

Integrative Model of Financial Literacy, Social Entrepreneurship, and Pentahelix Collaboration on MSME Performance

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Abstract

Purpose: This study aims to analyze the influence of financial literacy, social entrepreneurship, and Pentahelix collaboration on the performance of MSMEs in Karanganyar Regency, with business innovation as a mediating variable. This study aims to understand how internal and external factors interact to improve the performance and competitiveness of MSMEs in the era of digital economy transformation.

Research Methodology: A survey of 382 MSME actors in Ngargoyoso, Karangpandan, and Tawangmangu was conducted. Data were analyzed using SEM-PLS with SmartPLS software, testing the outer model, inner model, and mediation to assess direct and indirect relationships.

Results: Financial literacy and social entrepreneurship impact MSME performance, while Pentahelix collaboration does not. All three positively influence innovation, which enhances performance. Innovation mediates the relationship between financial literacy and Pentahelix collaboration, but not social entrepreneurship.

Conclusions: This study expands the application of the theory of Resource-Based View and open innovation theories by emphasizing that innovation is a strategic bridge between internal resources and external collaboration in strengthening MSME performance and sustainability.

Limitations: This study only covers three sub-districts in Karanganyar Regency; therefore, the generalization of results needs to be done carefully.

Contributions: This study provides insights into how financial literacy, social entrepreneurship, and pentahelix collaboration impact MSME performance, with business innovation as a mediator. It extends the Resource-Based View and open innovation theories, offering valuable implications for enhancing MSME competitiveness and sustainability in the digital economy.

Keywords: *Business Innovation, Financial Literacy, MSME Performance, Pentahelix Collaboration, Social Entrepreneurship*

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1. Introduction

The MSME sector has long been recognized as the backbone of national economic development. Karanganyar Regency in Central Java is one of the regions with a very large MSME base, with more than 100,000 business units spread across various sectors, such as culinary, handicrafts, agrotourism, and creative industries. Quantitatively, its growth has been quite rapid, with the addition of more than 20 thousand units in the last five years. However, in terms of quality and competitiveness, most MSMEs

are still in the low category. Prominent problems include low financial literacy, limited business innovation, minimal use of digital technology, and weak cross-sector collaboration. This situation makes MSMEs vulnerable to being left behind in competition at both the national and global levels.

The main challenge most frequently mentioned was low financial literacy. The *Otoritas Jasa Keuangan (OJK)* survey in 2022 showed that the level of financial literacy of the Indonesian population was only 49.68%. MSME actors are one of the groups with relatively low literacy levels, even though good financial management is required for sustainable businesses. Low financial literacy causes MSME actors to experience difficulties in managing cash flows, planning investments, accessing financing, and managing business risks. Consequently, many MSMEs fail to develop or even cease operations amid increasingly intense competition.

In addition to financial factors, social entrepreneurship has become a concern. Social entrepreneurship is viewed as a new paradigm in economic development that is oriented not only toward financial profit but also toward creating social value ([Peredo & McLean, 2006](#)). In the context of Karanganyar Regency, which is rich in local culture and traditional wisdom, the social entrepreneurship approach has significant potential. However, in reality, only a few MSMEs have implemented it systematically. Moreover, the success of MSMEs is not only determined by individual capacity but also by the support of the external ecosystem.

One increasingly relevant collaboration model is the Pentahelix approach. This model involves five main actors: academics, business actors, communities, government, and media, in synergistic development ([Etzkowitz & Leydesdorff, 2000](#)). Through Pentahelix, MSMEs can access technology, information, training, promotion, and comprehensive policy support. However, in Karanganyar, the implementation of this collaboration is still limited. Business innovation is another important factor that is often overlooked. Innovation is the main driver of economic growth and competitive advantage.

For MSMEs, innovation can take the form of developing new products, adopting digital technology, improving production processes, or creating marketing strategies. Without innovation, MSMEs risk being left behind amid changes in consumer preferences, market globalization, and technological disruption. Several studies have shown that financial literacy, social entrepreneurship, and Pentahelix collaboration do not always have a direct impact on MSME performance but are mediated by the ability to innovate ([Indrayani & Arman, 2025](#)). In other words, excellence in financial literacy or external collaboration will not be optimal if not accompanied by innovations relevant to market needs.

Based on data from the Department of Trade, Manpower, Cooperatives, and MSMEs, the number of MSMEs in this region in 2020 was 67, 962. This rapid growth presents both opportunities and challenges. Without an increase in capacity, literacy, and collaborative support, MSMEs will have difficulty taking advantage of global market opportunities and risk failing to survive in the long run. Therefore, identifying the factors that influence MSME performance in Karanganyar, particularly the role of financial literacy, social entrepreneurship, Pentahelix collaboration, and business innovation, is important.

Although various previous studies have examined the relationship between financial literacy, social entrepreneurship, and MSME performance, the results of these studies still show inconsistencies. [Agyapong and Attram \(2019\)](#); [Aribawa \(2016\)](#) found a positive and significant effect of financial literacy on performance, while [Menike \(2018\)](#) showed insignificant results. Inconsistencies also exist in the influence of social entrepreneurship on business performance. [Seran \(2019\)](#) emphasizes its positive role in business sustainability, but [Hoogendoorn, Van der Zwan, and Thurik \(2019\)](#) show that social motivation can weaken the innovative orientation of business actors. Likewise, the effectiveness of Pentahelix collaboration on MSME performance has not been conclusively tested because most studies emphasize conceptual aspects rather than their empirical impact at the micro-level.

Most previous studies have highlighted the direct influence of these three variables on performance, but few have examined the mechanism of the role of business innovation as a mediating variable that

explains how these internal and external factors interact to create competitive advantages. Therefore, this study aims to fill the literature gap by building an integrative model that tests the effect of financial literacy, social entrepreneurship, and Pentahelix collaboration on MSME performance through business innovation as a mediator. This research not only provides a theoretical contribution by expanding the understanding of innovation dynamics in the MSME context but also a practical contribution for local governments, academics, communities, and business actors in strengthening cross-actor collaboration oriented toward sustainable innovation. Thus, this study is expected to provide a conceptual and empirical basis for formulating adaptive, inclusive, and competitive MSME development policies in the era of digital economic transformation.

2. Literature Review and Hypothesis Development

2.1 Theoretical Review

2.1.1 Financial Literacy

The concept of financial literacy is rooted in behavioral finance theory, which explains how individuals' understanding, attitudes, and behaviors toward money influence their financial decisions ([Lusardi & Mitchell, 2014](#)). Financial literacy includes the ability to understand basic financial concepts, such as interest rates, inflation, risk diversification, business financial planning, and management. In the context of MSMEs, this theory emphasizes that good financial knowledge and skills enable business actors to make rational economic decisions, increase profitability, and maintain business sustainability ([Adomako, Danso, & Ofori Damoah, 2016](#)).

According to the Resource-Based View (RBV), financial literacy is a form of intangible capital that provides a sustainable competitive advantage. With high financial capability, MSMEs can take advantage of financing opportunities, manage their working capital, and invest in product innovation. Thus, financial literacy is a strategic foundation for achieving operational efficiency and performance improvement.

2.1.2 Social Entrepreneurship

Social entrepreneurship theory is based on the value creation theory, which emphasizes the creation of social value. Social entrepreneurs aim to solve social problems through sustainable business approaches that simultaneously create economic and social impact. ([Peredo & McLean, 2006](#)) state that social entrepreneurship is a catalyst for social change by combining innovation, sustainability, and community empowerment.

From the perspective of stakeholder theory, social entrepreneurs seek to balance the interests of various stakeholders (communities, customers, and the environment) without sacrificing their profitability. In the MSME context, this social orientation strengthens business legitimacy, increases customer trust, and builds a positive reputation that impacts long-term performance ([Hoogendoorn et al., 2019](#)). Thus, this theory emphasizes that social entrepreneurship generates economic value and expands social impact and business sustainability.

2.1.3 Pentahelix Collaboration

The Pentahelix model was developed from the Triple Helix theory ([Etzkowitz and Leydesdorff \(2000\)](#)) and the Quadruple Helix ([Carayannis, Barth, & Campbell, 2012](#)), which emphasizes synergy among key actors in innovation development. In the Pentahelix model, five main elements academics, business, government, community, and media collaborate to create an innovative ecosystem that supports sustainable economic growth ([Awaluddin, Sule, & Kaltum, 2016](#)). Theoretically, this collaboration represents the principles of open innovation theory, in which innovation emerges from cross-sector interactions that share knowledge and resources.

The pentahelix functions as a collaborative platform that enables technology transfer, promotion, and public policy support to strengthen MSME competitiveness ([Halibas, Sibayan, & Maata, 2017](#)). In the local context, the implementation of the Pentahelix model is also related to governance network theory, where the effectiveness of collaboration depends on the intensity of interaction, trust among actors, and

alignment of development goals. Therefore, Pentahelix collaboration becomes a strategic framework for strengthening MSME innovation and performance through sustainable multi-stakeholder synergy.

2.1.4 Business Innovation

The concept of business innovation originates from the classical theory of creative destruction which states that innovation is the main driver of economic growth and competitive advantages. Business innovation includes changes in products, processes, marketing strategies, and business models that generate new value for customers and organizations. In the modern context, innovation theory has evolved through the dynamic capability theory approach, which explains that an organization's ability to adapt and transform resources into innovation is the key to business sustainability. MSMEs with high innovative capabilities tend to be more responsive to market changes, digital technology, and consumer preferences ([Indrayani & Arman, 2025](#)). Thus, business innovation functions as a strategic variable that increases efficiency and differentiation and as a mediating mechanism that bridges internal factors (such as financial literacy and social entrepreneurship) and external factors (Pentahelix collaboration) to improve MSME performance.

2.1.5 MSME Performance

MSME performance describes the final outcome of a business's ability to achieve economic, social, and sustainable goals. Theoretically, MSME performance can be explained through Resource-Based View (RBV) and performance measurement theories ([Barney, 1991](#)). RBV emphasizes that performance advantages are obtained through a combination of unique resources that are difficult to imitate, including human, financial, social, and innovative capital. In the MSME context, performance includes increased sales, profitability, market expansion and business sustainability. Recent studies by [Al-Shami, Damayanti, Adil, and Farhi \(2024\)](#); [Arifuddin, Nurnaluri, and Intani \(2023\)](#) show that MSME performance is strongly influenced by the integration of internal capabilities (financial literacy and social orientation) and external support (Pentahelix collaboration), mediated by business innovation. Thus, MSME performance theory emphasizes the importance of a multidimensional approach to understanding the determinants of competitiveness and sustainable growth.

2.2 Hypothesis Development

2.2.1 Financial Literacy and MSME Performance

Financial literacy is a key factor in MSME success. A good understanding of finance enables business actors to manage working capital, maintain cash flow stability and make appropriate investment decisions. According to [Lusardi and Mitchell \(2014\)](#), financial literacy is not merely an understanding of financial products, but also includes planning, risk management, and business sustainability strategies. Limited financial literacy among MSMEs often becomes an obstacle in accessing formal financing sources, managing debt, and developing sustainable businesses. MSMEs with high literacy levels can manage working capital, optimize cash flow, and effectively utilize formal finance ([Adomako et al., 2016](#)). [Aribawa \(2016\)](#) emphasized that increasing MSME profitability and resilience can be achieved through good financial literacy. Similar findings were reported by [Agyapong and Attram \(2019\)](#), who found a positive effect of financial literacy on business performance. [Menike \(2018\)](#) found that this relationship is not always significant.

H₁: Financial literacy positively affects MSME performance.

2.2.2 Social Entrepreneurship and MSME Performance

Social entrepreneurship is a business paradigm that emphasizes the creation of social and economic value. According to [Peredo and McLean \(2006\)](#) social entrepreneurship seeks to balance financial goals with positive societal contributions. In the MSME context, this orientation can take the form of local community involvement, the use of environmentally friendly raw materials, or reinvestment of profits in empowerment programs. Social entrepreneurship can simultaneously address economic, social, and ecological issues.

Research in Indonesia also demonstrates the relevance of this concept. [Seran \(2019\)](#) found that social entrepreneurship encourages rural economic empowerment, while [Widayanti, Damayanti, and Marwanti \(2017\)](#) demonstrated its contribution to creating sustainable businesses. [Arifuddin et al.](#)

(2023) emphasized that social orientation has a positive impact on the performance of community-based enterprises. However, other views, such as those of [Hoogendoorn et al. \(2019\)](#) state that socially motivated entrepreneurs find it more difficult to survive than purely profit-oriented entrepreneurs. Nevertheless, most studies still emphasize the importance of social entrepreneurship as a strategy for improving MSME performance.

H₂: Social entrepreneurship has a positive effect on MSME performance.

2.2.3 Pentahelix Collaboration and MSME Performance

The Pentahelix model is an extension of the Triple Helix theory, which emphasizes the importance of synergy among academics, business actors, and the government. Over time, this concept expanded into the Quadruple Helix by adding the role of media, and finally into the Pentahelix by including the community as the fifth actor ([Awaluddin et al., 2016](#)). This cross-actor collaboration is believed to create an innovative ecosystem that supports MSME growth.

In practice, Pentahelix collaboration provides many benefits for MSMEs, such as access to technology, training, marketing, and digital promotion. The implementation of the Pentahelix model increases MSME productivity in Central Java. [Le Roy and Czakon \(2016\)](#) reinforces that cross-sector collaboration triggers innovation and more adaptive new business models than single-sector collaboration does. Nevertheless, the effectiveness of the Pentahelix on MSME performance is often influenced by innovation factors; therefore, the relationship is not always direct.

H₃: Pentahelix collaboration positively affects MSME performance.

2.2.4 Financial Literacy and Business Innovation

Financial literacy not only directly affects performance but also encourages the emergence of business innovation. MSMEs with high financial literacy can allocate capital for research, product development, and adopting new technologies ([Adomako et al., 2016](#)). With a good financial understanding, business actors can make investment decisions that support product differentiation and creative marketing strategies ([Is, Kv, & Hungund, 2025](#); [Jain & Sharma, 2023](#)). [Widayanti et al. \(2017\)](#) emphasized that financial literacy is crucial for business sustainability, including innovation adoption. There is a close relationship between financial literacy and the adoption of digital technology ([Al-Shami et al., 2024](#); [Gumbo, Margaret, & Chagwasha, 2022](#); [Kaban, 2024](#); [Towo & Jonasi, 2024](#)).

H₄: Financial literacy positively affects business innovation.

2.2.5 Social Entrepreneurship and Business Innovation

Social entrepreneurship encourages business actors to seek innovative solutions to social, economic, and environmental problems. This orientation often results in environmentally friendly products, community-based services, and new business models with added value for the company. Digitalization also drives entrepreneurship and business innovations ([Putra et al., 2024](#)). [Seran \(2019\)](#) showed that community-based social entrepreneurship generates new ideas relevant to local market needs. Social orientation not only increases social value but also stimulates business innovation.

H₅: Social entrepreneurship positively affects business innovation.

2.2.6 Pentahelix Collaboration and Business Innovation

Cross-sector collaboration within the Pentahelix provides space for MSMEs to innovate. Academics provide research support, the government provides regulation, the media supports promotion, communities provide feedback, and other business actors open access to markets ([Halibas et al., 2017](#); [Martini, 2023](#)). [Aryanti, Rahmi, Hendrayati, and Rahayu \(2023\)](#) proved that Pentahelix-based innovation strategies strengthen MSME resilience, especially in facing crises.

H₆: Pentahelix collaboration positively affects business innovation.

2.2.7 Business Innovation and MSME Performance

Business innovation is believed to be the main link between internal capabilities and business outcomes. Innovation as the engine of economic growth. In the MSME context, innovation not only expands markets but also creates production efficiency and product differentiation. Research has shown that business innovation plays a role in improving performance ([Fu et al., 2021](#); [Salfore, Ensermu, & Kinde,](#)

2023; Sulaiman, Fitralsima, Fata, & Nawawi, 2024). Indrayani and Arman (2025) emphasized the role of innovation as a mediator between social capital and the performance of digital-based MSMEs.

H₇: Business innovation positively affects MSME performance.

2.2.8 The Mediating Role of Business Innovation

Financial literacy, social entrepreneurship, and Pentahelix collaboration do not always directly affect performance. In many cases, business innovation is an important mediator. Indrayani and Arman (2025) emphasized that MSME competitive advantage depends on their ability to adopt innovation. For example, MSMEs with high financial literacy will not succeed in improving their performance without product or business-model innovation. Likewise, social entrepreneurship orientation requires innovation to create a real impact, and pentahelix collaboration is only effective if it produces concrete innovation.

H_{8a}: Business innovation mediates the effect of financial literacy on MSME performance.

H_{8b}: Business innovation mediates the effect of social entrepreneurship on MSME performance.

H_{8c}: Business innovation mediates the effect of Pentahelix collaboration on MSME performance.

3. Research Methodology

3.1 Research Design

This study uses an explanatory quantitative design with a Structural Equation Modeling-Partial Least Squares (SEM-PLS) approach to analyze causal relationships among latent variables, namely, financial literacy, social entrepreneurship, Pentahelix collaboration, business innovation, and MSME performance. The selection of a quantitative approach is based on the research objective, which is oriented toward hypothesis testing and the empirical measurement of cause-and-effect relationships. The use of SEM-PLS is considered appropriate because it can test complex models with multiple latent variables, moderate sample sizes, and data distributions that are not fully normal.

The research design was cross-sectional, with data collected through a survey of 382 MSME actors in three sub-districts in Karanganyar Regency (Ngargoyoso, Karangpandan, and Tawangmangu), selected using proportional random sampling techniques. The selection of locations was based on the representation of areas with creative economy characteristics and a strong MSME base, which still face challenges of low financial literacy and innovation. The research instrument was developed based on indicators that had been validated in previous studies and then adjusted to the local MSME context. Each construct was measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

3.2 Population and Sample

The research population consists of MSMEs located in three sub-districts in Karanganyar Regency: Ngargoyoso, Karangpandan, and Tawangmangu. To determine the sample size, this study used the Krejcie and Morgan table, which provides guidelines for sample size based on the population size. With a population of 5,796, the minimum required sample size was approximately 361. However, to increase representativeness and anticipate invalid data, this study collected data from 382 respondents. This number is considered adequate for SEM analysis, which generally requires a large sample size to ensure a more stable model estimation. The sampling technique used was proportional random sampling. This was conducted by considering the distribution of MSMEs in each sub-district. This technique ensured that all areas were well represented in the study.

3.3 Data Collection Techniques

Primary data were collected through the distribution of structured questionnaires to MSME actors in the region. The questionnaire was designed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The research instrument was developed based on theory and prior research. In addition to questionnaire data, this study collected data through in-depth interviews and FGDs. Secondary data were obtained from official documents of the local government, MSME reports, and statistical data from the Department of Cooperatives and MSMEs of the Karanganyar Regency. These data were used to complement the general description of the population and strengthen the arguments in the discussion.

3.4 Research Variables

Table 1. Operational Definitions and Measurement of Variables

No	Variable	Operational Definition	Indicator
1	MSME Performance	MSME performance is the result of business activities reflected in the achievement of financial and non-financial aspects, including growth, efficiency, and satisfaction.	<ul style="list-style-type: none"> a. Growth in sales and business profits b. Operational efficiency c. Level of customer satisfaction d. Resilience to crises or uncertainty e. Expansion of markets and business networks (Medhika, Giantari, & Yasa, 2018)
2	Financial Literacy	Financial literacy is the ability of MSME actors to understand, manage, and make effective financial decisions to support their business sustainability.	<ul style="list-style-type: none"> a. Understanding of concepts of interest, inflation, risk, and diversification b. Ability to prepare budgets and plan business finances c. Skills in recording financial transactions (bookkeeping) d. Use of formal financial services (banks, fintech, etc.) e. Investment planning and debt management (Al-Shami et al., 2024; Kasenda & Wijayangka, 2019; Lusardi & Mitchell, 2014).
3	Social Entrepreneurship	Social entrepreneurship is the business orientation of MSME actors to create economic value while also providing a social impact for the surrounding community or environment.	<ul style="list-style-type: none"> a. Social objectives in the business mission b. Involvement of local communities in production/marketing c. Environmentally friendly or sustainable business practices d. Reinvestment of profits for social programs e. Commitment to empowerment and inclusivity (Peredo & McLean, 2006)
4	Pentahelix Collaboration	Pentahelix collaboration is a strategic partnership established by MSMEs with five elements: academics, business, community, government, and media, to enhance their competitiveness and business capacity.	<ul style="list-style-type: none"> a. Collaboration with educational/training institutions (academics) b. Cooperation with other companies or business associations c. Community support and involvement in product development d. Access to assistance or programs from the government e. Participation or promotion through mass media/social media (Indrayani & Arman, 2025)

5	Business Innovation	Business innovation is the effort of MSME actors to create or adopt renewals in products, processes, marketing, or business models to enhance their competitive advantage.	<ul style="list-style-type: none"> a. Development of new products or services b. Changes or improvements in production processes c. Innovation in marketing or promotion d. Utilization of digital technology in business e. Adoption of new and adaptive business models (Indrayani & Arman, 2025)
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4. Results and Discussion

4.1 Measurement Model Testing (Outer Model)

4.1.1 Convergent Validity

The results of the loading factors for each indicator show loading factors greater than 0.5 and are significant (p-value < 0.05); therefore, no indicators were removed.

Table 1. Outer Loadings

	Original sample (O)	P values
IB1 <- Business Innovation	0.882	0.000
IB2 <- Business Innovation	0.833	0.000
IB3 <- Business Innovation	0.851	0.000
IB4 <- Business Innovation	0.885	0.000
IB5 <- Business Innovation	0.772	0.000
KP1 <- Pentahelix Collaboration	0.858	0.000
KP2 <- Pentahelix Collaboration	0.881	0.000
KP3 <- Pentahelix Collaboration	0.885	0.000
KP4 <- Pentahelix Collaboration	0.870	0.000
KS1 <- Social Entrepreneurship	0.805	0.000
KS2 <- Social Entrepreneurship	0.879	0.000
KS3 <- Social Entrepreneurship	0.860	0.000
KS4 <- Social Entrepreneurship	0.891	0.000
KS5 <- Social Entrepreneurship	0.862	0.000
KU1 <- MSME Performance	0.783	0.000
KU2 <- MSME Performance	0.851	0.000
KU3 <- MSME Performance	0.829	0.000
KU4 <- MSME Performance	0.790	0.000
KU5 <- MSME Performance	0.827	0.000
LK1 <- Financial Literacy	0.797	0.000
LK2 <- Financial Literacy	0.850	0.000
LK3 <- Financial Literacy	0.822	0.000
LK4 <- Financial Literacy	0.819	0.000
LK5 <- Financial Literacy	0.756	0.000

4.1.2 Discriminant Validity

Discriminant validity is indicated by the Average Variance Extracted (AVE) value for each construct. The AVE values for each variable were greater than 0.5; therefore, the variables used were concluded to be valid.

Table 2. Discriminant Validity

	AVE
Social Entrepreneurship	0.739
MSME Performance	0.667
Pentahelix Collaboration	0.763
Financial Literacy	0.655

Table 2 shows discriminant validity was measured using the Heterotrait–Monotrait Ratio (HTMT) to ensure that theoretically distinct constructs were empirically distinct. HTMT values below the recommended threshold, namely < 0.85 or < 0.90 , indicate that discriminant validity has been achieved.

Table 3. Discriminant Validity – HTMT

	Business Innovation	Social Entrepreneurship	MSME Performance	Pentahelix Collaboration	Financial Literacy
Social Entrepreneurship	0.483				
MSME Performance	0.570	0.559			
Pentahelix Collaboration	0.659	0.722	0.531		
Financial Literacy	0.482	0.487	0.559	0.552	

4.1.3 Composite Reliability

Instrument reliability was tested using two measures: Composite Reliability (CR) and Cronbach's Alpha (CA). A construct is considered reliable if the CR value is > 0.70 and CA values are > 0.70 . The test results show that all constructs have Composite Reliability values ranging from 0.82 to 0.91, while Cronbach's alpha ranges from 0.78 to 0.88. Thus, all research instruments were reliable and consistent in measuring the intended constructs.

Table 4. Composite Reliability

	Cronbach's alpha	Composite reliability (rho_c)
Business Innovation	0.899	0.926
Social Entrepreneurship	0.912	0.934
MSME Performance	0.875	0.909
Pentahelix Collaboration	0.897	0.928
Financial Literacy	0.868	0.905

4.2 Structural Model Testing (Inner Model)

Table 5. R-square

	R-square	
Business Innovation	0.381	Literacy, entrepreneurship, and collaboration variables are able to explain 38.1% of the variance in business innovation
MSME Performance	0.404	Literacy, entrepreneurship, collaboration, and innovation variables are able to explain 40.4% of the variance in performance

The Q-Square test for predictive relevance is 0.631 and lies within $0 < Q^2 < 1$, meaning that the model is improving.

Table 6. Direct Effect Analysis

	Path Coefficient	P values	Description
Financial Literacy → Business Innovation	0.172	0.001	Significant
Financial Literacy → MSME Performance	0.254	0.000	Significant
Social Entrepreneurship → Business Innovation	0.052	0.386	Not Significant
Social Entrepreneurship → MSME Performance	0.264	0.000	Significant
Pentahelix Collaboration → MSME Performance	0.012	0.856	Not Significant
Pentahelix Collaboration → Business Innovation	0.478	0.000	Significant
Business Innovation → MSME Performance	0.277	0.000	Significant

4.3 Uji Mediasi

Table 7. Analysis of Intervening Variable Effects

	Indirect effect	P values	Description
Financial Literacy → Business Innovation → MSME Performance	0.048	0.008	Significant
Social Entrepreneurship → Business Innovation → MSME Performance	0.014	0.395	Not Significant
Pentahelix Collaboration → Business Innovation → MSME Performance	0.132	0.000	Significant

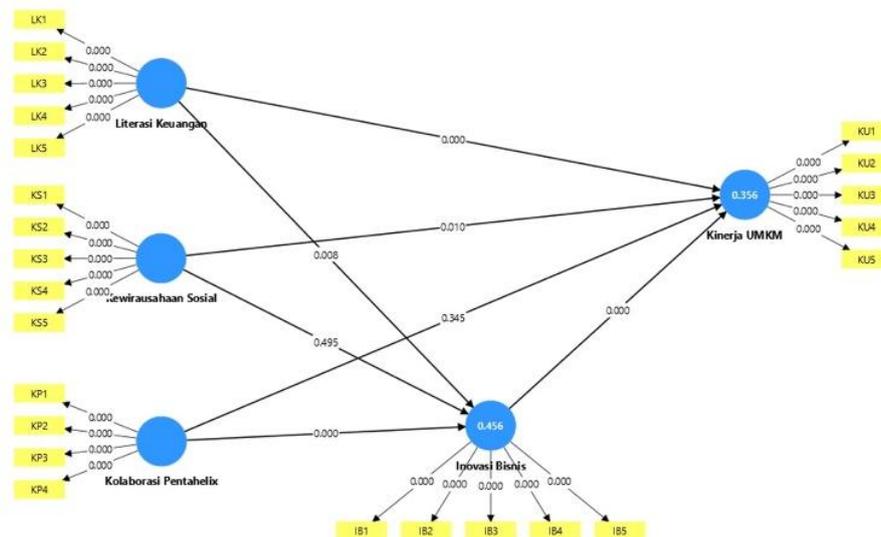


Figure 1. Research model

4.2 Discussion

The respondent profile shows diversity in terms of business type and demographic characteristics. The most dominant business sectors are culinary and trade, followed by handicrafts, processed agriculture, tourism, and small service sectors. This illustrates the structure of MSMEs in Karanganyar, which is largely still based on local consumption, with the potential for wider market development. In terms of business age, approximately 40% of the respondents have been operating for more than five years, indicating a group of MSMEs that are relatively established and able to survive in the long term. Meanwhile, approximately 35% of respondents fall into the category of relatively new businesses, aged less than three years. This group reflects the growth of new entrepreneurial dynamics in the research

area, although they are vulnerable to business failure owing to their limited experience. Overall, the respondent profile indicates that MSMEs in Karanganyar have great potential but face real challenges in terms of financial literacy, innovation, and cross-actor collaboration.

a. The Effect of Financial Literacy on MSME Performance

The results show that financial literacy significantly affects MSME performance. The better MSME actors understand how to manage business finances from record keeping and budget planning to the use of formal financial services the higher the performance achievements, both in terms of sales, efficiency, and business resilience. This finding confirms that financial literacy is a strategic instrument for MSME sustainability in Karanganyar. These results are in line with the findings of [Agyapong and Attram \(2019\)](#); [Aribawa \(2016\)](#); [Kimunduu, Erick, and Shisia \(2016\)](#); [Usama and Yusoff \(2019\)](#) which emphasize financial literacy as an important factor in improving business performance. However, this study differs from [Menike \(2018\)](#) who found an insignificant relationship. Thus, this study adds evidence that financial literacy remains a dominant factor in the context of MSMEs in Karanganyar, even though the findings in the global literature are still mixed.

b. The Effect of Social Entrepreneurship on MSME Performance

The analysis shows that social entrepreneurship significantly affects MSME performance. This means that the social mission adopted by MSMEs such as local community involvement, environmentally friendly practices, or profit reinvestment for social purposes has a tangible impact in the form of customer loyalty, a positive reputation, and social legitimacy that strengthen business competitiveness. This result is consistent with the studies of [Seran \(2019\)](#) and [Widayanti et al. \(2017\)](#), which emphasize that social entrepreneurship enhances the sustainability of community-based businesses. However, this finding is inconsistent with that of [Hoogendoorn et al. \(2019\)](#), who stated that socially motivated entrepreneurs have a lower likelihood of survival. This comparison suggests that in the local context of Karanganyar, social values strengthen business sustainability, particularly due to the culture of mutual cooperation and strong community ties.

c. The Effect of Pentahelix Collaboration on MSME Performance

The study shows that Pentahelix collaboration does not significantly affect MSME performance. This means that although MSME actors have interacted with academics, government, media, and communities, such collaboration has not yet directly improved business performance. This result is not in line with the studies of [Le Roy and Czakon \(2016\)](#) which found that multi-stakeholder collaboration strengthens MSME productivity and competitiveness. This difference can be explained by local conditions, where synergy among the helices is still limited to training or administrative activities and has not yet reached the stage of technology transfer or tangible market expansion. This finding confirms that Pentahelix collaboration in Karanganyar remains a potential, rather than a direct, determinant factor.

d. The Effect of Financial Literacy on Business Innovation

The results show that financial literacy significantly affects innovation. This means that MSMEs with good financial literacy can access funding, manage working capital, and allocate resources for research or the adoption of new technologies. These results are in line with [Adomako et al. \(2016\)](#), [Al-Shami et al. \(2024\)](#) and [Widayanti et al. \(2017\)](#), who emphasized that financial literacy is a key prerequisite for the willingness to innovate. This finding reinforces the fact that without financial literacy, innovation is difficult to realize due to capital constraints and the inability to manage risk.

e. The Effect of Social Entrepreneurship on Business Innovation

The results show that social entrepreneurship has no significant effect on innovation. This means that the social mission of MSMEs in Karanganyar tends to stop at social objectives without encouraging the creation of new products or business models. This result is not in line with [Seran \(2019\)](#), who found that social entrepreneurship can trigger social- and environment-based product innovations. However, this finding is consistent with that of ([Hoogendoorn et al., 2019](#)), who argued that social missions can reduce innovation motivation. Thus, this study indicates that in Karanganyar, social entrepreneurship functions more to build social legitimacy than to drive innovation.

- f. **The Effect of Pentahelix Collaboration on Business Innovation**
The study shows that Pentahelix collaboration significantly affects innovation. This means that although it does not directly impact performance, collaboration among actors (academics, business, government, media, and community) can trigger the emergence of new ideas, production technologies, and marketing strategies. This result is consistent with [Awaluddin et al. \(2016\)](#), [Halibas et al. \(2017\)](#), [Aryanti et al. \(2023\)](#) emphasizing that the benefits of Pentahelix are more appropriately understood as an innovation enabler rather than a direct driver of business performance.
- g. **The Effect of Business Innovation on MSME Performance**
The results show that innovation significantly affects performance. This means that innovations in the form of new products, digitalization, and improvements in production processes contribute significantly to increased sales, efficiency, and MSME resilience. These results are in line with [Indrayani and Arman \(2025\)](#) who emphasized innovation as the link between internal resources and improved performance. This finding strengthens theory that innovation is the main source of economic growth and competition.
- h. **Business Innovation Mediates the Effect of Financial Literacy on MSME Performance**
The results show that innovation partially mediates the effect of financial literacy on firm performance. This implies that literacy improves performance both directly and indirectly through innovation. This result is consistent with [\(Indrayani & Arman, 2025\)](#), who emphasized the role of innovation as a mediator between internal resources and MSME growth. This implies that literacy not only strengthens financial management but also encourages innovation, resulting in a dual impact.
- i. **Business Innovation Mediates the Effect of Social Entrepreneurship on MSME Performance**
The analysis shows that innovation does not mediate social entrepreneurship's effect on performance. This means that the influence of social entrepreneurship is direct, through reputation and social legitimacy, rather than through innovation. This result is not in line with [Seran \(2019\)](#) who found that social missions can generate community-based innovation. However, this result is consistent with the view of [Hoogendoorn et al. \(2019\)](#) that social motivation does not always correlate with innovation. Thus, this finding confirms that in Karanganyar, social entrepreneurship functions more to strengthen social relationships than to generate innovation in the field.
- j. **Business Innovation Mediates the Effect of Pentahelix Collaboration on MSME Performance**
The results show that innovation fully mediates the relationship between pentahelix collaboration and MSME performance. This implies that without innovation, collaboration does not significantly impact performance. This result is in line with [Le Roy and Czakon \(2016\)](#) who emphasized that the benefits of multistakeholder collaboration only emerge when it produces innovation. This finding reinforces the mechanism that pentahelix is an instrument, while innovation is the real bridge toward improving MSME performance.

5. Conclusions

5.1 Conclusion

This study aims to examine the effects of financial literacy, social entrepreneurship, and Pentahelix collaboration on MSME performance, with business innovation as a mediator. Based on the results of the SEM-PLS analysis of 382 MSME respondents in Karanganyar Regency, it was found that financial literacy and social entrepreneurship significantly affect MSME performance. Pentahelix collaboration does not have a direct effect but has a significant indirect effect through business innovation. These results confirm that innovation is a key element that bridges the influence of internal and external factors on MSME performance improvement.

Theoretically, this study extends research based on the Resource-Based View (RBV) and open innovation theory by presenting an integrative model that combines aspects of financial literacy, social orientation, and cross-actor collaboration into a comprehensive framework. The novelty of this study lies in the empirical evidence that cross-helix collaboration is only effective in improving performance when it produces concrete innovation, making innovation a strategic bridge between internal capabilities and external support in building sustainable competitiveness.

Practically, this study provides guidance for MSME actors to improve financial literacy and social entrepreneurship orientation as the main foundation for business decision making. Local governments are advised to strengthen collaborative ecosystems based on the Pentahelix model by establishing innovation hubs, digital mentoring programs, and incentives for business actors who successfully create sustainable innovation. Academics, communities, and media must also play an active role in strengthening networks, applied research, and the publication of local innovations so that collaboration has a real impact on regional economic growth.

From a policy perspective, the results of this study support the direction of national development within the framework of *Asta Cita* and sustainable economic transformation by emphasizing the importance of synergy among stakeholders. Local governments can use this model as a basis for designing inclusive innovation- and digitalization-based MSME empowerment programs, with a focus on financial literacy and productive multistakeholder collaboration.

5.2. Research Limitations

This study is limited by its geographical scope, as it only includes MSMEs from three sub-districts in Karanganyar Regency. The findings may not be fully generalizable to other regions with different MSME characteristics. Additionally, the study does not account for other factors, such as digital technology adoption or access to financing, which may also influence MSME performance.

5.3. Suggestions and Directions for Future Research

Future research should consider expanding the scope to include MSMEs from different regions with varying characteristics to gain a more comprehensive understanding of the factors affecting MSME performance. The inclusion of variables like digital technology adoption and access to financing could provide a more nuanced analysis. Furthermore, a longitudinal study is recommended to explore the causal relationships between variables and to better understand the long-term dynamics of MSME development.

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Author Contributions

RD conceptualized the study, designed the research methodology, and supervised data collection and analysis. RAH was responsible for data collection and analysis, as well as manuscript drafting. KHT contributed to the analysis, interpretation of results, manuscript revision, and final approval. All authors reviewed and approved the final manuscript.

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