broader market engagement. For MSMEs, digital literacy is increasingly important because market access, customer communication, and promotional activities are now closely connected to digital platforms. Firms with higher digital literacy are therefore better positioned to connect with wider business networks and identify international opportunities.

A notable point in this study is that digital literacy shows a slightly stronger effect than innovation. This suggests that, in the current business environment, digital capability may play a more immediate role in supporting market expansion. While innovation contributes to value creation, digital literacy enables firms to communicate and distribute that value more effectively. In this sense, digital literacy should be understood not only as a technical skill, but as a strategic capability that strengthens the international orientation of MSMEs.

### **H3. Innovation and digital literacy simultaneously affect the internationalization of MSMEs**

The results further confirm H3, indicating that innovation and digital literacy simultaneously have a positive and significant effect on the internationalization of MSMEs. This finding highlights that MSME internationalization is better explained by the combined role of multiple internal capabilities rather than by a single factor. Innovation contributes to the development of competitive value, whereas digital literacy enhances the firm's ability to access information, engage customers, and utilize digital channels for market expansion. Together, these variables provide a stronger explanation of internationalization outcomes.

This simultaneous effect suggests that MSMEs need both innovation capacity and digital competence to improve their international readiness. Innovation without digital literacy may limit the firm's ability to reach broader markets, while digital literacy without innovation may reduce the distinctiveness of its market offering. Therefore, the internationalization of MSMEs is most likely to occur when firms are able to integrate innovation with effective digital capability. This finding reinforces the importance of a capability-based approach in understanding MSME expansion into international markets.

### **Overall discussion**

Overall, the study demonstrates that the internationalization of MSMEs is shaped by the firm's ability to innovate and to use digital technology effectively. The acceptance of all three hypotheses confirms that innovation and digital literacy are both significant determinants of internationalization, individually and collectively. These findings suggest that MSMEs seeking wider market expansion should not rely solely on product development or technology adoption in isolation. Instead, they should strengthen both dimensions simultaneously in order to build sustainable international competitiveness.

## **CONCLUSIONS**

This study concludes that innovation and digital literacy have positive and significant effects on the internationalization of MSMEs, both individually and simultaneously. The findings indicate that MSMEs with stronger innovation capabilities are better able to improve competitiveness, adapt to market demands, and expand beyond domestic markets. At the same time, digital literacy plays an essential role in enabling MSMEs to access information, utilize digital platforms, communicate with broader markets, and support international business activities more effectively. The results also show that digital literacy has a slightly stronger influence than innovation, highlighting the increasing importance of digital capability in today's business environment. Overall, this

study confirms that MSME internationalization is shaped by the integration of innovation and digital literacy, making both variables important strategic drivers for wider market expansion.

## RECOMMENDATIONS

Based on the findings, it is recommended that MSME owners and managers strengthen both innovation capability and digital literacy as part of their business development strategy. Innovation should be continuously enhanced through product improvement, process refinement, and market-oriented adaptation, while digital literacy should be improved through the effective use of digital platforms, online communication, market intelligence, and technology-based decision-making. For policymakers and business support institutions, integrated training and assistance programs are needed to simultaneously develop innovation and digital competence among MSMEs in order to improve their international readiness. Future research is also recommended to expand the model by including other relevant variables, using larger and more diverse samples, and applying longitudinal or comparative approaches to provide a more comprehensive understanding of MSME internationalization.

## FURTHER STUDY

Future research should extend the present study by including additional variables that may explain MSME internationalization more comprehensively, such as entrepreneurial orientation, networking capability, export readiness, access to finance, institutional support, and market knowledge. Since this study was conducted within a specific context and used a cross-sectional design, future studies are encouraged to involve larger and more diverse samples across sectors and regions to improve the generalizability of the findings. Longitudinal research would also be valuable to examine how innovation and digital literacy influence internationalization over time. In addition, comparative studies between different categories of MSMEs or between domestic-oriented and export-oriented firms may provide deeper insight into the strategic conditions that support international expansion. Future researchers may also consider qualitative or mixed-method approaches to capture richer explanations of how MSMEs translate innovation and digital literacy into broader market engagement.

## REFERENCES

- Aggarwal, A., & Joshi, N. (2024). MSMEs' innovation: A barrier approach. *Journal of Small Business and Enterprise Development*, 31(3), 552-573. <https://doi.org/10.1108/JSBED-07-2023-0304>
- Ben Ghrbeia, S., & Alzubi, A. (2024). Building micro-foundations for digital transformation: A moderated mediation model of the interplay between digital literacy and digital transformation. *Sustainability*, 16(9), 3749. <https://doi.org/10.3390/su16093749>

- Coco, N., Colapinto, C., & Finotto, V. (2024). Fostering digital literacy among small and micro-enterprises: digital transformation as an open and guided innovation process. *R&D Management*, 54(1), 118-136. <https://doi.org/10.1111/radm.12645>
- García-Vidal, G., Sánchez-Rodríguez, A., Guzmán-Vilar, L., Martínez-Vivar, R., & Pérez-Campdesuñer, R. (2025). Exploring MSME Owners' Expectations of Data-Driven Approaches to Business Process Management. *Systems*, 13(4), 265. <https://doi.org/10.3390/systems13040265>
- Gong, S., Sun, Z., Wang, B., & Yu, Z. (2024). Could digital literacy contribute to the improvement of green production efficiency in agriculture?. *Sage Open*, 14(1), 21582440241232789. <https://doi.org/10.1177/21582440241232789>
- Ha, S., & Kim, S. (2024). Developing a conceptual framework for digital platform literacy. *Telecommunications Policy*, 48(3), 102682. <https://doi.org/10.1016/j.telpol.2023.102682>
- Hans, V. B., & Sastry, N. S. K. (2025). The role of micro, small, and medium enterprises (MSMEs) in promoting inclusive growth and sustainable development in Karnataka. *Int J Manag Stud Res*, 13(02), 26-35. <https://doi.org/10.20431/2349-0349.1302003>
- Haynes-Brown, T. K. (2023). Using theoretical models in mixed methods research: An example from an explanatory sequential mixed methods study exploring teachers' beliefs and use of technology. *Journal of mixed methods research*, 17(3), 243-263. <https://doi.org/10.1177/15586898221094970>
- Hoang, D. V., Duy, H. A., Thuy, D. T., Giang, D. T., Chau, V. N. M., Ngoc, N. L. M., & Quynh, V. H. (2025). Digital capabilities and competitive advantage in the context of technological uncertainty: Evidence from emerging market SMEs. *International Journal of Innovation Management*, 29(03n04), 2550018. <https://doi.org/10.1142/S1363919625500185>
- Ibrahim, M., & Aduah, E. W. (2025). Digital literacy, digital intelligence and small and medium enterprises'(SMEs) sustainability: The mediating role of digital technology usage. *Information Development*. <https://doi.org/10.1177/02666669251335001>
- Inegbedion, H. E., Thikan, P. R., David, J. O., Ajani, J. O., & Peter, F. O. (2024). Small and medium enterprise (SME) competitiveness and employment creation: the mediating role of SME growth. *Humanities and Social Sciences Communications*, 11(1), 1-10. <https://doi.org/10.1057/s41599-023-02434-y>

- Judijanto, L., Utami, E. Y., Apriliani, D., & Rijal, S. (2024). A holistic review of MSME entrepreneurship in Indonesia: The role of innovation, sustainability, and the impact of digital transformation. *International Journal of Business, Law, and Education*, 5(1), 119-132. <https://doi.org/10.56442/ijble.v5i1.355>
- Kabakus, A. K., Bahcekapili, E., & Ayaz, A. (2025). The effect of digital literacy on technology acceptance: An evaluation on administrative staff in higher education. *Journal of Information Science*, 51(4), 930-941. <https://doi.org/10.1177/01655515231160028>
- Kastelli, I., Dimas, P., Stamopoulos, D., & Tsakanikas, A. (2024). Linking digital capacity to innovation performance: The mediating role of absorptive capacity. *Journal of the Knowledge Economy*, 15(1), 238-272. <https://doi.org/10.1007/s13132-022-01092-w>
- Kreiterling, C. (2023). Digital innovation and entrepreneurship: A review of challenges in competitive markets. *Journal of Innovation and Entrepreneurship*, 12(1), 49. <https://doi.org/10.1186/s13731-023-00320-0>
- Kurniasih, J., Abas, Z. A., Asmai, S. A., & Wibowo, A. B. (2023). System dynamics approach in supporting the achievement of the sustainable development on MSMEs: a collection of case studies. *International Journal of Advanced Computer Science and Applications*, 14(6). <https://doi.org/10.14569/IJACSA.2023.01406106>
- Lim, W. M. (2025). What is quantitative research? An overview and guidelines. *Australasian Marketing Journal*, 33(3), 325-348. <https://doi.org/10.1177/14413582241264622>
- Loo, M. K., Ramachandran, S., & Raja Yusof, R. N. (2023). Unleashing the potential: Enhancing technology adoption and innovation for micro, small and medium-sized enterprises (MSMEs). *Cogent Economics & Finance*, 11(2), 2267748. <https://doi.org/10.1080/23322039.2023.2267748>
- Marín, V. I., & Castaneda, L. (2023). Developing digital literacy for teaching and learning. In *Handbook of open, distance and digital education* (pp. 1089-1108). Singapore: Springer Nature Singapore. [https://doi.org/10.1007/978-981-19-2080-6\\_64](https://doi.org/10.1007/978-981-19-2080-6_64)
- Naayif, A., Swacha, J., Saeed, S., & Śpiewak, R. (2025). Digital literacy as a mediator in the link between digital marketing adoption and business performance: insights from micro and small enterprises (MSEs) in the Maldives. *Asia-Pacific Journal of Business Administration*, 1-20. <https://doi.org/10.1108/APJBA-12-2024-0688>
- Nasiri, M., Saunila, M., Ukko, J., Rantala, T., & Rantanen, H. (2023). Shaping digital innovation via digital-related capabilities. *Information Systems Frontiers*, 25(3), 1063-1080. <https://doi.org/10.1007/s10796-020-10089-2>

- Ojobo, C. A., Orga, C. C., & Okechukwu, E. U. (2023). Impact of digital literacy on the performance of small-scale business in Enugu State. *Advance Journal of Business and Entrepreneurship Development*, 7(1), 57-78.
- Polizzi, G. (2025). Digital literacy and strategic (dis) engagement: examining how functional and critical digital literacy shapes participation. *Information, Communication & Society*, 28(14), 2483-2502. <https://doi.org/10.1080/1369118X.2025.2452282>
- Probohudono, A. N., Suhardjanto, D., Aligarh, F., Chayati, N., & Putra, A. A. (2025). Navigating MSMEs' performance through innovation and digital IT capabilities in business strategy. *Social Sciences & Humanities Open*, 12, 101810. <https://doi.org/10.1016/j.ssaho.2025.101810>
- Purnomo, S., & Purwandari, S. (2025). A comprehensive micro, small, and medium enterprise empowerment model for developing sustainable tourism villages in rural communities: A perspective. *Sustainability*, 17(4), 1368. <https://doi.org/10.3390/su17041368>
- Rakib, M. (2024). Impact of digital literacy, business innovation, competitive advantage on the existence of SMEs: A quantitative study in Makassar City, Indonesia. *Quality-Access to Success*, 25(198), 277-283. <https://doi.org/10.47750/QAS/25.198.30>
- Reddy, P., Chaudhary, K., & Hussein, S. (2023). A digital literacy model to narrow the digital literacy skills gap. *Heliyon*, 9(4). <https://doi.org/10.1016/j.heliyon.2023.e14878>
- Rizkita, M. A., Winarno, A., & Suwono, H. (2025). Harnessing Sustainability and Innovation in Micro, Small, and Medium Enterprises: Strategies and Challenges for Competitive Advantage. *International Journal of Sustainable Development & Planning*, 20(6). <https://doi.org/10.18280/ijmdp.200630>
- Rosyidiana, R. N., & Narsa, I. M. (2024). Micro, small, and medium-sized enterprises (MSMEs) during the post-pandemic economic recovery period: digitalization, literation, innovation, and its impact on financial performance. *Cogent Business & Management*, 11(1), 2342488. <https://doi.org/10.1080/23311975.2024.2342488>
- Rumanti, A. A., Daryanto, Y., Amelia, M., Rizaldi, A. S., Zulkarnain, I., & Andrawina, L. (2025). The role of organizational and stakeholder factors in strengthening digital literacy and communication for edu-tourism. *Journal of Open Innovation: Technology, Market, and Complexity*, 100618. <https://doi.org/10.1016/j.joitmc.2025.100618>

- Soesetio, Y., Rudiningtyas, D. A., Rakhmad, A. A. N., & Wiliandr, R. (2024). Entrepreneurial orientation, innovation, competitiveness, and performance of Ultra-Micro and micro enterprises in Indonesia. *Global Business & Finance Review*, 29(10), 55. <https://doi.org/10.17549/gbfr.2024.29.10.55>
- Sudirjo, F., Zaini, M., Rahmanto, B. T., & Juminawati, S. (2025). The Influence of Managerial Competence, Innovation, and Market Orientation on the Performance of Micro, Small and Medium Enterprises (MSMEs). *West Science Journal Economic and Entrepreneurship*, 3(02). <https://doi.org/10.58812/wsjee.v3i02.1898>
- Susanti, E., Mulyanti, R. Y., & Wati, L. N. (2023). MSMEs performance and competitive advantage: Evidence from women's MSMEs in Indonesia. *Cogent Business & Management*, 10(2), 2239423. <https://doi.org/10.1080/23311975.2023.2239423>
- Suyatna, H., Kafaa, K. A., Budiono, M. F., Firdaus, R. S. M., & Wibowo, I. A. (2026). Digitalising Traditional Markets: Challenges and Opportunities for Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. *Jurnal Ilmu Sosial dan Ilmu Politik*, 29(3), 265-277. <https://doi.org/10.22146/jsp.104248>
- Tinmaz, H., Fanea-Ivanovici, M., & Baber, H. (2023). A snapshot of digital literacy. *Library Hi Tech News*, 40(1), 20-23. <https://doi.org/10.1108/LHTN-12-2021-0095>
- Torres, P., & Godinho, P. (2025). National competitive advantage in the digital age: A necessary condition analysis. *Competitiveness Review: An International Business Journal*. <https://doi.org/10.1108/CR-05-2025-0160>
- Vasani, S., & Abdulkareem, A. M. (2024). MSME market presence and competitiveness in a global economy. *Cogent Economics & Finance*, 12(1), 2416992. <https://doi.org/10.1080/23322039.2024.2416992>
- Wang, C., & Si, L. (2024). The intersection of public policy and public access: Digital inclusion, digital literacy education, and libraries. *Sustainability*, 16(5), 1878. <https://doi.org/10.3390/su16051878>
- Wang, J. (2025). Can digital literacy improve income mobility? Evidence from China. *Telecommunications Policy*, 49(6), 102960. <https://doi.org/10.1016/j.telpol.2025.102960>
- Widiarty, W. S. (2023). The Role of the Government in Reaching the Welfare of Small and Medium Enterprises in the Perspective of Law Number 20 of 2008 Concerning Micro, Small and Medium Enterprises. *Russian Law Journal*, 11(4), 449-457. <https://doi.org/10.37680/almanhaj.v5i1.2543>

Yuwono, T., Novandari, W., Suroso, A., & Setyanto, R. P. (2025). The importance of ICT adoption on MSMEs performance: the mediating role of distinctive competencies. *Journal of Enterprising Communities: People and Places in the Global Economy*, 19(3), 610-630. <https://doi.org/10.1108/JEC-06-2024-0113>