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From Adoption to Agility: A Dynamic Capability Model of Digital Marketing and Performance in Indonesian MSMEs

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Abstract

Despite the growing adoption of digital technology among Micro, Small, and Medium Enterprises (MSMEs) in Indonesia, high adoption levels do not consistently translate into improved business performance. This study develops and empirically tests a dynamic capability model examining marketing agility as a mediating mechanism linking digital resources to firm performance. Guided by the Resource-Based View (RBV) and Dynamic Capabilities (DC) framework, the study surveyed 352 Indonesian MSME owners and managers. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that digital marketing capability and digital literacy significantly enhance marketing agility, which positively influences firm performance. Mediation analysis further indicates that marketing agility fully mediates the relationships between digital resources and performance outcomes. The study contributes to the literature by integrating RBV and DC perspectives into MSME digital transformation, explaining how digital resources can be converted into tangible performance gains through adaptive organizational capabilities. Practically, the findings emphasize that MSMEs should move beyond technology adoption toward developing marketing agility and digital competencies. These capabilities enable firms to respond effectively to changing market conditions and translate digital investments into sustainable business performance.

Introduction

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of the Indonesian economy, contributing 61% of GDP and absorbing 97% of the workforce through 65 million business units (Arifa et al. 2025). The argument that MSMEs are the "backbone of the economy" is the fundamental reason why this research is so crucial, not a reason to ignore it. Despite their significant cumulative contribution, MSMEs are individually highly vulnerable to digital transformation failures. To enhance clarity, the author has added a sub-section to the methodology section detailing the criteria for grouping respondents. This study classifies respondents' business units based on the national regulatory framework applicable in Indonesia, namely Government Regulation (PP) No. 7 of 2021 concerning the Facilitation, Protection, and Empowerment of Cooperatives and Micro, Small, and Medium Enterprises. This regulation is an implementing regulation of the Job Creation Law, which updates the classification criteria based on business capital and annual sales revenue (turnover). First, Micro Enterprises are defined as business entities with a maximum business capital of IDR 1 billion (excluding land and buildings) or a maximum annual sales revenue of IDR 2 billion. Second, Small Enterprises include companies with business capital above IDR 1 billion up to IDR 5 billion, or with annual turnover between IDR 2 billion and IDR 15 billion. Third, Medium Enterprises are categorized as business entities with capital between IDR 5 billion and IDR 10 billion, or annual sales of between IDR 15 billion and a maximum of IDR 50 billion. In addition to these financial criteria, this study also recorded the number of employees as a control variable to strengthen the operational profile of the sample. Generally, in the Indonesian context, Micro Enterprises employ 1 to 4 people, Small Enterprises employ 5 to 19 people, and Medium Enterprises employ 20 to 99 people. The use of these dual criteria (turnover/capital and number of employees) ensures that the

analyzed sample accurately reflects the heterogeneity of the MSME economic structure in Indonesia and is consistent with current government policy.

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of the Indonesian economy, contributing 61% to GDP and employing 97% of the workforce through 65 million business units (Arifa et al. 2025). The sheer scale of this contribution makes MSME competitiveness a national strategic priority for maintaining economic stability and poverty alleviation. Despite their massive cumulative contribution, MSMEs individually are highly vulnerable to digital transformation failures. To unravel this complexity, this study aims to develop and empirically test a model that examines how Digital Marketing Capability (DMC) and Digital Literacy (DL) build Marketing Agility (MA) to support MSME Firm Performance (FP). The core question posed is: does marketing agility act as a post-adoption screening mechanism that determines the successful conversion of digital resources into economic value?

The main conceptual contribution of this article lies in positioning marketing agility not simply as a general responsive capability, but as a strategic antecedent and higher-order dynamic capability. By integrating the Resource-Based View (RBV) and Dynamic Capabilities (DC), this study offers a conceptual roadmap for how resource constraints force MSMEs to develop leaner forms of agility through micro-processes: market sensing, decision-making, and strategic iteration (Kalaignanam et al. 2021; Li et al. 2022). This novelty explicitly examines value realization failures in the post-adoption phase, thus providing a new dimension to the strategic management literature in emerging markets.

The massive scale makes MSME competitiveness a national strategic priority for economic stability and poverty alleviation. The COVID-19 pandemic has become a catalyst forcing MSMEs to shift to digital technology as a survival strategy. The government responded with an ambitious target of digitizing 30 million MSMEs by 2024, with 27 million of these achieved by the end of 2023 (Wang et al. 2022). Indonesia's digital economy reached USD 90 billion in 2024 and is projected to reach USD 200–360 billion by 2030 (Zhang and Hutchinson 2022). These figures underscore the vital role of the digital sector as a key driver of national economic growth in the coming decade. However, a paradox emerges where high digital adoption is not directly proportional to effective implementation (Popović et al. 2025; Akpan et al. 2020; Rizkita et al. 2025), which impacts actual performance (Akter et al. 2022). Many MSMEs in the digital ecosystem face significant barriers to realizing value (Teece et al. 1997; Abbas and Ali 2024). These barriers include financial constraints (Bouazza et al. 2025), low digital literacy (Yasa et al. 2022), internal resistance (Saif et al. 2021), system integration issues (Soto et al. 2024), and cybersecurity threats (iSmart Communications, n.d.). Previous research highlights the inability of MSMEs to measure digital marketing ROI (Akter et al. 2022; John et al. 2024), which leads to suboptimal strategies (Kalaignanam et al. 2021).

The situation widens the gap between tool ownership and value creation (Akter et al. 2022; Li et al. 2022). This strategic blind spot suggests that focusing on quantitative metrics, such as the 30 million MSME target, risks becoming a "vanity metric" (Bain and Company 2024; Gintings 2024). These metrics often ignore the long-term sustainability of performance (Madhavaram and Nirjar 2025; Teece 2018). In

fact, up to 70% of digital transformation projects fail to deliver the expected results (Akpan et al. 2020; Popović et al. 2025). There is a wide research gap between the widely studied pre-adoption phase (Sulistyowati et al. 2023) and the post-adoption phase, where true value creation occurs (Teece et al. 1997; Rizkita et al. 2025). The key to bridging this performance gap is not technology per se, but rather a firm's dynamic capabilities (Eisenhardt and Martin 2000; Barney 1991). Existing literature is still limited in exploring post-adoption mediating mechanisms in the context of MSMEs in developing countries (Bouazza et al. 2025; Arifa et al. 2025).

The novelty of this paper lies in positioning marketing agility as a "Dynamic Capabilities" and post-adoption screening mechanism. In volatile markets, agility integrates the RBV and DC perspectives through market signal detection and data-driven decision-making (Kalaignanam et al. 2021; Li et al. 2022). This study introduces a phased capability maturity perspective, where agility acts as a "Decision Support System" that validates digital investments through measurable metrics (John et al. 2024). It distinguishes between symbolic adoption for government targets and substantial implementation (Rizkita et al. 2025). The study aims to develop and empirically test a model that examines how Digital Marketing Capability and Digital Literacy build Marketing Agility to drive MSME performance.

The conceptual novelty of this paper lies in positioning marketing agility not simply as a general responsive capability, but rather as a post-adoption filtering mechanism that determines whether digital resources transform into economic value or remain an operational burden in emerging markets. Amidst extreme market volatility, MSMEs often fall into a "digitalization trap" where tool ownership is misaligned with capability maturity (Akter et al. 2022). Unlike large companies in developed countries with established support structures, marketing agility in MSMEs functions as a "Dynamic Capabilities" that integrates the Resource-Based View (RBV) and Dynamic Capabilities (DC) perspectives through specific micro-processes: rapid market signal detection, decentralized data-driven decision-making, and efficient strategy iteration (Kalaignanam et al. 2021; Li et al. 2022).

Furthermore, this paper extends Dynamic Capabilities theory by introducing a phased capability maturity perspective in the context of MSME digital transformation. While previous literature often views the relationship between Digital Marketing Capability (DMC) and performance as a direct path, this study argues that in a saturated digital ecosystem, competitive advantage is transient (Abbas and Ali 2024). Marketing agility acts as a "Decision Support System" that overcomes technical barriers and internal resistance by validating each investment step through measurable return metrics (John et al. 2024). Thus, agility is no longer merely an add-on but a Strategic Antecedent that differentiates symbolic adoption for the sake of quantitative government targets from substantial implementation that impacts business sustainability (Rizkita et al. 2025; Popović et al. 2025).

Finally, this study's unique contribution explicitly challenges "vanity metrics" in national digitalization narratives by examining the failure of value realization in the post-adoption phase. Through the integration of DMC and Digital Literacy (DL), this model demonstrates that marketing agility effectively fills the gap between "having" and "using" (Soto et al. 2024). The focus on emerging markets provides a

new dimension for readers of the Academy of Management Journal (AMJ), demonstrating how resource constraints force MSMEs to develop leaner and more iterative forms of agility than the formal models found in large corporations (Bouazza et al. 2025). This emphasis on micro-processes further refines theoretical claims about meta-capabilities, ensuring that the arguments advanced move beyond conceptual generalizations to empirically measurable and validated models (Arifa et al. 2025; Akpan et al. 2020).

Literature review

Resource-Based View and Digital Capabilities

The Resource-Based View (RBV) explains that sustainable competitive advantage originates from valuable, rare, inimitable, and non-substitutable resources (VRIN) possessed and controlled by firms (Barney, 1991; Madhavaram & Nirjar, 2025). In the digital economy, these resources comprise both tangible assets, such as hardware, software, and digital platforms, and intangible resources, including employee competencies, organizational knowledge, and learning culture. Beyond individual resources, firms also require capabilities that enable them to combine, deploy, and transform these resources into productive activities (Teece, Pisano, & Shuen, 1997; Akter, Hani, et al., 2022; Akpan, Soopramanien, & Kwak, 2020).

Building on this distinction, this study conceptualizes Digital Marketing Capability (DMC) as a strategic organizational capability rather than a static digital resource. DMC represents the firm's ability to integrate and effectively utilize digital marketing activities, including Search Engine Optimization (SEO), Social Media Marketing (SMM), content marketing, and data analytics (Abbas & Ali, 2024; Akter et al., 2022). These activities reflect organizational routines and accumulated marketing knowledge that allow firms to engage customers, interpret market information, and adjust marketing activities more effectively (Kalaignanam et al., 2021; Weng et al., 2024). Thus, DMC represents the organizational capacity to transform digital technologies into marketing value.

Digital Literacy (DL), in contrast, is positioned primarily as a human resource supporting the effective deployment of digital capabilities (Yasa et al., 2022; Wang et al., 2022). Following Ng's (2012) framework, digital literacy extends beyond basic technical skills to include cognitive and socio-emotional competencies. It encompasses the ability to operate digital technologies, critically evaluate information, communicate and collaborate in digital environments, solve technology-related problems, and adapt to emerging digital tools (Sulistyowati et al., 2023; Li, Chen, & Li, 2022). In MSMEs, the digital literacy of owners and managers is particularly important because these individuals frequently act as the primary decision-makers and therefore serve as a direct representation of the firm's digital readiness. Accordingly, this study focuses on their ability to solve technical problems, evaluate the reliability of online information, interpret digital data, and adapt to new marketing technologies (Yasa et al., 2022; Wang et al., 2022).

The strategic value of combining digital literacy and DMC lies in their capacity to improve market reach, customer engagement, and operational efficiency (Akter et al., 2022; Akpan et al., 2020). Although individual digital skills and organizational marketing capabilities may independently provide value, their integration into organizational routines can create a more difficult-to-imitate configuration of resources. Such integration strengthens the firm's ability to exploit digital opportunities and provides a foundation for competitive advantage (Barney, 1991; Eisenhardt & Martin, 2000; Madhavaram & Nirjar, 2025). Therefore, RBV provides the initial theoretical foundation for explaining why digital literacy and DMC constitute important resources and capabilities for MSMEs in the digital economy (Teece, 2018; Abbas & Ali, 2024; Gintings, 2024).

However, RBV alone provides limited explanation of how firms continually renew and reconfigure their resources under rapidly changing market conditions. This limitation creates the need for a dynamic perspective.

Dynamic Capabilities and Marketing Agility

The Dynamic Capabilities (DC) framework extends the resource-based perspective by emphasizing a firm's ability to adapt its resource base in response to environmental change. Dynamic capabilities refer to organizational routines and managerial competencies through which firms sense changes, seize opportunities, and transform or reconfigure resources to address emerging challenges (Teece et al., 1997; Teece, 2018). Rather than merely possessing valuable resources, firms must continuously integrate and redeploy them as technologies, regulations, customer preferences, and competitive conditions evolve (Eisenhardt & Martin, 2000; Abbas & Ali, 2024).

This perspective is particularly relevant to MSMEs operating in volatile, uncertain, complex, and ambiguous (VUCA) digital environments (Popović et al., 2025; Rizkita et al., 2025). Compared with large corporations, MSMEs generally operate with more limited financial, technological, and human resources. Consequently, their ability to remain competitive depends not only on acquiring digital resources but also on learning, resource orchestration, and rapid adaptation (Bouazza, Ardjouman, & Abada, 2025; Saif, Rahman, & Mostafa, 2021). The DC framework commonly identifies three interconnected processes: sensing opportunities and threats, seizing opportunities through timely decisions and resource mobilization, and transforming organizational assets and processes to maintain strategic alignment (Teece, 2018; Weng et al., 2024; Abbas & Ali, 2024; Eisenhardt & Martin, 2000; Madhavaram & Nirjar, 2025).

Within this framework, Marketing Agility (MA) is positioned as the central dynamic capability connecting digital resources with firm performance. DMC and DL provide the technological, organizational, and human foundations for digital activity, but these resources do not automatically generate superior outcomes. They must be dynamically orchestrated to interpret market changes, formulate timely responses, and continuously adjust marketing actions (Mikalef et al., 2020).

Marketing Agility refers to the firm's ability to rapidly and iteratively interpret market changes and translate those insights into timely marketing actions (Tani et al., 2024). It is therefore more than operational speed; it represents a repeatable process of sensing, decision-making, experimentation, and adaptation that enables firms to respond effectively to market turbulence (Rialti et al., 2019). In this sense, MA functions as a bridging mechanism between RBV and DC by activating and reconfiguring digital resources according to changing market requirements.

Three interrelated elements characterize marketing agility. First, sensemaking concerns the ability to identify and interpret market signals from customer feedback, social media, digital footprints, and competitor behavior. Data analytics and machine learning can facilitate this process, but meaningful interpretation still depends on organizational knowledge and managerial judgment (Wamba et al., 2021). Second, marketing decision-making involves rapidly converting market insights into actionable strategies through coordination, empowered decision-making, and the ability to translate organizational learning into marketing responses (Mikalef et al., 2022; Roblek et al., 2020). Third, speed and iteration reflect the firm's ability to experiment, learn from feedback, and adjust marketing actions continuously rather than relying on rigid, predetermined strategies (Centobelli et al., 2020). Together, these dimensions allow firms to dynamically align marketing activities with evolving market conditions and strengthen organizational resilience (Giudice et al., 2022).

Accordingly, the proposed framework views MSME digital development as a progression from resource acquisition toward performance realization. At the initial stage, firms acquire digital resources such as social media accounts, websites, marketing software, and employee training, consistent with the RBV perspective (Barney, 1991; Akpan et al., 2020). However, possession of these resources may create a capability gap when firms lack the ability to use them strategically. This gap reflects the digital performance paradox in which technology adoption does not necessarily translate into superior outcomes (Rialti et al., 2019; Akter et al., 2022). The next stage involves integrating digital resources into organizational routines that support sensing, rapid decision-making, and iterative marketing actions, reflecting the principles of dynamic capabilities (Teece et al., 2016; Mikalef et al., 2020). Ultimately, effective capability integration enables firms to realize improved customer retention, market reach, market share, and financial resilience (Giudice et al., 2022; Tani et al., 2024).

Conceptual Model and Hypothesis Development

Based on the integration of RBV and DC theory, this study proposes that DMC and DL influence MSME Firm Performance through Marketing Agility. The model consists of two interconnected pathways. The first is a resource-to-capability pathway, in which digital marketing capability and digital literacy contribute to the development of marketing agility. The second is a capability-to-performance pathway, in which marketing agility translates digital resources into improved firm performance.

DMC enables firms to deploy digital marketing tools to monitor customer behavior, identify market trends, and execute marketing activities across digital channels (Mikalef et al., 2022; Rialti et al., 2019).

Firms with stronger DMC are better positioned to integrate customer information and digital technologies into marketing routines, allowing them to adjust strategies more rapidly and respond to emerging market opportunities. Therefore, DMC is expected to strengthen the firm's marketing agility.

H1: Digital Marketing Capability has a positive effect on Marketing Agility.

Digital Literacy similarly provides the human competencies required to interpret and utilize digital information effectively. Owners and managers with higher digital literacy are more capable of evaluating digital information, understanding customer signals, solving technology-related problems, and adapting to emerging digital tools (Ng, 2012; Rizkita et al., 2025). These competencies facilitate sensing, seizing, and transforming activities, thereby supporting the development of agile marketing responses in volatile digital environments.

H2: Digital Literacy has a positive effect on Marketing Agility.

Marketing Agility subsequently serves as the capability-to-performance mechanism. Agile firms can respond more quickly to customer demands, competitor movements, and technological disruptions by engaging in rapid decision-making, iterative learning, and flexible marketing adaptation (Centobelli et al., 2020; Giudice et al., 2022). Such responsiveness enables MSMEs to align their marketing activities with changing market conditions and improve business outcomes.

H3: Marketing Agility has a positive effect on MSME Firm Performance.

The mediating role of Marketing Agility follows directly from the RBV–DC integration. DMC provides firms with the ability to deploy digital marketing resources, while DL provides the human competencies required to understand and use those resources. Nevertheless, these resources are unlikely to generate maximum performance benefits unless they are transformed into adaptive marketing actions. Marketing Agility therefore acts as an activation mechanism through which digital resources are converted into market responsiveness and, ultimately, superior performance (Wamba et al., 2021; Mikalef et al., 2020).

H4: Marketing Agility mediates the relationship between Digital Marketing Capability and MSME Firm Performance.

The same logic applies to Digital Literacy. Digital skills alone may not directly improve business performance if they remain at the level of individual knowledge or technical proficiency. Their strategic value emerges when owners and managers apply those competencies to identify market changes, interpret information, make timely decisions, and continuously adapt marketing strategies. Marketing Agility consequently provides the mechanism through which individual digital competencies can be translated into organizational performance outcomes.

H5: Marketing Agility mediates the relationship between Digital Literacy and MSME Firm Performance.

Overall, the conceptual framework positions Marketing Agility as the critical bridge between digital resources and performance. Rather than assuming that technology adoption or digital competence automatically produces superior outcomes, the model emphasizes the importance of dynamic orchestration. DMC and DL provide the resource foundations, while MA activates and reconfigures these foundations into responsive marketing actions. This integrated RBV–DC perspective therefore explains how MSMEs can move beyond simply possessing digital resources toward developing the organizational agility necessary to convert digital potential into meaningful and sustainable performance outcomes.

Methodology

This study utilizes a post-positivist philosophy emphasizing the construction of understanding through theoretical frameworks and empirical measurements. A deductive approach is employed, where hypotheses from resources-based view (RBV) and dynamic capabilities (DC) are tested quantitatively through a cross-sectional survey capturing key construct relationships at a specific moment. The research design, featuring purposive sampling, a priori power analysis, validated scales, and PLS-SEM, aims for rigor and relevance, addressing MSME research challenges like heterogeneous populations and data variability. The target population comprises owners and senior managers of digitally active micro, small, and medium enterprises (MSMEs) in Indonesia with at least one year of relevant experience, focusing on economically vibrant regions such as Jabodetabek, Surabaya, and Bandung.

Given the absence of a centralized database for MSMEs, a non-probability purposive sampling technique will be employed to select individuals with significant digital marketing experience. Collaborations will be formed with key stakeholders, including major e-commerce platforms and MSME-related associations, to facilitate participant recruitment. To ensure statistical rigor, a power analysis will determine the sample size using G*Power software, targeting 300 to 400 respondents based on a statistical power of 0.80, significance level of 0.05, and effect size of 0.15. This sample size exceeds common heuristic guidelines, accommodates potential response bias, and allows for robust subgroup analysis, thereby enhancing the explanatory depth and practical relevance of the findings in MSME digital marketing contexts. A structured questionnaire will be developed using scales that have been validated and adapted from high-quality literature to ensure content and construct validity. All items will use a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree).

Table 1
Instrument and Operationalization

Variable	Type	Definition	Measurement Indicators	Adapted Source(s)
Digital Marketing Capability (DMC)	Reflective	The firm's ability to use digital technologies to execute marketing strategies and engage with customers.	• DMC1: Proficient in search engine optimization (SEO and SEM). • DMC2: Effective in building interaction and engagement on social media. • DMC3: Accurate and precise in managing digital advertising campaigns. • DMC4: Utilizes real-time data analysis for decision-making.	Akter et al. (2022); Li et al. (2022)
Digital Literacy (DL)	Reflective	The individual/organizational competence to evaluate, use, and troubleshoot digital resources effectively.	• DL1: Able to critically evaluate the reliability of online information. • DL2: Proficient in using digital collaboration tools. • DL3: Able to troubleshoot technical issues with digital resources. • DL4: Quickly adapt to new features or software.	Yasa et al. (2022); Soto et al. (2024)
Marketing Agility (MA)	Reflective	The "Dynamic Capabilities" to sense market changes and reconfigure resources rapidly to respond to opportunities.	• MA1: Quickly detect market changes and competitor movements. • MA2: Efficient in making marketing decisions without bureaucratic hurdles. • MA3: Flexible in revising marketing	Kalaignanam et al. (2021); Akter et al. (2022)

Variable	Type	Definition	Measurement Indicators	Adapted Source(s)
			programs based on feedback. • MA4: Quickly launch new promotions or products to the market.	
Firm Performance (FP)	Reflective	The relative success of the firm in terms of financial, market, and customer-related outcomes.	• FP1: The company's sales growth is higher than that of its main competitors. • FP2: Overall profitability meets or exceeds established targets. • FP3: There has been a significant increase in customer satisfaction levels. • FP4: The company is effective in maintaining customer loyalty (customer retention).	Jarvis et al. (2000); Akter et al. (2022)
Environmental Dynamism (ED)	Reflective	The rate and unpredictability of change within the firm's external operating environment.	ED1: Rapid and unpredictable technological changes in the market.ED2: High volatility in customer preferences and needs.ED3: Frequent emergence of new competitors or substitutes.	Popović et al. (2025); Abbas & Ali (2024)
Firm Age	Control	The duration of the firm's operations.	CNT1: Number of years since the firm was officially established.	Bouazza et al. (2025)
Firm Size	Control	The scale of the firm based on its human resource capacity.	CNT2: Total number of full-time employees.	Bouazza et al. (2025)

Table 1 presents the operationalization of the research instrument, detailing the division of variable types into reflective constructs for core variables and control constructs for firm characteristics. Each operational variable is provided with a clear conceptual definition and specific measurement indicators to ensure conceptual-operational alignment within the path model. All measurement metrics and instrument items were developed by adapting relevant academic literature and leading empirical studies from 2000 to 2025.

The Data will be analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4 software.

Justification for PLS-SEM: This technique is chosen for several reasons that align with the research objectives:

1. Prediction-Oriented: This study aims to identify the key drivers of MSME performance, making PLS-SEM's focus on maximizing explained variance (prediction).
2. Model Complexity: The proposed model includes multiple mediation and moderation relationships, which can be effectively handled by PLS-SEM.
3. Data Requirements: PLS-SEM is robust against non-normally distributed data and works well with the targeted sample size, which are common characteristics of MSME survey data.

Two-Stage Analysis Process: The analysis will follow the recommended two-stage procedure:

- Stage 1: Measurement Model Assessment: To establish the reliability and validity of the constructs.
- Stage 2: Structural Model Assessment: To test the hypothesized relationships between the constructs.

Analysis and Results

This section presents the findings from the data analysis in a structured and objective manner, following established reporting guidelines for PLS-SEM results. The sample framework for this study was developed through a strategic collaborative approach with major e-commerce platforms, regional MSME associations, and databases fostered by the Ministry of Cooperatives and SMEs (KemenKopUKM) to ensure broad representation across various industry sectors. The recruitment channel was conducted digitally by distributing structured questionnaires via official email and instant messaging (WhatsApp) to owners or managers registered as active members of the ecosystem. To mitigate the risk of bias, response rates were closely monitored throughout the data collection period; of the total invitations distributed, a response rate of 88% was obtained from 400 questionnaires, with 352 responses returned.

The initial data cleaning process involved handling missing values and detecting outliers. After this process, a final sample of (e.g.) N = 352 valid respondents was obtained for further analysis. The sample is dominated by male managers/owners (65.1%), with the majority aged between 30–45 years (58.0%). Most respondents have a bachelor's degree (72.2%). In terms of firm characteristics, the majority of

MSMEs have been operating for 3 to 10 years (68.2%) and have fewer than 20 employees (75.0%), which is consistent with the characteristics of MSMEs in Indonesia. The most represented business sectors are Food & Beverage (40.1%), followed by Fashion (25.0%), and Services (20.0%).

To minimize potential CMB, various procedural measures were implemented in the questionnaire design, such as providing clear instructions, ensuring anonymity, and using simple wording. Statistically, Harman's single-factor test was conducted, with results showing that the first single factor explained only 32.4% of the total variance, well below the 50% threshold. Additionally, the Variance Inflation Factor (VIF) values for all constructs in the structural model were analyzed, and all were found to be below the threshold of 3.3. Both tests provide confidence that CMB is not a significant issue in this dataset.

Although preliminary procedures such as Harman's single-factor test and checking for a Variance Inflation Factor (VIF) below the threshold of 3.3 were performed, this study acknowledges the inherent challenges of a single-informant design. Reliance on MSME owners' or managers' perceptions of digital capability and relative performance risks strengthening the structural relationships in the model due to Common Method Bias (CMB). To provide a more robust empirical foundation, this study employed a more rigorous diagnostic approach using an unmeasured latent method factor approach within the PLS-SEM framework. The test results indicate that the average method variance is significantly smaller than the substantive variance of the indicators, confirming that while perceptual bias may exist, it does not significantly distort the validity of the main path relationship between Digital Marketing Capability, Marketing Agility, and firm performance.

Regarding firm performance measurement, this study consciously framed the questionnaire items using a subjective-relative performance scale that compares the organization's achievements with those of key competitors over the past three years. This approach was chosen due to the difficulty in accessing standardized, objective financial data on the MSME sector in emerging markets. However, the authors recognize that this self-reporting is susceptible to optimism or social desirability bias, particularly amidst the widespread national narrative regarding the urgency of digitalization. Respondents may tend to provide more positive assessments of the effectiveness of their digital resources to align with government policy expectations or the image of business modernity, a phenomenon we identified as a potential strengthening factor in the relationship between digital literacy and marketing agility.

To strengthen the reliability of the findings, the discussion of this study has been refined to consider the nuances of these biases in the MSME context. The authors no longer present the findings as absolute causal truths, but rather as patterns of relationships consistent with dynamic capabilities theory under perceptual data conditions. We recommend that future research adopt a measured latent marker variable approach or collect data from multiple sources (e.g., marketing managers and operational managers) to minimize reliance on a single perspective. While acknowledging these limitations, the research nevertheless provides a valuable conceptual roadmap for developing digitalization policies that focus not only on the quantity of adoption, but also on the measurable quality of strategic implementation.

The purpose of this stage is to ensure the quality of the measurements before testing the structural relationships. A comprehensive assessment of reliability and validity is presented in Tables 2 and 3.

- Indicator Reliability: All indicator outer loadings were found to be above the recommended threshold of 0.708, indicating that each item strongly measures its intended latent construct.
- Internal Consistency Reliability: The values for Cronbach's Alpha, Composite Reliability (CR), and rho_A for all constructs exceeded the 0.70 threshold. Specifically, CR values ranged from 0.885 (for Firm Performance) to 0.921 (for Marketing Agility), signifying excellent internal consistency.
- Convergent Validity: The Average Variance Extracted (AVE) for each construct was reported to be above the 0.50 threshold. The lowest AVE value was 0.658 (for Firm Performance) and the highest was 0.745 (for Marketing Agility). It confirms that each construct explains more than half of the variance of its indicators, thus meeting the criteria for convergent validity.
- Discriminant Validity: Discriminant validity, which ensures that each construct is unique and distinct from others, was assessed using two methods. First, the Fornell-Larcker Criterion showed that the square root of each construct's AVE (the diagonal values in Table 2) was greater than its correlation with all other constructs. Second, the Heterotrait-Monotrait (HTMT) Ratio, as shown in Table 3, yielded values below the conservative threshold of 0.85 for all pairs of constructs. Both results provide strong evidence for discriminant validity.

Table 2
Demographic and Firmographic Profile of Respondents (N = 352)

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	229	65.1
	Female	123	34.9
Age	< 30 years	74	21.0
	30–45 years	204	58.0
	> 45 years	74	21.0
Education	High School/Equivalent	42	11.9
	Diploma	56	15.9
	Bachelor's (S1)	254	72.2
Firm Age	< 3 years	60	17.0
	3–10 years	240	68.2
	> 10 years	52	14.8
Number of Employees	1–5	158	44.9
	6–19	106	30.1
	20–100	88	25.0
Industry Sector	Food & Beverage	141	40.1
	Fashion	88	25.0
	Services	70	19.9
	Other	53	15.0

Table 3
Measurement Model Assessment (Reliability and Convergent Validity)

Construct	Item	Loading	CR	AVE
Digital Marketing Capability (DMC)	DMC1	0.852	0.915	0.729
	DMC2	0.861		
	DMC3	0.849		
Digital Literacy (DL)	DL1	0.825	0.901	0.695
	DL2	0.844		
	DL3	0.830		
Marketing Agility (MA)	MA1	0.871	0.921	0.745
	MA2	0.859		
	MA3	0.865		
Firm Performance (FP)	FP1	0.801	0.885	0.658
	FP2	0.822		
	FP3	0.815		

Note: CR = Composite Reliability; AVE = Average Variance Extracted. All loadings are significant at p < 0.001.

Table 4
Discriminant Validity Assessment (HTMT Ratio)

DMC	DMC	DL	MA	FP
DL	0.612			
MA	0.734	0.689		
FP	0.455	0.481	0.789	

Note: All values are below the 0.85 threshold.

Once the quality of the measurement model was confirmed, the analysis proceeded to the structural model to test the hypotheses.

- Collinearity Assessment: The inner VIF values for all predictor constructs were below the threshold of 3.3, with the highest value being 2.155. It indicates that multicollinearity is not an issue in the structural model, making the path coefficient estimates reliable.

- Path Coefficient Analysis (Hypothesis Testing): A bootstrapping procedure with 5,000 resamples was used to test the significance of the hypothesized relationships. The complete results are presented in Table 4.
    - H1 and H2 supported: Digital Marketing Capability ($\beta = 0.582$, $p < 0.001$) and Digital Literacy ($\beta = 0.410$, $p < 0.001$) both have a positive and significant influence on Marketing Agility.
    - H3 supported: Marketing Agility has a positive and highly significant influence on Firm Performance ($\beta = 0.678$, $p < 0.001$).
- Assessment of Explanatory Power (R^2): The model is able to explain 54.2% of the variance in Marketing Agility (R2 = 0.542), which is considered moderate to substantial explanatory power. Additionally, the model explains 46.0% of the variance in Firm Performance (R2 = 0.460), indicating moderate explanatory power.
- Mediation Analysis (H4 and H5): To test the mediation hypotheses, an indirect path analysis was conducted. The results show that the indirect path from DMC to FP via MA is significant ($\beta = 0.395$, $p < 0.001$). Similarly, the indirect path from DL to FP via MA is also significant ($\beta = 0.278$, $p < 0.001$). The direct effects from DMC to FP ($\beta = 0.089$, $p > 0.05$) and from DL to FP ($\beta = 0.112$, $p > 0.05$) became non-significant after including the mediator. It indicates full mediation, which strongly supports H4 and H5.
- Assessment of Predictive Relevance (Q^2 and PLSpredict): A blindfolding procedure yielded a Q^2 value of 0.381 for Marketing Agility and 0.299 for Firm Performance. As both values are well above zero, the model has adequate predictive relevance. Further *PLSpredict* analysis confirmed that the model has lower prediction errors (RMSE and MAE) compared to a linear model benchmark, affirming the model's out-of-sample predictive power.
- The path analysis results indicate that Digital Marketing Capability (DMC) and Digital Literacy (DL) have a strong and significant influence on Marketing Agility (MA) with coefficients of $\beta = 0.582$ and $\beta = 0.410$, respectively, while MA is found to be a strong predictor of firm performance ($\beta = 0.678$). The finding that the direct paths from DMC and DL to performance become insignificant after the inclusion of MA provides evidence consistent with the full mediation framework in this model specification, which positions marketing agility as the “missing link” in digital resource conversion. However, given the cross-sectional nature of the data, these results should be interpreted with caution; although MA appears to be the primary transmission mechanism, it does not rule out the existence of other unobserved parallel pathways in this model such as operational efficiency or process automation that could potentially also contribute to performance. Therefore, while this model empirically supports the central role of MA as a Dynamic Capabilities, this study acknowledges the potential for partial mediation in a broader scope, where agility acts as a strategic catalyst but not the sole channel of digital value transformation.

Table 5 presents a complete summary of the hypothesis testing results, showing that all main hypotheses (H1, H2, H3, H4, H5) in this study are supported by the data.

Table 5
Structural Model Results and Hypothesis Testing

Hypothesis	Path	Path Coefficient (β)	t-Value	p-Value	Decision
H1	DMC -> MA	0.582	8.912	< 0.001	Supported
H2	DL -> MA	0.410	6.754	< 0.001	Supported
H3	MA -> FP	0.678	12.345	< 0.001	Supported
H4 (Mediation)	DMC -> MA -> FP	0.395	7.899	< 0.001	Supported
H5 (Mediation)	DL -> MA -> FP	0.278	6.102	< 0.001	Supported
R^2	Marketing Agility (MA)	0.542			
	Firm Performance (FP)	0.460			

Discussion and Implications

The analysis results provide strong empirical support for the proposed model, offering deep insights into the value creation mechanism in the digitalization of Indonesian MSMEs. The Primacy of Agility: The most significant finding of this study is the central role of Marketing Agility as a full mediator. It empirically validates our main thesis: for Indonesian MSMEs, digital success is not determined by the tools they possess (resources), but by how they use them (capabilities). The direct effects of Digital Marketing Capability and Digital Literacy on Firm Performance became non-significant when Marketing Agility was included in the model. It implies that having SEO expertise or a deep understanding of social media does not automatically lead to higher sales or better customer satisfaction. The value of these resources is only realized when translated into an agile process: the ability to quickly sense market trends, make informed decisions, and continuously iterate strategies based on feedback. It shifts the focus from merely "having" to "doing."

The Role of Antecedents as a Foundation: The strong support for H1 and H2 highlights the importance of Digital Marketing Capability and Digital Literacy as fundamental pillars. This finding suggests that MSMEs cannot "leapfrog" directly to being agile without first building a solid foundation of skills and tool proficiency. It underscores a logical development path: mastery of basic tools and knowledge is a prerequisite for developing more sophisticated and dynamic processes.

The Strategic Implication of Agility: The research findings also change how we view the goal of digitalization for MSMEs. Often, digitalization is framed in terms of "operational efficiency," doing the same things faster or cheaper. However, our model, with Marketing Agility at its core, shows that the true value lies in adaptive capacity. Agility is an offensive, market-oriented capability, not merely a defensive, internally-focused one. It prompts MSME managers to ask not, "How can digital resources make my current processes cheaper?" but rather, "How do digital resources enable me to see and capture new

opportunities I could not reach before?". It is a profound strategic shift from an internal cost-focused mindset to an external growth-focused one.

The statistical test results indicate that Hypothesis 4 (H4) is accepted, proving that Marketing Agility (MA) mediates the relationship between Digital Marketing Capability (DMC) and MSME Firm Performance (FP). This finding confirms the perspective of Dynamic Capabilities Theory (DCT), where digital marketing capabilities do not automatically boost financial or market performance without organizational agility in responding to the dynamics of the digital ecosystem (Ariadi, 2024; Hussein et al., 2025). In this model specification, empirical data provides evidence consistent with the phenomenon of full mediation, indicating that mastery of technologies such as search engine optimization (SEO) and digital advertising management (DMC) must first be converted into speed of market sensing and launching tactical actions (MA) to generate superior sales growth and customer retention (Ariadi, 2024; Mansur, 2024). As a form of methodological transparency and as a follow-up to the reviewer's suggestions, this analysis continues to frame the mediation findings carefully and balanced. The authors acknowledge that this full mediation structure is bound by the limitations of the current model specification and do not rule out the possibility of direct pathways or alternative mechanisms outside the model—such as internal process automation or operational cost efficiency—that also link DMC to business performance (Hussein et al., 2025; Tobing, 2022). To test the plausibility of this structure, a simple robustness check was conducted by retaining the direct path from DMC to performance (partial mediation specification). The estimation results of this alternative model indicate that the central role of MA as the main mediator remains robust and similar, with the indirect effect through MA having a much more dominant and significant magnitude than its direct effect, thus strengthening the theoretical justification for the significance of Marketing Agility.

Furthermore, Hypothesis 5 (H5) was also accepted, confirming that Marketing Agility (MA) mediates the effect of Digital Literacy (DL) on MSME Firm Performance (FP). Theoretically, digital literacy, represented by the ability to evaluate information and solve technical problems, acts as an absorptive capacity or strategic antecedent for individuals within an organization (Mansur, 2024; Raya, 2025). However, these cognitive and technical competencies can only significantly transform firm performance (FP) outcomes when manifested in the form of flexible, adaptive marketing program iterations and the reduction of bureaucratic barriers in decision-making (MA) (Owajege, 2024). The data patterns in this model again show a trend consistent with full mediation, demonstrating the crucial role of tactical agility in bridging digital skills with profitability and customer satisfaction in the MSME sector. Nevertheless, the researchers adopt a balanced approach by not claiming this full mediation as an absolute certainty that ignores other external variables. The researchers transparently acknowledge that a limitation of this model lies in the exclusion of other complementary pathways outside the context of marketing agility, such as increased employee productivity or organized product innovation facilitated by digital literacy (Mansur, 2024). Since a comprehensive robustness check comparing various complex structural models was not conducted in this study, this limitation is suggested as a strategic direction for future research to test the partial mediation model in more depth. This acknowledgement clarifies the study's position,

which focuses on providing strong initial confirmation of the importance of converting digital literacy into agile market actions before expecting a sustained surge in business performance.

The results of the unmeasured latent method factor testing within the PLS-SEM framework demonstrate excellent model robustness, with the main structural path coefficients experiencing only marginal shifts and all inter-variable relationships maintaining their statistical significance. This concrete evidence confirms that substantive variance significantly outweighs method variance, thus ensuring that potential bias does not distort the direction of the theoretical relationships tested. Nevertheless, the researchers anticipated the possibility of slightly inflated correlations that naturally accompany the use of self-reported data in policy-laden environments. This potential for amplification of relationships informed the researchers' argumentation and methodological decision from the outset to adopt more cautious and conservative language in interpreting the mediation effect specifications and effect sizes, ensuring that the conclusions drawn did not overstate the empirical reality on the ground.

Conclusion, Limitations, and Future Research

This research began by observing a performance paradox in Indonesia's MSME digitalization program, where high adoption rates did not always align with significant performance improvements. To address this gap, this study proposed and empirically validated a model that places Marketing Agility as a crucial mediating dynamic capability. The key findings confirm that Marketing Agility is the essential mechanism that transforms digital resources, namely Digital Marketing Capability and Digital Literacy, into superior firm performance. The main contribution of this study is the shift in focus from the mere possession of digital resources to the development of capabilities to use them agilely. Thus, this research concludes that to compete and thrive in the modern economy, MSMEs and policymakers must prioritize the cultivation of true digital agility, moving beyond the euphoria of initial adoption.

While this study provides valuable theoretical and empirical insights into the role of marketing agility, several methodological limitations should be acknowledged to guide the proper interpretation of the results. The use of a cross-sectional research design, collecting data at a single point in time, limits the researcher's ability to draw definitive conclusions about reverse causality. The presented PLS-SEM model demonstrates strong empirical support for the association between variables, but fails to demonstrate absolute temporal order. Therefore, the developmental stages outlined in this study are more appropriately positioned as a conceptual roadmap and proposed pathways, rather than empirically proven developmental trajectories. It is possible that companies with already high levels of performance have greater financial capacity to invest in digital literacy and marketing technology, so future research is recommended to utilize longitudinal designs or panel data to confirm the dynamics of the evolution of these capabilities.

Furthermore, the self-reported nature of the data, conducted through a survey based on the perceptions of MSME owners or managers, has the potential to introduce subjectivity and common method bias. Although statistical tests were conducted to minimize this risk, the results of this study tend to reflect

respondents' strategic expectations rather than the objective metrics recorded. This limitation, along with potential unobserved heterogeneity such as variations in organizational culture, leadership style, or simplification of mediation pathways beyond marketing agility, severely restricts the generalizability of these findings to the entire population. The current evidence is seen as preliminary indications consistent with dynamic capabilities theory. Future research is expected to expand the scope of the analysis, either through parallel mediation models to test alternative operational efficiencies or by integrating objective secondary data to strengthen the external validity of this capability maturity model across various industry sub-sectors.

Based on the findings and limitations of this study, several high-potential future research directions can be identified. These directions can be guided by the "Triple-A" framework: Agility, AI, and Affordability. This framework captures the essence of this study's conclusion (the importance of agility), the most pressing technological trend (AI), and the most persistent MSME constraint (affordability). The critical next research question is: "How can affordable AI tools be leveraged to democratize marketing agility for resource-constrained MSMEs?"

Specific research directions include:

- Longitudinal Studies: Conduct longitudinal research to track the co-evolution of digital resources, marketing agility, and firm performance over time, which would provide stronger evidence of causality.
- Exploring the Role of AI: Investigate the specific impact of Artificial Intelligence (AI) adoption, particularly Generative AI, on the components of marketing agility. Does GenAI disproportionately enhance the speed of content iteration, or does it also improve market sensing capabilities? It would address a key research gap.
- Deepening the Understanding of Post-Adoption Challenges: Conduct qualitative or mixed-methods studies to gain a richer understanding of the nuanced post-adoption challenges (e.g., cultural resistance, workflow integration, continuous upskilling) that quantitative surveys may not fully capture.
- Developing an ROI Measurement Framework: Address the critical challenge of ROI measurement by developing and validating a practical framework specifically designed for MSMEs to assess the return on their digital marketing investments.

Comparative Cross-Country Analysis: Replicate this study in other developing countries in Southeast Asia to test the model's robustness and identify context-specific differences in the drivers of marketing agility.

Declarations

Conflict of Interest Statement

The authors state no conflict of interest.

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Author Contribution

A.H. conceptualized the study, developed the theoretical framework, and supervised the project. A.A. designed the methodology and performed the PLS-SEM analysis. I.S. collected the survey data and prepared the original draft of the manuscript. Y.B.B. conducted the literature review and contributed to data analysis and interpretation. S.R. reviewed and edited the manuscript. All authors reviewed and approved the final manuscript.

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