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The Impact of Digital Transformation and Entrepreneurial Orientation on Women-Led MSME Performance: The Mediating Role of Innovation Capability

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ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) play a central role in Indonesia's economy by generating employment and contributing to GDP. However, rapid technological change requires MSMEs to embrace digital transformation and strengthen entrepreneurial orientation to sustain growth. This study investigates how digital transformation and entrepreneurial orientation affect MSME performance, with innovation capability serving as a mediating factor. A quantitative descriptive design was employed, collecting data through surveys from 150 women-led MSMEs in the Greater Jakarta area. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test seven proposed hypotheses. The results indicate that digital transformation and entrepreneurial orientation both have positive effects on innovation capability and business performance. Furthermore, innovation capability significantly improves MSME performance and mediates the influence of digital and entrepreneurial factors. This study contributes to the literature by linking digital transformation and entrepreneurial orientation with innovation-driven performance in women-led MSMEs. It also provides practical insights for policymakers and support institutions to develop digitalization and innovation programs that strengthen competitiveness in a dynamic market environment.

Keywords - Digital Transformation, Entrepreneurial Orientation, Innovation Capability, MSME Performance

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of Indonesia's economy, accounting for 99% of business units, 61% of GDP, and 97% of national employment (KADIN Indonesia, 2024). Despite a contraction of –2.24% in 2020 due to the COVID-19 pandemic, MSMEs demonstrated resilience with steady recovery, recording 1.52% growth in 2023 (Figure 1).

Data UMKM 2018-2023

Tahun	2018	2019	2020	2021	2022	2023
Jumlah UMKM (Juta)	64.19	65.47	64	65.46	65	66
Pertumbuhan (%)		1.98%	-2.24%	2.28%	-0,70%	1,52%

*Diolah dari berbagai sumber

Fig. 1. Indonesia's MSME Growth
Source: KADIN Indonesia, 2024

Their adaptability highlights their vital role in sustaining economic stability and inclusive growth. According to data from the World Bank and Statistic Indonesia (2025), women represent about 49.77% of Indonesia's total population, which amounts to approximately 140.8 million individuals. Women entrepreneurs are particularly prominent, managing about 64.5% of MSMEs, mainly in creative and

digital sectors such as fashion, culinary, and arts, where innovation drives business development (Aravik *et al*., 2025).

The digital transformation of MSMEs has accelerated rapidly, with the number of enterprises connected to digital platforms increasing from 7 million in 2020 to 20.76 million in 2022 and projected to reach 30 million by 2024 (Figure 2).

Fig. 2. Number of MSMEs entering the digital ecosystem in Indonesia
Source: KADIN Indonesia, 2024

Digital tools such as e-commerce, social media, and mobile banking have become essential for expanding market access and enhancing competitiveness. However, many MSMEs continue to face obstacles, including limited resources, low digital literacy, and inadequate infrastructure (Purnomo *et al*., 2024). The obstacles faced by MSMEs, highlight the critical need for effective digital transformation and a strong entrepreneurial orientation.

In this context, entrepreneurial orientation characterized by innovativeness, proactivity, and risk-taking plays a critical role in helping MSMEs navigate uncertainty and seize emerging opportunities (Munif & Priyono, 2024). Entrepreneurial orientation, through its core dimensions, acts as the driving force that inspires and shapes the innovation capability within MSMEs. Innovation capability serves as the key mechanism that translates digital transformation and entrepreneurial orientation into improved performance outcomes. It enhances firm's ability to quickly respond to fast-changing digital innovations and competitive pressures. Strengthening this capability is therefore crucial for women-led MSMEs to thrive in an increasingly digital and competitive economy.

LITERATURE REVIEW

2.1 Digital Transformation and Innovation Capability

Digital transformation enhances firms' ability to innovate by improving data-driven decision-making, optimizing operations, and enabling new business models (Radicic & Petkovic, 2023). It also facilitates open innovation through digital collaboration with supply chain partners, fostering knowledge exchange and technological advancement (Wang & Zhang, 2025). However, successful implementation requires strategic management and a supportive culture to overcome organizational challenges and adapt quickly to shifting customer demands.

Strong innovation capability allows enterprises to convert digital adoption into tangible performance benefits. Firms with this capability can identify weaknesses in traditional processes, act on market insights, and respond swiftly to technological and environmental changes (Teece, 2018; Um, 2017). By doing so, they are better equipped to recognize unmet needs, manage risks, and develop new business models (Zhang *et al*., 2023). Prior studies confirm that digital transformation significantly strengthens innovation capability, positioning it as a critical factor for sustained competitiveness (Ratnawati *et al*., 2024).

H1: Digital Transformation has a positive effect on innovation capability

Entrepreneurial Orientation and Innovation Capability

Entrepreneurial orientation (EO) is reflected in autonomy, proactivity, innovativeness, competitive aggressiveness, and risk-taking. Autonomy encourages experimentation and creativity by giving decision-making freedom, while proactivity enables MSMEs to anticipate market changes and develop new products or processes (Wijaya *et al*., 2025; Nugroho *et al*., 2021). Risk-taking supports innovation despite its inherent uncertainties, and competitive aggressiveness reflects the drive to outperform rivals (Lumpkin & Dess, 1996, 2001). Innovativeness, meanwhile, involves acquiring and applying new knowledge to improve traditional practices (Al-Mamary & Alshallaqi, 2022).

Together, these EO dimensions foster innovation capability, equipping MSMEs to generate ideas, seize opportunities, and sustain growth. Prior studies confirm that EO significantly enhances innovation capability (Ratnawati *et al*., 2024).

H2: Entrepreneurial Orientation has a positive effect on innovation capability

Entrepreneurial Orientation and MSME Performance

Entrepreneurial orientation (EO) plays a crucial role in shaping firm performance by fostering innovation, proactivity, and risk-taking behaviors that enable businesses to adapt and grow in competitive environments (Lumpkin & Dess, 1996). For many entrepreneurs, especially those starting small businesses, EO provides the strategic mindset needed to overcome limited resources and market uncertainty. Competencies such as opportunity recognition, strategic decision-making, and resilience are central to achieving long-term success, including sustainability, profitability, and business continuity (Kyal *et al*., 2021).

Previous studies consistently demonstrate a strong link between EO and business performance. Nasip *et al*. (2017) confirmed EO's significant influence on SMEs, while Fan *et al*. (2021) found similar evidence across different contexts. More recent research by Munif and Priyono (2024) reinforced the positive and significant effect of EO on MSMEs, highlighting its importance for firms aiming to sustain growth and competitiveness.

H3: Entrepreneurial orientation has a positive effect on MSME Performance

Digital Transformation and MSME Performance

Digital transformation is more than the adoption of technology; it involves reconfiguring business models, operations, and value delivery to remain relevant in a dynamic marketplace. By

integrating digital tools, MSMEs can streamline processes, reduce inefficiencies, and enhance customer interactions, creating opportunities for new revenue streams and competitive advantages (Ningsih *et al*., 2025).

Firms that successfully implement digital transformation often experience improvements in operational efficiency, profitability, and market share. For MSMEs, digital adoption through e-commerce platforms, social media, or online financial systems provides a pathway to scale beyond traditional market boundaries and reach broader audiences. Empirical studies show that digital transformation has a direct, positive effect on MSME performance, making it a strategic priority for long-term sustainability and growth (Ningsih *et al*., 2025).

H4: Digital Transformation has a positive effect on MSME Performance

Innovation Capability and MSME Performance

Innovation capability reflects a firm's capacity to integrate knowledge, skills, and resources to generate new products, processes, and business models that enhance competitiveness. For MSMEs, developing such capability is vital to sustaining performance in dynamic environments. It supports areas such as product development, marketing strategy, creativity, and training, which are crucial for adapting to shifting consumer demands (Widyanti & Mahfudz, 2020). Saunila (2020) emphasized that firms with strong innovation capability are more likely to secure sustainable competitive advantage by consistently introducing value-creating innovations. Similarly, Fan *et al*. (2021) found that proactive firms with well-developed innovation capacity respond more effectively to disruptions and maintain growth. More recently, Munif and Priyono (2024) confirmed that innovation capability plays an essential role in boosting MSME performance, ensuring resilience and long-term business sustainability.

H5: Innovation capability has a positive effect on MSME Performance

Digital Transformation, Innovation Capability, and MSME Performance

While digital transformation provides opportunities to enhance efficiency and competitiveness, its full benefits are realized when firms also possess strong innovation capabilities. Digital tools such as e-commerce, cloud systems, and social media not only optimize operational processes but also serve as platforms for innovation-driven value creation (Zhang *et al*., 2023). Studies highlight that innovation acts as a mediating factor, enabling MSMEs to transform digital adoption into sustainable outcomes, including improved efficiency, profitability, and social impact (Vargas *et al*., 2024). Fernández-Portillo *et al*. (2022) demonstrated that innovation significantly strengthens the link between digitalization and firm performance, suggesting that digital tools without innovation capacity yield limited results. Ratnawati *et al*. (2024) further reinforced that innovation capability amplifies the effect of digital transformation, allowing MSMEs to convert technological investments into business success and competitive advantage.

H6: Digital transformation influence MSMEs Performance through Innovation Capability

Entrepreneurial Orientation, Innovation Capability, and MSME Performance

Entrepreneurial orientation (EO) is widely acknowledged as a strategy that drives innovation and business growth, characterized by risk-taking, proactivity, and innovativeness (Lumpkin &

Dess, 1996; Huang & Wang, 2011; Bouncken *et al*., 2018). Although EO directly supports performance, its effect is often enhanced when mediated by innovation capability (Ratnawati *et al*., 2024). Firms with strong EO are more likely to identify opportunities and adopt bold strategies, but innovation capability provides the means to transform these strategies into concrete outcomes. Gomes *et al*. (2022) found that EO significantly contributes to service innovation, which subsequently improves organizational performance. Moreover, organizational learning and adaptability strengthen the EO–innovation–performance pathway. Ratnawati *et al*. (2024) provide further evidence that innovation acts as a key mediator, allowing EO-driven initiatives to translate into sustained competitiveness and growth, especially for MSMEs facing dynamic market conditions.

H7: Entrepreneurial Orientation influence MSMEs Performance through Innovation Capability

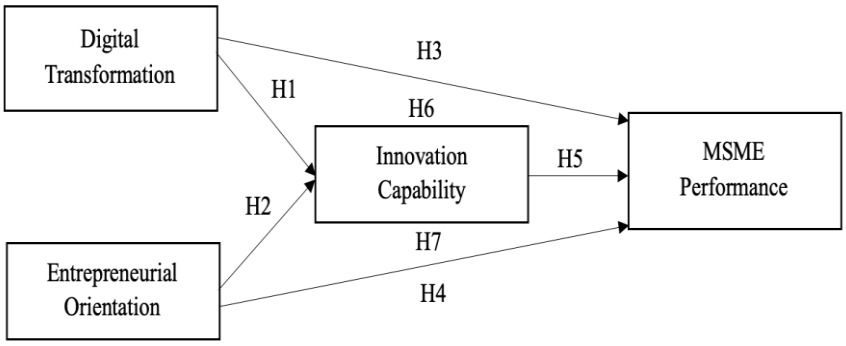

Fig. 2.1. Theoretical Framework

Source: Model By Wijaya *et al*. (2025)

METHODOLOGY

This study adopts a descriptive quantitative research design, which provides a structured framework for examining the impact of digital transformation and entrepreneurial orientation on MSME performance, with innovation capability as a mediating variable. By using structured instruments like standardized questionnaires, this approach enables precise hypothesis testing and rigorous statistical analysis. Consequently, the design ensures the reliable generation of empirical evidence on how digital transformation and entrepreneurial orientation influence MSME performance, mediated by innovation capability. The structured data collection allows systematic examination of hypothesized relationships, supporting informed decision-making.

A sample is a smaller subset selected from a larger population that accurately reflects the essential characteristics of that population (Sekaran & Bougie, 2020). For this study, respondents were chosen from MSME owners, managers, or key decision-makers within the Greater Jakarta area, which

includes Jakarta, Bogor, Depok, Tangerang, and Bekasi, as their experiences and viewpoints directly relate to the research objectives. The selection criteria for respondents were as follows:

1. MSME owners who have been operating their business for a minimum of 2 years.
2. Owners of MSMEs specifically run by women and have digitalized their business.
3. MSMEs situated within the Greater Jakarta area.

The "10-times rule" in Partial Least Squares SEM (PLS-SEM) advises selecting a minimum sample size that is at least ten times the largest number of structural paths leading to any single construct. Based on this guideline, our study uses 15 indicators in the data collection tool. Following Hair *et al*. (2018), the minimum sample size is determined by multiplying the number of indicators by 10, which results in 150 respondents.

Using a Likert scale ranging from 1 to 5, where 1 indicates strong disagreement and 5 indicates strong agreement, this study can transform abstract concepts into quantifiable data, facilitating statistical analysis and the formation of valid conclusions.

Variable	Questions	References
Digital Transformation	1. We have enough resources to implement e-commerce 2. MSME uses e-commerce to reach a bigger market. 3. MSME uses social media for marketing their products. 4. Digital transformation has enhanced our customer satisfaction	(Ratnawati *et al*., 2024; Wijaya *et al*., 2025)
Entrepreneurial Orientation	1. Workers in our business are given access to all important information about the business to generate profits 2. Always try to take initiative in every situation. 3. The concept of "risk-taking" is considered positive for people in the business.	(Wijaya *et al*., 2025)
Innovation Capability	1. MSME considered creating new products to become the first one in the market by creating innovation in the market. 2. MSME actively introduces innovations in our production methods to increase output quality. 3. Business is looking for new ways to make profit. 4. Our new product introductions have increased.	(Wijaya *et al*., 2025)
MSME Performance	1. Innovation that have been made in this business has increased the revenue 2. MSMEs gain increased revenue through new customers 3. MSME gain a customer satisfaction MSME has the ability to develop new products or services.	(Wijaya *et al*., 2025)

This study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the data, a powerful statistical method used to assess causal relationships between latent variables in a theoretical model and to determine how well these constructs collectively account for the phenomena under investigation (Aybek & Toraman, 2022). PLS-SEM is particularly beneficial for exploratory research that includes complex models and utilizes small to moderate sample sizes.

The validity testing process in the study used SMART PLS 4 software to evaluate whether the research instrument effectively measures the intended indicators. Construct validity was tested through convergent and discriminant validity.

For convergent validity, key criteria included:

- Loading factors should ideally be above 0.7, but values between 0.6 and 0.7 are acceptable for exploratory research, with indicators below 0.4 removed.
- Average Variance Extracted (AVE) must be 0.5 or higher to show sufficient representation by the indicators.
- Outer loading values between 0.4 and 0.7 may be retained if removing them weakens the model, but those below 0.4 should be excluded.

Discriminant validity was assessed mainly through:

- Heterotrait-Monotrait Ratio (HTMT), which should be below 0.90 to confirm distinctiveness between constructs.
- Fornell-Larcker Criterion was used as a secondary measure, checking if the square root of AVE exceeded the highest correlation with other constructs, though it is less reliable than HTMT.

The reliability testing in the study was conducted using SMART PLS 4 software to ensure the research instrument produces consistent and stable results. Two main methods were used:

- Cronbach's Alpha (α): Values of 0.7 or higher indicate strong reliability, while values between 0.6 and 0.7 are acceptable for exploratory research. Values below 0.6 suggest low reliability and the need to revise indicators.
- Composite Reliability (CR): Values of 0.7 or above signify good reliability, with 0.6 to 0.7 being tolerable for exploratory studies. Values below 0.6 indicate insufficient reliability, requiring re-evaluation of the indicators.

Three key criteria for evaluating a structural model in PLS-SEM:

- R^2 (Coefficient of Determination) indicates how well the model explains the variance in dependent variables. Values of 0.75, 0.50, and 0.25 represent substantial, moderate, and weak explanatory power, respectively. Acceptable R^2 values vary by research field.
- Effect size (f^2) measures the impact of each independent variable on the dependent variable by comparing R^2 values with and without the variable. Values of 0.35, 0.15, and 0.02 indicate large, medium, and small effects. Even small effects can be meaningful.
- Predictive relevance (Q^2) assesses the model's ability to predict new data, with values above zero indicating adequate predictive power, while zero or below signals insufficient prediction.

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