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Developing a Comprehensive Digital Ecosystem Model to Enhance Competitive Advantage in Government-Fostered MSMEs

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A B S T R A C T
In response to the growing technological disruption, micro, small, and medium enterprises (MSMEs) require a comprehensive digital ecosystem as a crucial strategy to enhance their capabilities and competitiveness in a dynamic market. This study aims to develop and empirically validate a comprehensive digital ecosystem model grounded in the Resource-Based View (RBV) theory to enhance the competitive advantage of government-assisted MSMEs through optimizing the role of marketing performance. Based on the RBV theory, the research focuses on an in-depth analysis of four key elements of the MSME digital ecosystem: digital platform adoption capability, business incubator program effectiveness, MSME digital literacy, and collaboration capability. The research was conducted using a survey method on 238 MSME respondents from various sectors in Central Java, Indonesia. The research data were analyzed using Structural Equation Modeling (SEM-AMOS). The results prove that digital platform adoption, business incubator programs, digital literacy, and collaboration capabilities significantly affect MSMEs' marketing performance and competitive advantage. The implications of this research emphasize the importance of building a comprehensive MSME digital ecosystem by adopting technology, business incubator programs, digital literacy, and MSME collaboration capabilities to improve MSME competitiveness. This research contributes to the marketing management literature by expanding the application of the Resource-Based View theory in the context of MSMEs.

Keywords: Adoption of digital platforms; Business incubator program; Collaboration capability; Competitive advantage; Digital literacy for MSMEs

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) are the backbone of the economy that contribute significantly to job creation, poverty alleviation, and equitable economic development (Haqqi, 2023). Nevertheless, MSMEs frequently face various constraints, barriers, and weaknesses such as limited access to capital, technology adoption, and wider market reach (Morgan & Anokhin, 2023). Hence, comprehensive efforts are required to strengthen the competitiveness and sustainability of MSMEs in Indonesia. In this digital transformation era, MSMEs also face major challenges in adopting technology and competing in the global market (Saputra et al., 2024). Although the potential for MSME growth through digitalization is enormous, some still experience difficulties optimally utilizing these opportunities (Saputra et al., 2024). This is due to various factors, including limited access to technology (Valdez-De-Leon, 2019), a lack of understanding of digital strategies (Zaoui & Souissi, 2020), and a lack of adequate digital ecosystem support (Valdez-

De-Leon, 2019). It is essential for SMES to have adaptive and digital-based capabilities so that they have a great opportunity to improve their business performance (Saputra et al., 2024).

As the spearhead of MSME development, local governments have a strategic role in encouraging the digitalization of small and medium enterprises (Mukhopadhyay & Bouwman, 2019). However, the effectiveness of coaching programs is often constrained by the limitations of a comprehensive and tested digital ecosystem model. The MSME digital ecosystem consists of several interrelated key elements: 1) Digital platform adoption, which enables MSMEs to expand their market reach (Andriani et al., 2020; Marzi et al., 2023); 2) Business incubator programs, which provide training and mentoring in technology adoption (Al-Mubaraki & Busler, 2011; Hong & Lu, 2016); 3) Digital literacy of MSMEs, which is the foundation of businesses' ability to utilize technology (Ollerenshaw et al., 2021); and 4) Collaboration capabilities, to open up access to a wider market (Saputra & Pratomo, 2023). Although each element has been identified as an important factor, no comprehensive research has quantitatively measured how the interaction between these elements affects the overall competitiveness of MSMEs. This study is, thus, motivated by the research gap in research on the factors driving competitive advantage in the MSME sector, so there is a need for a follow-up study to explain the process of the relationship between variables in increasing competitive advantage for MSMEs.

For that reason, this study aims to develop and empirically test a comprehensive digital ecosystem model based on the RBV theory that can increase the competitiveness of MSMEs, fostered by local governments through optimizing the role of marketing performance. The researchers use the RBV theory approach since it is relevant to encourage the competence and ability of MSME actors to respond to current market developments that are very dynamic. Thus, the novelty of this study is developing a new conceptual model that focuses on increasing the competitive advantage of MSMEs with a comprehensive, effective, and implementable digital ecosystem approach to improve the competitiveness of MSMEs assisted by local governments.

LITERATURE REVIEW

The main approach to fill this paper's research gap and contribution is referring to the Resource-Based View (RBV) theory. The following is a general explanation of the relevance of the RBV concept in building the conceptual framework of this study.

Resource-Based View Theory

The basic assumption in the Resource-Based View (RBV) theory is how a company can compete with other companies by managing its resources to have a competitive advantage (Barney, 1991; Sune & Gibb, 2015). For that, dynamic capability can be interpreted as the company's ability to integrate, build, and reconfigure internal and external competencies to deal with a rapidly changing environment (Teece et al., 1997). The advantages of resources, both tangible and intangible, as a determining factor of a company's competitive advantage have been well discussed by researchers. Dynamic resource-based capabilities allow companies to provide the best service to their customers continuously.

The Resource-Based View theory is one of the strategic approaches that focuses on utilizing the company's internal resources as a major factor in creating sustainable competitive advantage. This approach emphasizes that competitive advantage is determined not only by external conditions or market position but also by the unique capabilities and resources possessed by the company (Kaufman, 2015). In the context of MSMEs, RBV is highly relevant because it provides a foundation for exploring the internal potential of MSMEs as a basis for building digital and innovative strategies that are adaptive to the development of the business environment.

According to RBV, resources can be grouped into three main categories: physical, human, and organizational. To create a sustainable competitive advantage, these resources must meet the VRIO criteria: Valuable, Rare, Inimitable, and Organized. In the context of MSMEs, mastery of digital technology, the ability to innovate, business networks, and managerial capacity can be categorized as strategic resources if they meet these four characteristics.

The increasingly massive digital transformation requires MSMEs to develop a comprehensive digital capacity (Saputra et al., 2024). In this case, RBV views that adopting digital technology is not only a matter of the availability of tools or systems but also includes internal capabilities in effectively integrating technology into business processes. Therefore, developing a comprehensive digital ecosystem is vital as a means to optimize the utilization of internal resources owned by MSMEs. The digital ecosystem includes not only technological infrastructure but also interactions between business actors, supporting institutions, digital platforms, and access to market information and financing.

Furthermore, RBV also emphasizes the importance of dynamic capabilities, which are the organization's ability to adapt, integrate, and reconfigure internal resources in response to changes in the external environment (Maijanen, 2022). In the context of MSMEs, dynamic capabilities include the ability to adopt new technologies, develop digital business models, expand strategic partnership networks, and utilize data and information for more informed decision-making. By building a digital ecosystem model that supports the formation of dynamic capabilities, MSMEs can increase flexibility and responsiveness to market dynamics, thereby strengthening their competitiveness.

In addition, RBV views that collaboration and strategic partnerships in the digital ecosystem can strengthen the internal resource position of MSMEs. Through partnerships with other industries, government, academia, and technology providers, MSMEs can access additional resources such as knowledge, technology, and capital that were previously difficult to reach (Saputra & Pratomo, 2023). Synergies in the digital ecosystem enable value co-creation and information exchange that accelerate the process of innovation and technology diffusion (Franklin & Marshall, 2019).

Thus, RBV provides a solid theoretical foundation in designing a Comprehensive Digital Ecosystem Model for MSMEs. This model focuses on identifying and developing strategic resources and capabilities owned by MSMEs to encourage the achievement of sustainable competitive advantage. In an increasingly digitized business environment, internal strengthening through a comprehensive digital ecosystem is crucial for MSMEs to survive and grow. Hence, RBV is not only an analytical framework but also a strategic guide in holistic digital transformation efforts for MSMEs.

MSMEs Digital Ecosystem

The MSMEs digital ecosystem is an environmental setting that supports the transformation and strengthening of MSME competitiveness through digital technology's strategic and sustainable use. This ecosystem is not only related to the presence of digital infrastructure but also includes various key elements that strengthen the internal capacity of MSMEs in facing the dynamics of the digital economy (Haqqi, 2023). In the context of this research, the MSME digital ecosystem is built on four main pillars: digital platform adoption capabilities, business incubator programs, digital literacy, and collaboration capabilities. The integration of these components enables the creation of synergy and sustainably added value. Therefore, the development of digital ecosystems cannot be done partially, but must be designed as a whole in order to become a strategic foundation for MSMEs in building competitive advantages in the digital economy era (Barykin et al., 2020).

Digital platform adoption capability refers to the extent to which MSMEs can utilize various technology platforms, such as e-commerce, social media, and digital business applications, to support operations, marketing, and product distribution effectively. Meanwhile, business incubator programs play a role in strengthening institutional support through training, mentoring, and access to business networks that can accelerate the growth of digital-based MSMEs.

Digital literacy is also an important foundation in this ecosystem because it concerns the ability of MSME actors to understand, access, and manage information technology intelligently and productively (Valdez-De-Leon, 2019). Meanwhile, MSME collaboration capabilities demonstrate the capacity of small businesses to build synergies with fellow business actors, educational institutions, government, and the private sector in a digital context. The digital ecosystem provides a conducive environment for MSMEs to grow and compete through access to market information, increased operational efficiency, ease of product promotion, and expansion of customer reach (Senyo et al., 2019). In this context, digital technology acts as an enabler that strengthens the position of MSMEs in the value chain, accelerates the adoption of innovations, and improves adaptability to market changes.

The Influence of Digital Platform Adoption on MSME Marketing Performance

Digital platform adoption capability can be interpreted as the capability of MSMEs in understanding, selecting, and strategically utilizing various digital platforms to support business activities, especially in the context of marketing (Khan & Tao, 2022). Digital platforms such as marketplaces, social media, customer relationship management (CRM) applications, and data-driven marketing systems provide important infrastructure for MSMEs to reach a wider market at a relatively low cost. In the context of digitalization, this capability reflects not only technological readiness but also managerial and organizational readiness to transform business processes as a whole (Cenamor et al., 2019). Therefore, adopting digital platforms is not merely an implementation of technology, but also a reflection of a marketing paradigm shifts towards a technology- and data-driven approach.

Theoretically, the Resource-Based View (RBV) approach emphasizes that sustainable competitive advantage comes from managing internal resources that are valuable, rare, inimitable, and organizationally embedded. In this case, the ability to adopt digital platforms can be categorized as a strategic resource if it can create added value in the form of improved

marketing performance. Digital platforms provide advantages regarding consumer data accuracy, marketing communication effectiveness, and product distribution speed and scalability. With optimal utilization of digital technology, MSMEs have the opportunity to create more intensive and personalized interactions with consumers, increase engagement, and build customer loyalty through digitally relevant content and services (Jun et al., 2022).

The marketing performance of MSMEs, which can be measured through dimensions such as increased sales volume, market expansion, strengthened brand awareness, and customer satisfaction, is strongly influenced by the effectiveness in utilizing digital marketing channels. The higher the ability of MSMEs to adopt and manage digital platforms, the greater the potential for achieving effectiveness and efficiency in marketing activities (Cenamor et al., 2019). This is supported by findings in various empirical studies revealing a positive relationship between the adoption of digital technology and improved marketing performance, especially in the MSME sector with limited access to conventional markets.

Various previous studies have shown that the use of digital technology has a positive influence on improving marketing performance, especially among MSMEs. Marketing performance is seen not only from sales achievements but also from how effectively MSMEs build relationships with target markets through digital channels. Therefore, the higher the ability of MSMEs to adopt and manage digital platforms, the greater the opportunity to achieve superior marketing performance. Based on these descriptions, the first hypothesis proposed in this study is:

H1: The ability of MSMEs to adopt digital platforms positively affects MSME marketing performance.

The Effect of Business Incubator Program on Marketing Performance of MSMEs

A business incubator program is a mentoring mechanism designed to assist MSMEs in building their business capacity, from managerial, financial, marketing, technological, and business networking. Business incubators provide various strategic services such as training, mentoring, access to partner networks, physical facilities, and support for access to financing. The main function of the incubator is not only as a learning platform but also as a catalyst that accelerates the readiness of MSMEs to compete in the market, including in carrying out digital transformation and adopting a more modern and technology-based marketing approach (Akpoviroro et al., 2021).

In the context of marketing, incubation programs can significantly impact increasing the knowledge and skills of MSME actors in developing more effective marketing strategies (Akpoviroro et al., 2021; Lesáková, 2012). Through training facilitated by incubators, businesses are equipped with insights into consumer behavior, the use of digital media for promotion, branding strategies, and market analysis. Incubators are also often the link between MSMEs and professional mentors, educational institutions, and large corporations, which can open new market access and strengthen MSME brand positioning (Lose & K. Tengeh, 2016). In other words, incubator programs create a learning and experimental environment that can encourage innovation in marketing approaches.

Theoretically, incubator support can be understood as a form of strengthening organizational resource capacity, in accordance with the RBV approach. Although incubators are not internal resources, their presence enables MSMEs to develop strategic

capabilities that are valuable and organized. In this case, the incubation program plays a role in increasing the adaptability of MSMEs to market changes, strengthening the confidence of business actors, and directing them to data-based marketing practices and innovation (Lose & K. Tengeh, 2016; Wonglimpiyarat, 2016). This suggests that incubator programs have a leveraging role in creating competitive advantage through improved marketing performance.

In line with that, several studies have demonstrated that MSME participation in incubator programs positively correlates with improved business performance, including in the marketing aspect (Akpoviroro et al., 2021). Incubated MSMEs tend to have more structured marketing strategies, more effective use of promotional media, and clearer market orientation than non-incubated MSMEs. With this support, MSMEs are better equipped to develop marketing campaigns, manage customer relationships, and respond quickly to market dynamics. Based on these descriptions, the second hypothesis proposed in this study is:

H2: Business incubator programs have a positive effect on MSME marketing performance.

The Effect of Digital Literacy for MSMEs on MSME Marketing Performance

Digital literacy for MSMEs is a set of competencies that includes the ability to access, understand, evaluate, and utilize digital technology effectively to support business processes, especially in the marketing aspect (Ojobo et al., 2023). This literacy involves not only the technical ability to use digital devices and applications but also a strategic understanding of how technology can be used to create added value in interactions with customers, build brand image, and expand market reach. In the context of a highly competitive and dynamic digital economy, digital literacy is the main foundation for MSMEs to compete equally with large-scale businesses.

From an RBV theory perspective, digital literacy can be categorized as a strategically valuable organizational capability. When MSMEs have good digital understanding and skills, they can better navigate various digital marketing platforms, manage consumer data, create relevant and engaging content, and use digital metrics to evaluate the effectiveness of marketing campaigns (Saputra et al., 2024). These capabilities enable MSMEs to make data-driven decisions, improve customer communication efficiency, and build long-term relationships oriented towards consumer satisfaction and loyalty (Ojobo et al., 2023). Thus, digital literacy is not just a tool, but a strategic enabler in improving overall marketing performance (Krajčík et al., 2023).

Several empirical studies also confirm that a high level of digital literacy in MSME actors directly contributes to improved marketing performance by increasing sales, expanding the market, and strengthening brand positioning (Krajčík et al., 2023). Digitally literate MSMEs are faster in adopting new technologies, more adaptive to market trends, and more innovative in managing digital marketing strategies. Conversely, low digital literacy is an obstacle to utilizing online market opportunities. Based on these descriptions, the third hypothesis proposed in this study is:

H3: Digital literacy owned by MSME actors positively affects MSME marketing performance.

The Effect of Collaboration Capability on MSME Marketing Performance

Collaboration capability refers to the capacity of MSMEs to build, maintain, and manage productive partnership relationships with various parties, both internal and external (Saputra & Pratomo, 2023). Collaboration can include partnerships with fellow MSME actors, educational institutions, government, financial institutions, technology providers, and customers. In the context of marketing, collaboration opens opportunities for MSMEs to share resources, share market information, conduct joint promotions, develop products co-creatively, and reach consumers with a more synergistic approach (Nuryakin, 2024). The ability to collaborate allows MSMEs to overcome their individual limitations and create value through the power of networks (Nuryakin, 2024).

From the Resource-Based View (RBV) perspective, collaboration capabilities can be seen as relational capabilities that not only reflect technical capabilities but also include aspects of trust, communication, coordination, and flexibility in interacting across entities. Effective collaboration provides access to broader market knowledge, accelerates information flow, and increases flexibility in developing marketing strategies more responsive to consumer dynamics (Nuryakin et al., 2021). MSMEs with high collaborative capabilities can more quickly adjust to changes in the external environment, capitalize on shared opportunities, and develop a community- or ecosystem-based marketing approach oriented towards sustainability (Chi et al., 2018).

Various studies have revealed that collaborative capabilities contribute to improved marketing performance, especially through increased promotional effectiveness, broader market penetration, and strengthened brand appeal. MSMEs that actively build collaborations tend to be more innovative in marketing campaigns and have wider market access than businessmen who run alone. Therefore, the ability to collaborate is one of the strategic assets in improving the marketing performance of MSMEs amid increasingly complex competition challenges. Based on these arguments, the fourth hypothesis proposed is:

H4: The ability of MSME actors to collaborate positively affects MSME marketing performance.

The Effect of MSME Marketing Performance on MSME Competitive Advantage

Marketing performance reflects the effectiveness and efficiency of marketing activities carried out by MSMEs in achieving their market objectives (Davcik & Sharma, 2016). This performance is usually measured through various indicators such as increasing sales volume, market share, customer loyalty, new consumer acquisition, and strengthening brand awareness. In the context of MSMEs, marketing performance is strongly influenced by the ability of business actors to recognize market needs, develop appropriate promotional strategies, and use distribution and communication channels relevant to target consumers. Good marketing performance not only impacts short-term financial aspects but also determines the position of the business in a competitive market ecosystem (Saputra et al., 2024).

Based on the RBV approach, superior marketing performance is the result of managing strategically valuable resources and capabilities. When MSMEs can carry out marketing functions effectively, whether through digital marketing, the right segmentation strategy, or

collaboration in promotion, this performance becomes an internal strength that supports the achievement of competitive advantage (Saputra et al., 2024). Competitive advantage itself refers to the ability of MSMEs to offer higher value than competitors in terms of product quality, price, customer service, and brand differentiation (Cuthbertson & Furseth, 2022). Marketing performance is the foundation that forms positive consumer perceptions and strengthens the competitiveness of MSMEs.

Empirically, a number of studies have uncovered a positive and significant relationship between marketing performance and competitive advantage, especially in the MSME sector, which relies heavily on image, loyalty, and long-term relationships with customers. When MSMEs consistently improve their marketing performance, they can build strong positioning, maintain a loyal customer base, and overcome competitive pressures from the market. Therefore, the fifth hypothesis of this study is:

H5: MSMEs' marketing performance has a positive effect on competitive advantage.

Figure 1 is the empirical model designed in this study.

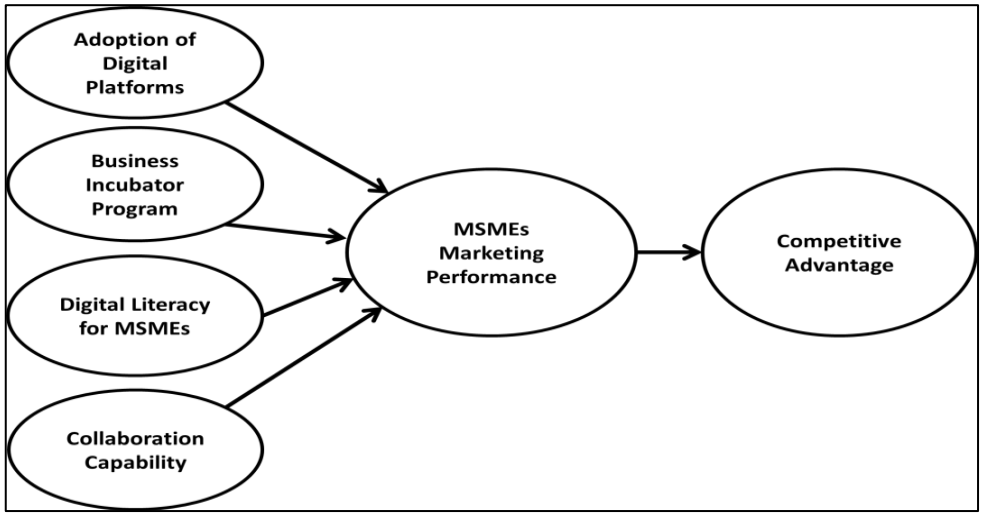

Figure 1. Empirical Research Model

RESEARCH METHOD

Sample and Data Collection

This quantitative study employed a survey method, recruiting respondents from government-assisted MSMEs in three districts in Central Java (Purworejo, Magelang, and Kebumen). The questionnaire was distributed to 250 respondents, but 12 incomplete answers were not included in the data processing process. Hence, the sample size in this study was 238. The sample size in this study is considered adequate for analysis using the Structural Equation Modeling (SEM) method with AMOS. According to Hair et al. (2010), the recommended minimum sample size for SEM is 5 to 10 times the estimated parameters, or at least 200 respondents for models with moderate complexity. Given that this study included six latent constructs and multiple indicators, the sample of 238 met the statistical requirements, ensuring stable, reliable, and generalizable parameter estimates. Since the sampling technique was carried out by purposive sampling, the criteria for respondents in this study were MSME actors whom the local government assisted.

Measurement Instrument

This study used six variables: adoption of digital platforms, business incubator program, digital literacy for MSMEs, collaboration capability, MSMEs' marketing performance, and competitive advantage. The instruments or measuring instruments in this study were adopted and adapted from instruments used in previous research. Each indicator and statement item in this study was measured using a scale from 1 (strongly disagree) to 5 (strongly agree).

Table 1. Loading Factor, Average Variance Extracted, and Composite Reliability

Variables and Indicators	Loading Factor
Adoption of Digital Platforms (AVE = 0.588; CR = 0.878)	
Frequency of digital platforms used in business activities	0.745
Types of digital platforms that have been adopted	0.788
Level of convenience and ease of digital platforms	0.776
Impact of digital platforms on increasing business process efficiency	0.760
Availability of support and training related to platform use	0.775
Business Incubator Program (AVE = 0.581; CR = 0.874)	
MSME access to incubator program facilities	0.718
Guidance and consultation provided by mentors	0.800
The impact of the incubator program on business growth	0.791
How well does the incubator program help MSME participants	0.771
Participants' assessment of managerial skills development	0.726
Digital Literacy for MSMEs (AVE = 0.629; CR = 0.895)	
Level of understanding in using digital devices	0.768
Knowledge of data protection and digital security	0.846
Use of social media in marketing	0.778
Ability to use digital applications	0.794
Level of understanding of the latest technological trends	0.777
Collaboration Capability (AVE = 0.553; CR = 0.832)	
Ability to convey information	0.721
SMEs can coordinate to achieve common goals.	0.787
Ability to work together collectively	0.705
Flexibility and readiness of SMEs to adapt	0.759
SMEs Marketing Performance (AVE = 0.674; CR = 0.892)	
Increased sales volume	0.817
Growth in the number of customers	0.835
Expansion of sales area coverage	0.815
Increased sales of product variants	0.816
Competitive Advantage (AVE = 0.612; CR = 0.908)	
MSMEs create innovations that differentiate their products from competitors.	0.840
Customer satisfaction levels with product or service quality are higher compared to competitors.	0.812
MSMEs' ability to manage resources efficiently	0.862
Prices of products/services offered are better than competitors.	0.861

The Structural Equation Modeling-AMOS (SEM-AMOS) approach was used to test the instruments and hypotheses built in this study (Table 1). SEM analysis is generally carried out through two stages: measurement and structural models. Before being used as a measurement tool for this research, the instrument was first tested for validity and reliability. The validity test is carried out to determine the ability of the instrument to measure the variables under study. While qualitative measurements look at face and content validity, quantitative measurements are carried out by confirmatory factor analysis (CFA). The results of instrument testing can be seen in the following table.

CFA testing is used to analyze the measurement model to test the relationship between latent and manifest variables (Williams et al., 2004). A measurement model was conducted to measure convergent validity (factor loading and average variance extracted), discriminant validity and reliability (composite reliability). Williams et al. (2009) explain that a good factor loading value must be above 0.5 with a critical ratio value of more than 1.96. Besides that, a good instrument must meet the minimum requirements for the average variance extracted (AVE) value above 0.5 and the composite reliability (CR) value above 0.7. In Table I above, all construct indicators had factor loading values of more than 0.5; this indicates that the measurement model has good convergent validity. All tested constructs also show relatively high AVE values as they have minimum values above 0.5.

The construct reliability (CR) value of the ADP variable shows 0.878, BIP 0.874, DLM 0.895, CC 0.832, MP 0.892 and the CR value of the AC construct is 0.908, so it can be concluded that all exogenous and endogenous constructs in this study have good internal consistency or reliability. Based on the results in Table 1, all factor loadings, AVE, and composite reliability values are above the required, so it can be concluded that the instrument is valid and reliable.

The instrument test results also explain that the instrument has met discriminant validity. Discriminant validity measures how far a construct truly differs from others (Malhotra, 2014). Discriminant validity can be tested by comparing the square root of the AVE with the correlation between variables. In this research, all constructs had a high discriminant validity value because the AVE square root value was above the correlation value between these constructs. Therefore, it can be concluded that overall, the latent constructs of this study are quite unique, have distinctiveness, and can capture the measured phenomena.

The test results of the data used in this model showed a positive determinant of the sample covariance matrix score of 0.020. These results indicate that the data used to test the model is free from multicollinearity and singularity problems. Multicollinearity and singularity testing are also done by comparing exogenous variables' correlation values. A high level of correlation (0.9 or more) between indicators and between exogenous variables signals the presence of multicollinearity and singularity (Ferdinand, 2006). The correlation test between exogenous variables can be seen in the following table.

Based on Table 2, it can be seen that the coefficient correlation between exogenous constructs was low (far below 0.9). The correlation value suggests no evidence of multicollinearity and singularity in the variables tested in this study.

Table 2. Correlation between Exogenous Constructs

Correlation between Independent Variables			Estimate
Adoption Digital Platform	↔	Business Incubator Program	0.404
Digital Literacy MSMEs	↔	Business Incubator Program	0.334
Digital Literacy MSMEs	↔	Collaboration Capability	0.270
Digital Literacy MSMEs	↔	Adoption Digital Platform	0.310
Adoption Digital Platform	↔	Collaboration Capability	0.161
Collaboration Capability	↔	Business Incubator Program	0.238

RESULTS AND DISCUSSION

Results

The data analysis process to test the hypothesis in this study used Structural Equation Modeling with the AMOS program (Table 3). Figure 2 is the structural model tested in this study.

Table 3. Goodness of Fit Model Analysis

Goodness of fit index	Result	Meaning
Cmin/DF	1.126	Good Fit
NFI	0.909	Good Fit
IFI	0.989	Good Fit
GFI	0.903	Good Fit
TLI	0.987	Good Fit
CFI	0.989	Good Fit
RMSEA	0.023	Good Fit

Based on the AMOS full model output image presented in Figure 2, the data processing results showed a good goodness of fit model (GoF) value, with GoF parameter scores mostly meeting the rule of thumb required by statistical procedures. Model feasibility testing in this study has been well supported, with good CFI values (0.989), NFI 0.909, TLI 0.987, GFI 0.903, and RMSEA 0.023. Thus, the model has met a nice goodness of fit.

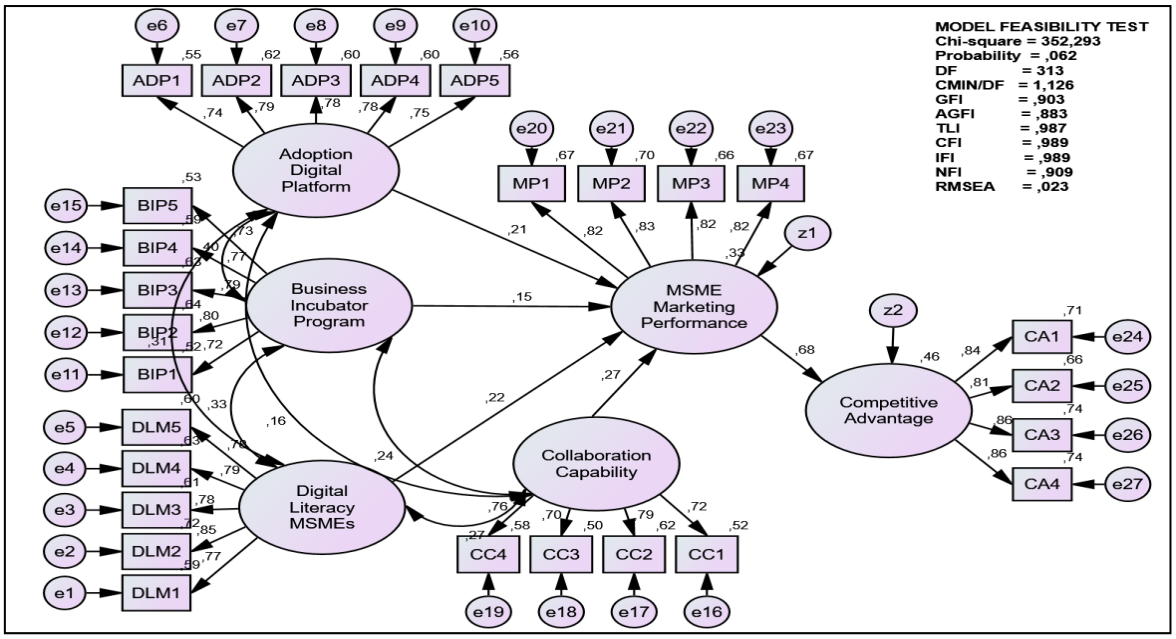

Figure 2. Full Structural Model Analysis

Furthermore, the results of hypothesis testing by analyzing the significance of the estimated value, critical ratio, and probability value in the regression weight and standardized regression weight outputs are presented in Table 4. Based on the results shown in Table 4, the critical ratio values for H1, H2, H3, H4, and H5 were greater than the cut-off value of 1.96, with significant probabilities lower than 5%. Hence, the conclusion is that all hypotheses are accepted or confirmed by the field data.

Table 4. Hypothesis Testing Results

Hypothesis	Construct	Estimate	S.E.	C.R.	P	Result
H1	ADP →SMP	0.255	0.080	2.795	0.005	Supported
H2	BIP → SMP	0.187	0.091	2.059	0.039	Supported
H3	DLM → SMP	0.249	0.081	3.068	0.002	Supported
H4	CC →SMP	0.329	0.088	3.748	***	Supported
H5	SMP →CA	0.835	0.088	9.533	***	Supported

ADP: Adoption Digital Platforms; BIP: Business Incubator Program; DLM: Digital Literacy for MSMEs; CC: Collaboration Capability; SMP: MSMEs Marketing Performance; CA: Competitive Advantage.

***) Significant ≤1% ; **) Significant ≤5%

Discussion

The results of this study indicate that all hypotheses are supported. This study proves that the better MSME actors adopt digital platforms, participate in business incubator programs, improve digital literacy, and engage in collaboration, the better their MSME marketing performance will be. MSME marketing performance is also proven to play an important role in increasing the competitive advantage of MSMEs.

The results of testing the first hypothesis reveal that the adoption of digital platforms by MSME actors significantly improves MSME marketing performance. In other words, the higher the level of adoption of digital platforms in MSME business activities, the more effectiveness of their marketing strategies increases. Digitalization in marketing allows MSMEs to reach a wider market, improve interactions with customers, and optimize the distribution of products and services more efficiently. This result also aligns with previous research, which confirms that using digital technology provides a competitive advantage for small and medium businesses through operational optimization and ease of online promotion and transactions (Cenamor et al., 2019; Jun et al., 2022).

The results also indicate that easy access to various digital platforms and the availability of training for MSME actors play an important role in improving marketing performance. Proper adoption of digital technologies not only expands market coverage but also improves customer satisfaction through more responsive and efficient services. In addition, flexibility in adopting various digital features such as social media, e-commerce, and business management applications has a positive impact on increasing sales volume and customer loyalty. Thus, this study confirms that digitalization is a key factor in MSME marketing strategies, and efforts to improve digital literacy and access to technology should continue to be encouraged to optimize the benefits of adopting digital platforms in MSME business management.

Additionally, the results of this study prove that the better MSME actors are at making adjustments and adopting the utilization of various available digital platforms, the more it will improve the marketing performance of MSMEs. The results of this study also verify that the better the availability of various digital platforms that make it easier for MSME actors to sell and promote their products, the better the performance of these MSME actors will be. The ability to utilize various digital and internet facilities will also make it easier for MSMEs to retain customers and improve their performance (Goldring, 2015). The ease with which companies adapt to customers will make it easier for entrepreneurs to maintain and increase company growth.

The results of testing the second hypothesis demonstrate that the business incubator program organized by the government significantly influences the marketing performance of MSMEs. Thus, the more effective the business incubator program is provided to MSMEs, the greater the impact on improving their marketing strategies. Business incubators act as facilitators that provide access to training, guidance, and mentoring in digital marketing, business management, and business network development. Through this program, MSMEs can better understand modern marketing techniques, market penetration strategies, and more optimal use of various digital marketing channels.

Moreover, the success of the business incubator program is also supported by mentoring and business consultations that encourage MSME actors to implement more innovative and adaptive marketing strategies to market changes. The program not only provides insights into digital marketing strategies but also assists MSMEs in building partnerships with various stakeholders, such as technology providers, financial institutions, and potential markets. With increased marketing capacity through business incubators, MSMEs can improve their competitiveness, expand their customer networks, and optimize market expansion opportunities more effectively. Therefore, the findings of this study confirm that well-designed business incubators by the government have a strategic role in encouraging MSMEs to be more competitive in the digital era (Akpoviroro et al., 2021; Lose & K. Tengeh, 2016).

The results of testing the third hypothesis ascertain that digital literacy owned by MSME actors has a significant effect on improving MSME marketing performance. In other words, the higher the level of digital literacy of MSME actors, the better their marketing performance. Digital literacy makes MSMEs more proficient in using various digital platforms, managing customer data, and implementing technology-based marketing strategies more effectively. A good understanding of the use of social media, e-commerce, and marketing analytics software allows MSMEs to increase product visibility, reach a wider market, and improve interactions with customers in a more personalized and efficient manner.

In addition, strong digital literacy helps MSMEs self-manage marketing campaigns, optimize digital marketing content, and utilize customer data to design more targeted promotional strategies. With adequate digital skills, MSMEs can develop a competitive advantage through marketing innovations, such as algorithm-based advertising, market trend analysis, and customer service automation. The results of this study confirm that digital literacy is not only a technical skill but also a strategic asset that supports the growth and sustainability of MSMEs in the digital era (Ojobo et al., 2023). Therefore, improving digital literacy through continuous training and mentoring is crucial in strengthening MSME competitiveness and encouraging achieving more optimal marketing performance.

The results of testing the fourth hypothesis uncover that collaboration capability owned by MSME actors significantly influences MSME marketing performance. This means that the higher the ability of MSMEs to collaborate with various parties, the higher the effectiveness and achievement of their marketing performance. Collaboration capability allows MSMEs to expand market access, improve operational efficiency, and develop more innovative marketing strategies through synergies with business partners, such as suppliers, distributors, business communities, and digital platforms. In an increasingly digitally

connected business ecosystem, MSMEs that can collaborate with various actors in the supply chain and marketing will find it easier to reach new customers and increase the loyalty of existing customers.

Besides, effective collaboration also allows MSMEs to share resources, share knowledge, and adopt best business practices that can strengthen their competitiveness in the market. For example, collaboration with marketplaces and logistics service providers can help MSMEs optimize the distribution of their products at a more efficient cost, while partnerships with business communities or business associations can open up wider networking opportunities. The ability to communicate effectively, build trust with business partners, and adapt to the dynamics of collaboration are key factors in improving MSME marketing success. The results of this study reinforce the view that in a competitive digital era, marketing success depends not only on a company's internal strategy but also on the extent to which MSMEs can build and utilize productive collaboration networks to create greater added value for their business (Saputra et al., 2024).

The results of testing the fifth hypothesis verify that MSME marketing performance has a very significant influence on increasing the competitive advantage of MSMEs. Optimal marketing performance allows MSMEs to increase sales volume, expand market share, and strengthen brand positioning amidst industry competition. Excellence in marketing not only impacts increasing revenue but also creates product differentiation and customer loyalty, which are the main keys to maintaining business competitiveness in the long term. In the digital era, MSMEs that can effectively implement technology-based marketing strategies have a greater chance of surviving and growing than those who still rely on conventional marketing methods.

Furthermore, good marketing performance reflects the ability of MSMEs to understand market needs, innovate promotional strategies, and utilize various distribution channels to reach customers more efficiently. The competitive advantage gained from superior marketing performance comes not only from an increase in the number of customers but also from the ability of MSMEs to provide different added value compared to competitors. This can be achieved through product innovation, better service offerings, and competitive pricing. In addition, MSMEs with strong marketing strategies can better adapt to market dynamics and changing consumer trends, making them more resilient in facing business challenges. Thus, the results of this study further confirm that optimal marketing performance is not only a tool to increase sales but also a key foundation in building a sustainable competitive advantage for MSMEs (Cuthbertson & Furseth, 2022; Saputra et al., 2024).

The construction of the model built in this study is proven to overcome the gaps in previous research results, explaining strategies to improve marketing performance and competitiveness of MSMEs more comprehensively. This research provides empirical evidence that MSME actors must improve their digital platform adoption capabilities, business incubator programs, digital literacy, and collaboration capabilities to improve MSME marketing performance and competitiveness.

Theoretical Implications

This research provides a theoretical contribution in developing Resource-Based View (RBV) studies with a digital-based approach in the context of MSMEs. The finding that digital capabilities, incubation programs, digital literacy, and collaboration can improve marketing performance, which in turn drives competitive advantage, expands the scope of RBV, which was previously more dominantly applied to large companies. This research confirms that intangible capabilities such as literacy and collaboration can also be a source of sustainable competitive advantage. The digital ecosystem model developed can be a new theoretical framework for analyzing MSMEs' competitiveness in the evolving digital transformation era.

This research makes a theoretical contribution by enriching the understanding of how key factors, such as digital platform adoption, business incubator programs, digital literacy, and collaboration capabilities, affect MSME competitiveness through marketing performance as a mediating variable. The results of this study strengthen the theory of strategic marketing and digital transformation in the context of MSMEs, showing that digitalization and business collaboration do not necessarily improve competitiveness without marketing strategy optimization. These findings support the resource-based view (RBV) theory-based approach, which states that competitive advantage can be achieved through a combination of appropriate resource utilization and adaptation to changes in the business environment. In addition, this research provides a new perspective in the study of MSME digital ecosystems by emphasizing the importance of the digital marketing ecosystem as a link to achieving more competitive MSME business competitiveness.

The originality of this research lies in exploring new concepts and constructs through a synthesis process of theories in the relevant marketing field, and the results of a study of empirical evidence from previous studies. The conceptual model of this research can be used as an important reference in modeling marketing management with the RBV theory approach in the MSME sector, so that this research contributes to filling the research gap puzzle by bringing up relevant conceptual models.

Managerial Implications

This research provides relevant practical guidance for MSME actors in adopting digital platforms, business incubator programs, digital literacy for MSMEs, and collaboration capabilities to improve marketing performance and competitiveness of MSMEs. The results of this study provide insights that various parties can utilize to improve the competitiveness of MSMEs. The findings provide clear direction for MSME actors and policymakers. For MSMEs, investments in strengthening digital literacy, technology adoption, and active involvement in business incubators and collaborative networks are proven to improve marketing effectiveness and competitiveness. The government and MSME support institutions need to strengthen the role of incubator programs and digital training equally and create a collaborative environment that encourages synergy between businesses. In addition, digital platform providers can also utilize these findings to design features and services that better suit the unique needs and capabilities of Indonesian MSMEs.

The logical consequence for government and policymakers is the importance of developing more structured and needs-based digital marketing training and mentoring

programs for MSMEs. Local governments should also improve MSME access to digital platforms and technology infrastructure that support the digital transformation of small businesses, strengthen the role of business incubator programs with a focus on improving marketing skills and digital literacy of businesses, provide incentive policies for MSMEs that adopt digital technology, and encourage collaboration between MSMEs and technology companies, marketplaces, and business communities to improve MSME competitiveness and market access.

CONCLUSION

This study aims to develop and empirically validate a comprehensive digital ecosystem model grounded in the RBV theory to enhance the competitive advantage of government-assisted MSMEs through optimizing the role of marketing performance. Based on the data analysis and hypothesis testing results, it can be concluded that all variables in the digital ecosystem—digital platform adoption capabilities, business incubator programs, digital literacy, and collaboration capabilities—are proven to have a positive and significant effect on MSME marketing performance. Furthermore, marketing performance is also verified to significantly improve MSMEs' competitive advantage. This finding confirms that marketing performance is a strategic pathway that connects MSMEs' digital capabilities and institutional capabilities with achieving a competitive position in the market.

Theoretically, this research enriches the literature on Resource-Based View (RBV) in the context of MSMEs by emphasizing that digital-based resources and collaborative network capabilities are intangible assets that contribute directly to improving business performance. A comprehensively built digital ecosystem not only strengthens the internal aspects of the business but also encourages external synergies that are important in responding to increasingly complex and technology-based market challenges.

In practice, the results of this study provide important implications for stakeholders, including MSMEs, government, educational institutions, and technology service providers, to jointly build digital infrastructure, improve digital literacy, expand access to incubator programs, and strengthen collaborative networks. The competitive advantage of MSMEs in the digital era is not solely determined by physical capital, but by their ability to adapt, innovate, and collaborate in an integrated digital ecosystem. Therefore, support for the digital transformation of MSMEs needs to be a strategic agenda in encouraging inclusive and sustainable national economic growth.

In addition to collecting data through structured questionnaires, the researchers interviewed several MSME actors to gain deeper insights. The results of these interviews revealed a strong alignment with the key findings of the quantitative analysis, particularly regarding the importance of digital platform adoption, the role of business incubator programs, digital literacy, and collaboration capability in enhancing marketing performance and competitive advantage. These confirmations from MSME practitioners further strengthen the validity of the research findings and indicate that the proposed digital ecosystem model accurately reflects the empirical realities experienced by MSMEs in the field.

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