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Article

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MANAGEMENT | RESEARCH ARTICLE

MSMEs performance and competitive advantage: Evidence from women's MSMEs in Indonesia

Evi Susanti¹, Rita Yuni Mulyanti^{1*} and Lela Nurlaela Wati¹

Abstract: This study intends to examine how competitive advantage mediates the effects of digital transformation and innovation on the performance of women-owned MSMEs. A sample of 246 MSMEs in Indonesia run by women was used in this study. To analyze the data, a structural equation model (SEM) was applied. The study's findings indicate that the performance of women-owned MSMEs is not directly impacted by digital transformation. It does have an impact on innovation and competitive advantage. Innovation and competitive advantage can boost women's MSMEs' performance and play a mediating role in Indonesia's digital transformation of women's MSMEs. The study's findings also confirm and broaden the RBV's assertions on the importance of innovation in determining women's MSMEs' competitive advantage. This empirical evidence can be the basis for the government's efforts to encourage the digitization and innovation of women's MSMEs. Research that discusses the competitive advantages of MSME women to performance, digital transformation, and innovation, which is still limited, this study offers a model of the performance of MSME women in developing countries.

Subjects: Entrepreneurship; Small Business Management; Strategic Management; Management of Technology & Innovation; Gender Studies - Soc Sci;

Keywords: digital transformation; innovation; competitive advantage; women's MSMEs performance



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1. Introduction

Micro, small, and medium-sized businesses (MSMEs) are seen as the key forces behind both established and developing economies because of their role in fostering social cohesion, innovating, and creating jobs (Fan et al., 2021; Lutfi et al., 2022). MSMEs play a crucial role in the economic development of Indonesia and are the backbone of the country's economy, as evidenced by their contribution to raising the Gross Domestic Product (GDP). By 2021, Indonesia will have 65.47 million MSMEs, according to data from the United Nations Conference on Trade and Development (UNCTAD) and the ASEAN Secretariat. MSMEs contributed to the Gross Domestic Product by 60.3% and 14.4% of national exports. MSMEs in Indonesia are also the highest in number in Southeast Asia and cover 97% of the total workforce nationally (DataIndonesia.id, 2021).

The contribution of the MSMEs sector in enhancing Indonesia's GDP is also inseparable from the women's role, both as business actors (entrepreneurs) and as workers. The Central Statistics Agency (BPS) in 2021 reveals that 64.5% of the total MSMEs in Indonesia are managed by women. At first glance, these numbers seem significant. However, if measured by the scale, women-managed MSMEs are still in the small category (Ramdlaningrum et al., 2020). MSMEs owned by women are still difficult to develop, even to move up a grade. Women who run MSMEs experience more difficulties than males do, which makes them feel reluctant to expand their companies. Djuwita and Yusuf (2018) list the challenges women encounter as lacking a company license, financial literacy, internet literacy, and limited access to the finance environment. In addition, the COVID-19 Pandemic has changed people's shopping behavior, namely increasing online shopping due to restrictions on activities outside the home. Competing with big business requires adapting and using new technology applications. Unfortunately, only 5.1 million MSMEs in Indonesia use online transactions and have e-commerce capacity to run their business.

For SMEs, utilizing information technology might be difficult. Digital platforms must replace outdated marketing techniques. For MSMEs to become more competitive and sustainable, digital transformation is essential. Digital technology must now be integrated into business innovation to keep up with the demands of the fourth industrial revolution (Remane et al., 2017). Only a small percentage of business actors can use technology, although it has been shown to assist them survive during a crisis (Ramdlaningrum et al., 2020). MSMEs can compete in domestic and international markets (Alkhateeb & Abdalla, 2021; Emmanuel et al., 2022), Paul et al. (2017) stated that in the Asia Pacific e-commerce market, Indonesia experienced growth of (42%), followed by the Philippines (28%), Thailand (22%) and Malaysia (14%).

The competitiveness of MSMEs can be increased by providing service innovations that outperform their competitors. Rosmadi's study (Rosmadi, 2020) states that innovation, creativity, and capital support the sustainability of MSME activities. MSMEs' women create state-of-the-art business plans that incorporate online marketing, new enterprise models, effective money management, product diversification, and product innovation. Apart from that, they also take advantage of information technology that was already running before or after the pandemic occurred (Ramdlaningrum et al., 2020).

According to research by Ebersberger and Kuckertz (2021) conducted in Asia, Oceania, North America, and Europe, MSMEs have innovated their way out of these problems. The use of information technology and digital transformation in business is crucial for creating business strategies, stimulating innovation and creativity, and boosting competitiveness (Ongori & Migiro, 2010; Van Auken et al., 2008), all of which result in a firm's ability to compete more effectively on the global market and improve financial performance. Previous studies conducted by Mubarak et al. (2019) found that digital transformation has an effect and can improve the business performance of MSMEs in Pakistan. The study by (Guo & Xu, 2021; Nwankpa & Roumani, 2016; Singh et al., 2021; Tajvidi & Karami, 2017) revealed that digital transformation improves company performance. According to Popović-Pantić et al. (2020), product innovation serves as a mediator between the

effects of digital transformation and the performance of women's MSMEs rather than having a direct impact. MSMEs must be made as one of the businesses that have competitiveness by utilizing innovation in facing an increasingly competitive business environment. Therefore, innovation is very important for the resilience of MSMEs (Dhewanto, 2015). Research by Henfridsson et al. (2018) and Nambisan et al. (2017) highlighted how digital technology has the potential to generate new types of innovation. The results of the study by Kotsopoulos et al. (2022) reveal that innovation is a very important factor that drives the company's survival.

Several previous studies have revealed that information technology and innovation have a significant effect on competitive advantage (Cakmak Irlayici & Tas, 2012; Manaf et al., 2020; Yuliantari & Pramuki, 2022). However, in previous research conducted by Mario et al. (2010); they found that innovation has no positive and significant effect on competitive advantage. Previous research by Udriyah et al. (2019) states that there is a role for innovation in building competitive advantage. Research conducted by Pantano et al. (2020) states that business actors who have the desire to compete in an unprecedented pandemic era must prioritize the ability to think innovatively to be able to reshape customer satisfaction. In addition, Falahat et al. (2020) also concluded that forming a competitive advantage in the current global era must be supported by the company's ability to respond to market conditions, innovate products, and offer reasonable prices.

Based on tracing the studies above, female MSME actors must be able to compete and innovate by adopting modern technology and preparing infrastructure, digital literacy, and regulations to develop their business' sustainability. This study also deepens the findings and fills in the gaps of other researchers with the variables of digital transformation, innovation, competitive advantage, and the performance of women's MSMEs by conducting an in-depth and comprehensive analysis to find out which variables affect performance. Women's MSMEs both directly and indirectly where no researcher has ever conducted thorough research. This study is also motivated by a resource-based view so that the topics and dimensions of this research are different from previous researchers, so according to the author, this research has high originality. Our research aims to analyze the effect of mediating variables, namely innovation and competitive advantage to see the effect of digital transformation on the performance of women's MSMEs. Furthermore, the data and results of this research can be used as a source of information and input for the central and regional governments in providing considerations in making policy decisions related to the development of women, especially SMEs. And this research recommends that women's MSMEs can adopt the findings of this research to innovate and improve and sustain their business by investing in human and technical capacity.

2. Theoretical background and hypotheses development

2.1. Lens of RBV

The Resource-Based View (RBV) has been widely utilized to illustrate how businesses can achieve superior performance and a competitive edge. According to the resource-based perspective, successful companies have resources and talents that are particular to the company, unusual, and challenging for rivals to imitate (J. B. Barney, 1986; Bharadwaj, 2000). Consequently, by obtaining or developing organizational qualities that are uncommon, unique, and irreplaceable, businesses can gain a competitive edge (Amit & Schoemaker, 1993; J. Barney, 1991). According to this idea, the major factors affecting an organization's success are its talents, abilities, and other resources, which vary throughout companies and are assumed to be different. Consequently, a business that can recognize the unique assets or skills that set it apart from rivals will have a long-lasting competitive edge (J. Barney, 1991; Daft, 2010).

The RBV is primarily concerned with its resources. According to J. Barney (1991), the internal resources of a company, which could be classified into three categories, are what contribute to it being successful. Physical resources include all factories, equipment, sites, technology, and raw materials. Human resources are all of an employee's education, experience, intelligence,

knowledge, skills, and capacities. Corporate architecture, decision-making processes, information systems, databases, and other organizational resources are examples.

In the MSME's context, RBV explains that business actors are a combination of unique and different resources that have a role in the organization (Dhewanto et al., 2018). RBV can also identify MSME's capabilities in the form of 1) Innovation capability, 2) Production capacity, and 3) Marketing management skills (Priem & Butler, 2001). The combination of strategic resources and the entrepreneurial orientation of MSMEs owners will improve or enhance competitive advantage, align the dynamics of the business environment, and improve MSMEs' performance (Suardhika, 2012). This study uses the RBV lens as inspiration to support the claim that, for MSME businesses to adopt digital transformation fully in a developing context, strategic management considerations from the perspective of technology developers must be explored. The availability of resources is a key success element for innovation, competitive advantage, performance, and business sustainability, according to this study's analysis.

2.2. Digital transformation

The term "digital transformation" describes change that is fueled by and constructed on a digital technological foundation. The organizational shift toward big data, analytics platforms, cloud, mobile, and social media within an organization is known as digital transformation. To adapt to changing business environments, organizations are constantly evolving and changing, making radical changes to their business operations, business procedures, and value creation (Libert et al., 2016). Through digital transformation, organizations can incorporate digital technology into many aspects of their operations and engage customers through digitalization (Aral & Weill, 2007).

2.3. Innovation

Innovation theory applies new ideas in organizations that manifest as products, processes, and services in organizational management and marketing systems Maguire et al. (1997). There are five different sorts of innovation, according to Schumpeter (1983): the introduction of new products, new production techniques, the opening of new markets, the creation of new sources of supply, and new industrial structures. This study refers to the resource-based view (RBV), which is a (Fritsch, 2017) supplement to the innovation theory, which describes growth as a result of change (Dabić et al., 2020). RBV refers to the use of special skills and a variety of resources that are priceless, uncommon, cannot be precisely replicated, and cannot be replaced by businesses that improve MSME performance and innovation (J. Barney, 1991). Innovation is crucial, innovation is not only a priority in building performance, but the most important thing is continuous uncertainty and turbulence so that companies can survive (Kafetzopoulos et al., 2019). According to R. J. Rajapathirana and Hui (2018), innovation has four components: organizational innovation (providing new business sources), process innovation (providing new ways in the production process), marketing innovation (providing new ways in the marketing process), and product innovation (providing better products).

2.4. Competitive advantage

The ability of a corporation to respond to opportunities in the external world by utilizing its internal strengths while avoiding external dangers and internal weaknesses gives it a competitive advantage (Mooney, 2017). Porter (1985) defined competitive advantage as the ability of a corporation to outperform rival companies in the same industry or market by utilizing the company's strengths and resources. The RBV hypothesis states that a firm's competitive advantage and superior firm performance are mostly generated from its resources, which are extraordinarily valuable and expensive to duplicate or copy (J. Barney, 1991).

2.5. Performance

According to Cao and Zhang (2011), a company's performance is determined by how successfully it achieves its aims and objectives in comparison to its primary rivals. Performance is a broad

category that reflects how well a company can achieve its market operations, growth, and financial goals within a given time frame. Good performance is an important indicator of company success because good performance will help maintain the company's financial position and competitive advantage (Guo & Xu, 2021). According to Fairouz et al. (2010), organizational goals attained through the efficacy of strategies and procedures lead to corporate performance.

2.6. Digital transformation and innovation

Digital transformation opens up possibilities for organizations to take advantage of the interrelationships between people, data, information, and knowledge by leveraging digital connections. The ability to implement novel techniques and creative projects into corporate operations is a benefit of organizations that have undergone digital transformation (Díaz-Chao et al., 2015). Therefore, the value chain's business partners communicate more and come up with new ideas as a result of digital transformation. Another opinion was proposed by Ardito et al. (2021) who explained that digital technology could support innovation performance in MSMEs. They can take advantage of digitalization to develop and manage the flow of information through digital technology. The success of digital innovation in small and medium firms is determined by the digital orientation, according to research by (Karina & Astuti, 2022; Kwon & Lim, 2012; Sainio et al., 2012). Based on this clarification, the study's first hypothesis is as follows:

H1: Digital transformation has a positive effect on innovation

2.7. Digital transformation and competitive advantage

Competitive advantage is the sole most important concept for business owners who wish to achieve higher results than competitors do. Every organization can produce goods and services that are better than those offered by its competitors (Torres et al., 2018). Companies need to transform production and services and implement digital transformation processes in all areas, including strategy, structure, and operations, to acquire a competitive advantage in the present market. Additionally, digital transformation can be accomplished by enhancing production procedures, dividing work, and raising labor productivity. (Paunov & Rollo,) and reducing company production costs (Q. Chen et al., 2019). Previous studies on the beneficial impact of digital transformation on business actors' competitive advantage were conducted by Wardhana (2015) and Berliandaldo et al. (2020), who concluded that MSMEs, among other business actors, use digital transformation to change their business strategies. The second hypothesis for this investigation is as follows, based on this description:

H2: Digital transformation has a positive effect on competitive advantage.

2.8. Digital transformation and MSMEs' performance

Previous research on the effects of digital technology demonstrates that digitalization can enhance business performance. IT capabilities boost business performance better for organizations that adopt more digitally embedded business processes (Brynjolfsson & Yang, 1997). According to Kane et al. (2015), installing digital technology alone won't be enough to spur digital transformation. To enable a successful digital transition, a company must instead have enough digital capabilities, a digital strategy, a digital culture, and talent development. Other studies have discovered that several factors, including consumer behavior, expectations, industry-wide digital transitions, shifts in the level of competition, and legislative changes, are important (Berghaus & Back, 2017) Driving elements for the digital transition can be found in (Berghaus & Back, 2017). Digital transformation can also be sparked by the chance to improve business performance, including profitability and new revenue growth, customer satisfaction, improved operational efficiency, convenience and high-quality technical standards, increased business agility, increased employee productivity, and competitive advantage (Ezeokoli et al., 2016).

These results are supported by (Singh et al., 2021; Zhai et al., 2022) who conducted research in China and stated that digital transformation improves company performance (Guo & Xu, 2021; Nwankpa & Roumani, 2016; Widnyani et al., 2021). Based on this elucidation, the third hypothesis of this study is as follows:

H3: *Digital transformation has a positive effect on performance*

2.9. Innovation and competitive advantage

Innovation has long become a central theme in the business strategy literature. According to Anatan and Ellitan (2009), there are two types of innovation, i.e., product and process innovation. Research conducted by Andiyanto et al. (2017) states that innovation can be used as mediation in building competitive advantage between similar business sectors. Research by Song and Parry (1997) explained that the competitive advantage of a product is one of the determining factors for the success of a new product so an innovative product must have an advantage compared to other similar products. This advantage cannot be separated from the development of innovative products so that they will have an advantage in the market, which will then win in the competition. Research by M. Chen et al. (2014) stated that innovation is the main source of competitive advantage in the knowledge economy era because, through differentiation, they can maintain their advantages better.

The ability of a business to innovate through the implementation of new procedures, items, or concepts within the company, is directly related to innovation. Research by Karina and Astuti (2022) showed the important role of the innovation process in supporting MSMEs to utilize their digital capabilities as a competitive advantage. The innovative methods MSMEs utilize will be able to produce products with real value and be of benefit to society. Previous research on the positive effect of innovation on the competitive advantage of MSMEs entrepreneurs was proposed by Hendayana et al. (2019) supported by Mulyono et al. (2020) stating that the innovation implementation has a positive effect on competitive advantage and financial performance. Similar studies done by Udriyah et al. (2019) demonstrated that market orientation and innovation have a favorable and considerably partial effect on competitive advantage. In light of this, the following fourth hypothesis is put up for this study:

H4: Innovation has a positive influence on the competitive advantage of MSMEs.

2.10. Innovation and performance of MSMEs

Innovation has become a crucial tool for corporate survival and expansion in a market that is becoming more competitive and uncertain (Grønhaug & Kaufmann, 1988). Innovation boosts potential value, improves organizational effectiveness, and provides intangible resources to the business (Z. Wang & Wang, 2012). More innovative companies can build additional capabilities that result in good performance and are more responsive to client needs (Calantone et al., 2002).

Previous research by Mulyono et al. (2020), as well as studies by Herman et al. (2018), Kurniawan et al. (2021), Saepulloh and Susila (2021), Udriyah et al. (2019), and Zeb and Ihsan (2020), revealed that the performance of women-owned small and medium enterprises in Pakistan is directly correlated with innovation. The business is still small, and innovation requires costs that will undoubtedly hurt financial performance, especially in the short term. Additionally, research by Larashati et al. (2021) found that innovation strategy hurts financial literacy and the performance of MSME bags and suitcases. The opposite conclusion, on the other hand, was proposed by (Ch et al., 2020), which claimed that innovation hurts financial performance. The following hypothesis is put forth if the aforementioned circumstances are true:

H5: Innovation has a positive effect on MSMEs' performance

2.11. Competitive advantage and performance of MSMEs

The issue of competitive advantage is gaining popularity after Porter developed the concept that one of the main keys to entrepreneurial success is gaining performance at a higher level than its competitors. Business performance can be understood as the outcome of a company's success in market share combined with its capacity to provide new value that is acceptable in that market share, according to earlier research by Chittithaworn et al. (2021). This assertion supports the viewpoint expressed by Widnyani et al. (2021) that digital strategy and innovation can be used as elements to boost MSMEs' competitive advantage. A strong competitive advantage will boost a company's success, according to research (Afiyati et al., 2019; Andiyanto et al., 2017; Kurniawan et al., 2021).

Improved company performance can be created or obtained by increasing its competitive advantage, as suggested by J. Barney (1991). According to J. Barney (1991), a corporation can achieve or create improved performance through enhancing its competitive edge. Competitive advantage, following G. Wang et al. (2011) and Suhong et al. (2006), has a favorable impact on performance as measured by sales volume, profit level, market share, and return on investment. Studies have shown a significant correlation between competitive advantage and organizational performance when using sales-based metrics like sales revenue, profitability, return on investment, productivity, product-added value, market share, and product growth (Nilssen et al., 2015). Therefore, the next hypothesis is proposed as follows:

H6: There is a positive relationship between competitive advantage and MSMEs' performance.

2.12. Innovation as a mediating variable

Companies and business actors must strive for innovation to win the competition in an increasingly competitive globalization era. Innovation is a creative process that requires a new invention that is developed into a product or service with economic value from an item or service (Fritsch, 2017). According to Yu et al. (2013), ICT improves organizational performance by boosting efficiency and innovation, and many researches have indicated that innovation is a mediator between digital transformation and financial performance. According to Palacios-Marqués et al. (2015), innovation capability fully mediates performance. Additionally, Arvanitis and Loukis (2016) discovered that innovation enhances the performance-improving effects of ICT.

According to research by Kessler and Chakrabarti (1996), organizational competency characteristics and strategic orientation can have a good or negative impact on the speed of innovation (Nilssen et al., 2015). Research by Stefanus et al. (2013) exposed the factors related to the types of innovation that contribute to increasing the competitiveness of MSMEs. In addition, it is confirmed that there is a limited number of research on how innovation affects the relationship of digital transformation to the competitive advantage of MSMEs and simultaneously improves their performance. However, Kessler and Chakrabarti (1996) affirmed that there is growing recognition that the speed of innovation is important to create and maintain corporate competitiveness in a rapidly changing business environment.

Research on the mediating role of innovation in the relationship between digital transformation, competitive advantage, and MSME performance was not found, according to the results of a literature search. There are limitations to the empirical evidence. The reason behind the innovation mediation effect is that MSMEs that carry out digital transformation can offer innovations in higher quality products and services, cost efficiency, production process innovations, and product and service distribution innovations to increase the competitiveness of MSMEs and have an impact on improving MSME performance in the context of gender. Based on these reasons, we argue that innovation can mediate digital transformation for competitive advantage and the performance of MSMEs managed by women. Therefore, we hypothesize the following:

H7: *Innovation mediates the effect of digital transformation on MSMEs' competitive advantage.*

H8: *Innovation mediates the effect of digital transformation on MSMEs' performance.*

2.13. Competitive advantage as a mediating variable

Major changes are brought about by digital transformation, which is fueled by information technology innovation. Complex innovations in all social systems, shifting market fundamentals, reshaping boundaries, and fundamental modifications to business models are the essential traits of digital transformation. For MSMEs management, the change in digital strategy can result in benefits by raising their (Muditomo & Wahyudi, 2021; Sylvana & Awaluddin, 2017; Tang, 2021).

Yuliantari and Pramuki (2002) suggest that prior study on digital transformation has a favorable impact on MSMEs' performance through competitive advantage. Meanwhile, the relationship between digital transformation and MSMEs' success is partially mediated by competitive advantage. Research by Brahmanthara and Yasa (2017) has shown that the performance of angkringan MSMEs in Denpasar City is positively correlated with a competitive advantage that mediates product innovation. Hajar and Sukaatmadja's (2016) study found that among boutique MSMEs in Denpasar City, the relationship between entrepreneurial orientation and company success is mediated by competitive advantage. In South Kuta, Badung Regency, Dewi and Putri Ekawati (2017) offers proof of how competitive advantage might moderate the relationship between market orientation and business success.

Innovation talent is viewed as a key advantage for firms looking to establish and maintain a competitive edge (Lawson & Samson, 2001). The ability to innovate allows companies to quickly create new products and apply new systems, which is essential for giving ongoing competition meaning (R. J. Rajapathirana & Hui, 2018).

Business models and risk management have a considerable and favorable impact on increasing MSMEs' performance, according to research by Octavio and Tjakrawala (2021), when competitive advantage is used as a partial mediating factor. Another research that incorporated competitive advantage as an intervening variable was conducted by Asyhari et al. (2018) stated that having a strong business strategy and acting morally as a vendor can help you get a competitive advantage. The second finding showed that elements like business strategy quality, seller ethics, process innovation, an entrepreneurial mindset, business environment flexibility, and partial competitive advantage have a positive effect on a company (Afiyati et al., 2019; Mudiantono, 2019; Saepulloh & Susila, 2021; Udriyah et al., 2019) and (Merakati et al., 2014). Therefore, the following hypotheses are proposed:

H9: *Competitive advantage mediates the effect of digital transformation on MSMEs' performance.*

H10: *Competitive advantage mediates the effect of innovation on MSMEs' performance.*

2.14. Digital transformation affects the performance of MSMEs which is mediated by innovation and competitive advantage

The added value that a company owns in contrast to its rivals is known as a competitive advantage. Companies with a competitive advantage rule the market and can continue operating their businesses while surviving. MSMEs' innovations will advance businesses in a good way as well (Trott, 2008) While business performance is inextricably linked to applied market orientation, sustainable product innovation, and competitive advantage—all of which significantly contribute to the growth of MSMEs—Lapian (2016). According to Gunday et al. (2011), innovation is one of the key tools used by businesses to grow their market share and gain a competitive advantage. Innovation also improves a company's performance by putting it in a better position to compete and perform well (Gomes & Wojahn, 2017).

For businesses to become profitable and competitive, marketing and innovation are essential (Song et al., 2005). García-Morales et al. (2007) found that effective innovation can make external imitation more challenging and help a business better maintain its competitive edge. Thus, performance and competitive advantage may be impacted by innovation (Wingwon et al., 2012). Some researchers reveal that innovation entirely bridges the gap between competitive advantage and business model experimentation. However, while having a direct impact on performance, competitive advantage is revealed to play a minimal mediating role. All direct relationships are important, but in sequential mediation, the mediating effect only partially outweighs the direct relationships (Khan et al., 2021). Small and medium-sized businesses don't typically apply the business model experiment in developing nations, nevertheless. As a result, this study will examine how innovation and competitive advantage sequentially mediate the performance of women-owned MSMEs. The current study has decided to contribute to the knowledge and literature gaps in introducing the role of innovation and competitive advantage to mediate the relationship of digital transformation with the performance of women's managed MSMEs. Thus, this study proposed the following hypothesis:

H11: Innovation and competitive advantage mediate the effect of digital transformation on MSMEs' performance

3. Research methodology

3.1. Samples and data

This study used a quantitative approach with a causality design to test the hypothesis. This study uses the Cluster Random Sampling method. Data were collected using a questionnaire distributed and filled out by 246 woman's MSMEs entrepreneurs from the Province of DKI Jakarta, West Java, and Banten. The number of samples was calculated by following the rule of thumb (Hair et al., 2011). The respondents were considered to have sufficient knowledge about digital transformation, innovation, competitive advantage, and business performance (Sekaran & Bougie, 2016). The collected data were then processed using smartPLS Professional 4.0, by following the PLS analysis stages, i.e., testing the outer model and testing the inner model to ensure there was an influence between variables. Hypotheses testing was performed by t-test.

3.2. Variable measurements

Data collection was carried out by distributing the questionnaires with a Likert scale, scored of 1–5 representing strongly disagree (1) to strongly agree (5). There were three types of variables in this study, i.e., digital transformation as independent variables, innovation, and competitive advantage as intervening variables, and MSMEs performance as dependent variables. The digital transformation variable was measured by Chaniago's (2020) dimensions, i.e., the use of social media, job simplification, speed of change, and managerial speed. Innovation was measured by the two innovational dimensions as proposed by the OECD (2010), i.e., product and service innovation. The measurement of competitive advantage variables referred to the dimensions proposed by Suhong et al. (2006); and Thatte et al. (2007) i.e., the use of quality, technology, product innovation, and management. Meanwhile, the performance variable was measured according to the MSMEs performance proposed by Rapih et al. (2015) and (Thi Xuan Hoa and Tuyen (2021), i.e., the dimensions of market growth, productivity, brand reputation, and customer satisfaction.

3.3. Model specifications

The primary data were analyzed using Structural Equation Modeling (SEM), with a first-order confirmatory approach with Smart PLS. All latent constructs of digital transformation, innovation, competitive advantage, and performance were measured by reflective indicators.

The following equations are proposed.

a. Model of women's MSMEs innovation

$$I = \beta_1 DT + \varepsilon_1 \quad (1)$$

b. Model of competitive advantage of women's MSMEs

$$CA = \beta_2 DT + \beta_3 I + \beta_3 DTI + \varepsilon_2 \quad (2)$$

c. Model of women's MSMEs performance

$$P = \beta_1 DT + \beta_2 I + \beta_3 CA + \beta_4 DTCA + \beta_5 DTICA + \varepsilon_3 \quad (3)$$

Where:

I = innovation,

DT= digital transformation,

DTI = innovation mediates digital transformation

CA = competitive advantages

P = performance

DTCA = competitive advantages mediate digital transformation

DTICA = innovation and competitive advantages mediate digital transformation

$\varepsilon_{1,2,3}$ = error

4. Results and discussion

4.1. Respondent characteristics and variable descriptions

The following table (Table 1) describes the information on the characteristics of respondents consisting of business types, length of business, number of workers, age of the entrepreneurs, educational background, and marital status. Based on the results, more than 68% of respondents were involved in the culinary business, 39.8% ran a business for 1–3 years, more than 45% had 1–2 workers, while the majority of the entrepreneurs were over 35 years old, i.e., 76.8%; more than 38 % of them had senior high school background of education. Most of the respondents (87.4%) were married. The total number of respondents was 246 women entrepreneurs. The majority of MSMEs managed by women indicate that the skills and creativity possessed by women can be developed as a source of livelihood. The data in the table above shows that women's MSMEs can survive even during the COVID-19 pandemic. Women's MSMEs also have the potential to create new job opportunities and help overcome unemployment. Most of the women managing MSMEs come from the millennial generation, who are well-educated and use Facebook. They are married, which means that besides managing a business, women who own MSMEs also carry out their roles as wives and mothers at home.

In Table 2 above, it can be seen that the total average value of digital transformation carried out by MSMEs is included in the "good" category and has used digital media for promotion, speeding up work, improving the quality of management, and monitoring of work, although there are still

Table 1. Characteristics of the respondents

Characteristics of the respondents	Total	
	Frequency	Percentage
Type of business		
Souvenir	10	4.1
Culinary	168	68.3
Fashion	50	20.3
Automotive	2	0.8
Agribusiness	7	2.8
Other	9	3.7
Total	246	
Tenure		
<1 year	11	4.5
1–3 year	98	39.8
4–6 year	59	24.0
>6 year	78	31.7
Total	246	
No. of workers		
No Employees	69	28.0
1–2 workers	113	45.9
3–5 workers	42	17.1
>5 workers	22	8.9
Total	246	
Entrepreneur age		
<20 year	4	1.6
20–25 year	14	5.7
26–30 year	12	4.9
31–35 year	27	11.0
>35 year	189	76.8
Total	246	
Media online used		
Facebook	88	35.8
Instagram	57	23.2
Tik tok	33	13.4
Whats app	41	16.7
Twitter	2	0.8
Website	25	10.2
Total	246	
Revenue		
<5	105	42.7
5–10 million	31	12.6
10–20 million	35	14.2
20–50 million	27	11.0
50–100 million	8	3.3
>100 million	5	2.0
Total	246	

(Continued)

Table 1. (Continued)

Characteristics of the respondents	Total	
	Frequency	Percentage
Education		
Elementary School	7	2.8
Junior High School	29	11.8
Senior High School	95	38.6
Diploma	30	12.2
Bachelor	80	32.5
Magister	5	2.0
Total	246	
Marital status		
Married	215	87.4
Single	31	12.6
Total	246	

Source: Authors' calculation.

female MSMEs that have not integrated their businesses with the ecosystem. Digital innovations made by women-owned SMEs have been made by providing products that suit customer needs, fast and timely service, flexible production processes, and quality products.

Women's MSMEs have a high competitive advantage because the products produced are always updated according to the times, have differences from competitors, are easily recognized, and use innovation in marketing products. The performance of women's MSMEs is high, as evidenced by the products produced that are acceptable to consumers, an increase in market share, an increase in production capacity, and an increase in the number of customers and employees who feel comfortable at work.

4.2. Measurement models

Testing the measurement model in this study can be seen in Figure 1. The tests are the first-order pattern, while the latent variables of this research are digital transformation, innovation, competitive advantage, and MSME performance. Indicators for each latent variable can be seen in the following figure and table.

In Figure 1 above, it is seen that all loading factor values are greater than 0.5, so convergent validity is met. Discriminant validity testing using cross-loading with constructs also shows that each item with its construct has a higher value than the correlation of other items. The cross-loading value of each variable can be seen in Table 3 below.

The subsequent validity test is the Fornell-Larcker Criterion, which is stated to be valid when the construct has a greater association construct correlation than the correlation between other constructs.

Table 4 above shows the correlation value of the association construct is greater than that of the other constructs. Thus, we are convinced that the model has good discriminant validity. Based on the values indicated by the indicators of convergent validity and discriminant validity, all constructs in this study are claimed to be valid and meet the requirements for further analysis.

Table 2. Description of research variables

Construct		Mean
X1	Digital Transformation	
X1.1	Having an online account to market products or services to manage business	4.43
X1.2	Having a website with complete features	3.51
X1.3	Use of digital media to coordinate sales of products/services	4.34
X1.4	The use of digital media to make product/service businesses survive in a critical time	4.22
X1.5	Having data stored automatically with the use of digital media	4.25
X1.6	Using technology in financial record keeping to manage a business	3.86
X1.7	The managed business is already integrated with the digital ecosystem	3.75
X1.8	Business transactions already use the digital platform	3.85
X1.9	Utilization of technology to easily monitor the previous, current, and future work	4.28
	The use of technology for quick decision-making based on data	4.22
X1.11	The use of technology to improve quality in business management	4.25
X2	Innovation	
X2.1	Producing products or services with efficient operating costs	3.97
X2.2	Providing products or services based on the customers' needs and expectations	4.28
X2.3	Offering high-quality products or services compared to competitors	4.20
X2.4	Sending customer orders according to the quantity ordered	4.49
X2.5	Sending customer orders on time	4.28
X2.6	Considering work speed in managing business	4.35
X2.7	Providing flexibility in the production process	4.22
Z	Competitive advantage	
Z1	Generating easily recognized new products or services by costumers	4.09
Z2	Updating products following the trend of the market	4.18
Z3	Having an information system to store company data	3.87
Z4	Managing business using the application	3.22
Z5	Innovation in marketing the products or services offered	3.88
Z6	Offering products/services with different designs from competing products	4.02
Z7	Having an organizational structure for facilitating communication	3.81
Z8	Having a team that works professionally	3.83

(Continued)

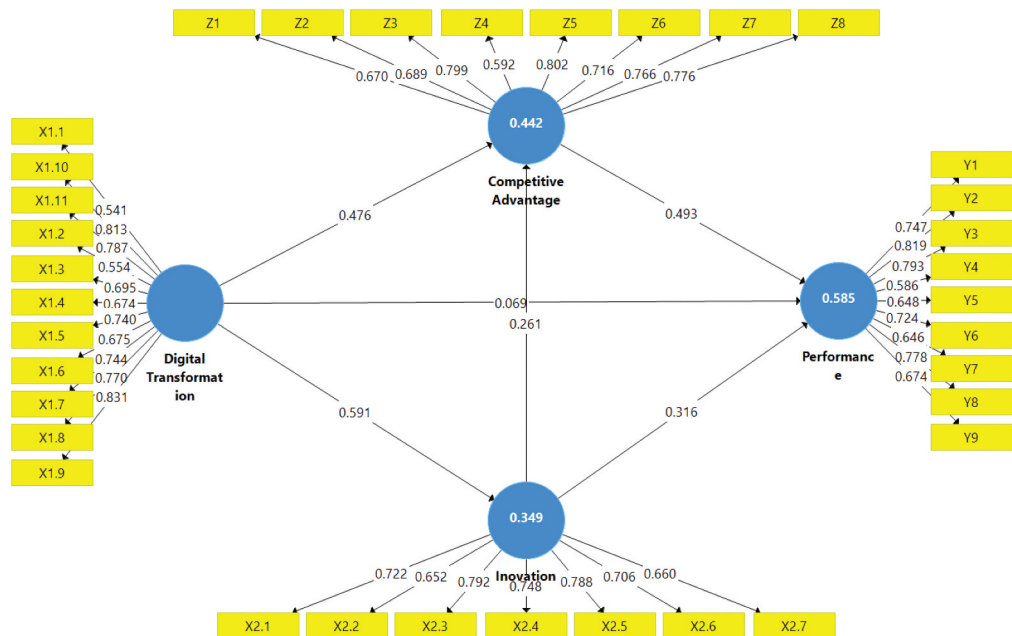
Table 2. (Continued)

Construct		Mean
Y	MSMEs' performance	
Y1	Having a wider market development	3.93
Y2	Experiencing high sales growth	3.69
Y3	An increase in annual business production capacity	3.85
Y4	Ability to lower production cost than planned	3.39
Y5	Ability to make customers' good acceptance	4.35
Y6	Providing a comfortable workplace for workers	4.04
Y7	Having a good reputation that makes it easy to earn venture capital	3.84
Y8	The number of customers increases every year	3.94
Y9	Customers make repeat purchases	4.32

Source: authors' calculation.

Figure 1. Measurement model (outer model).

Source: Authors' calculation.



4.3. Reliability testing

According to Ghazali and Latan (2015), reliability is a method for measuring a survey that serves as an indicator of a variable or construct. A questionnaire is considered to be trustworthy if the respondents consistently provide stable replies to the questions. Likewise, this study also expects consistency from the dimensions and research variables. Thus, it can proceed to the next test stage. Cronbach's Alpha is more than 0.6, and data are deemed credible if they meet these criteria. A further indicator of the construct dependability is the Average Variance Extracted (AVE) value, which must be more than 0.5.

Figure 2. Simple mediation model.

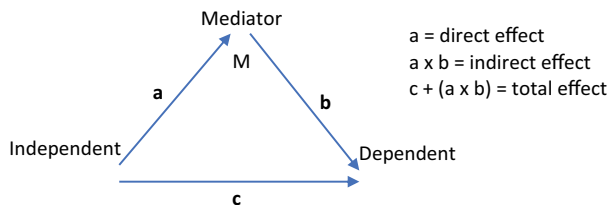


Table 3. Cross loading

Indicator	Competitive Advantage	Digital Transformation	Innovation	MSMEs Performance
X1.1	0.299	0.541	0.444	0.371
X1.10	0.470	0.813	0.548	0.465
X1.11	0.515	0.787	0.540	0.480
X1.2	0.363	0.554	0.203	0.259
X1.3	0.418	0.695	0.457	0.438
X1.4	0.429	0.674	0.414	0.452
X1.5	0.326	0.740	0.366	0.270
X1.6	0.500	0.675	0.294	0.403
X1.7	0.558	0.744	0.362	0.417
X1.8	0.517	0.770	0.410	0.394
X1.9	0.507	0.831	0.511	0.434
X2.1	0.390	0.524	0.722	0.428
X2.2	0.392	0.433	0.652	0.446
X2.3	0.417	0.409	0.792	0.553
X2.4	0.291	0.387	0.748	0.434
X2.5	0.451	0.412	0.788	0.494
X2.6	0.392	0.411	0.706	0.366
X2.7	0.405	0.414	0.660	0.428
Y1	0.549	0.431	0.456	0.747
Y2	0.568	0.423	0.405	0.819
Y3	0.553	0.435	0.476	0.793
Y4	0.440	0.363	0.339	0.586
Y5	0.344	0.297	0.601	0.648
Y6	0.581	0.432	0.435	0.724
Y7	0.521	0.384	0.332	0.646
Y8	0.522	0.474	0.471	0.778
Y9	0.455	0.393	0.507	0.674
Z1	0.670	0.431	0.511	0.497
Z2	0.689	0.496	0.465	0.480
Z3	0.799	0.451	0.344	0.536
Z4	0.592	0.398	0.192	0.322
Z5	0.802	0.585	0.410	0.613
Z6	0.716	0.483	0.437	0.568
Z7	0.766	0.351	0.347	0.502
Z8	0.776	0.444	0.397	0.544

Source: Authors' calculation.

Table 4. Discriminant validity of fornell larcker criterion

	Competitive Advantage	Digital Transformation	Innovation	MSMEs Performance
Competitive Advantage	.730			
Digital Transformation	.630	0.717		
Innovation	.543	0.591	0.726	
MSMEs Performance	.708	0.566	0.624	.717

Source: Authors' calculation.

Table 5. Construct reliability

Variable	Cronbach's Alpha	Composite Reliability	AVE	Remark
Digital Transformation	.903	.920	0.514	Reliable
Innovation	.849	.886	0.527	Reliable
Competitive Advantage	.873	.900	0.532	Reliable
MSMEs Performance	.879	.904	0.514	Reliable

Source: Authors' calculation.

The indicators selected for each variable have strong reliability or can measure the construct, as shown in Table 5 above. One may say that a build dependability table is a tool used to gauge several aspects of digital transformation. Performance, competitive advantage, and innovation are reliable and valid.

4.4. Structural models

Structural model testing includes goodness of fit, coefficient of determination, and effect size as well as hypothesis testing. Evaluation of goodness of fit using predictive relevance (Q^2) scores are described as follows.

$$Q^2 = 1 - (1 - R21)(1 - R22)(1 - R23)$$

$$Q^2 = 1 - (1 - 0.349)(1 - 0.442)(1 - 0.585)$$

$$Q^2 = 0.849$$

The Q^2 value indicates that the model can explain the phenomenon of MSMEs' performance associated with several variables, i.e., digital transformation, innovation, and competitive advantage by 84.9%.

The coefficient of determination (R^2) of digital transformation for innovation is 0.349, meaning that digital transformation can explain the innovations in women-managed MSMEs by 34.9%, while the remaining (65.1%) is caused by other variables not included in the research model. The coefficient of determination in the competitive advantage model is 0.442 (44.2%), meaning that the competitive advantage of women's MSMEs can be explained by digital transformation and innovation by 44.2%, while the remaining 53.5% is explained by other variables. The performance model for women's MSMEs has a coefficient of determination of 0.585 (58.5%), meaning that the performance of women's MSMEs is explained by digital transformation, innovation, and competitive advantage by 58.8%, and the remaining is explained by other variables not included in the research model.

Based on Table 6 above, it can be concluded that The coefficient of determination(R^2) value indicates the extent to which the predictive variable can explain the variability of the dependent variable. Meanwhile, the magnitude of the influence between the variables in the study is indicated by the effect size (f^2). The size f^2 is very useful to determine the extent to which the explanatory or mediating variable contributes to the R^2 of the dependent variable. The f^2 value of 0.5 is classified as the large category, while the value of 0.15 is in the medium category, and 0.02 is in the “small category” (Cheah et al., 2018). In Table 7, the f^2 value of digital transformation to innovation is 0.534, classified as the “large category”. The f^2 values of digital transformation and innovation on competitive advantage are 0.246 and 0.080 respectively, meaning that the variable with the highest effect on competitive advantage in women’s MSMEs is digital transformation. In the performance model, we can see that the f^2 values of digital transformation, innovation, and competitive advantage are 0.006, 0.145, and 0.326, respectively. The greatest effect size on the performance of MSMEs is found in the variable of competitive advantage. Thus, we conclude that the variable with the highest effect on the women-managed MSMEs’ performance is a competitive advantage.

Innovation is positively and significantly impacted by the digital transition. Competitive advantage is directly and significantly positively impacted by digital innovation and transformation. The performance of women’s MSMEs is positively and significantly impacted directly by innovation and competitive advantage. However, it has been discovered that digital transformation has no direct impact on the performance of women-owned MSMEs (Table 6).

Table 6. Hypothesis testing results

Hypothesis		Coeff	t-statistics	f^2
Innovation Model				
H1	Digital Transformation -> Innovation	0.591	11.567**	0.536
R^2		0.349		
Adjusted R^2		0.346		
Competitive advantage model				
H2	Digital Transformation -> Competitive Advantage	0.476	6.650**	0.246
H3	Innovation -> Competitive Advantage	0.261	3.617**	0.080
R^2		0.442		
Adjusted R^2		0.437		
MSMEs Performance Model				
H5	Digital Transformation-> Performance	0.069	1.020	0.006
H6	Innovation -> Performance	0.316	5.342**	0.145
H7	Competitive Advantage -> Performance	0.493	8.692**	0.326
R^2		0.585		
Adjusted R^2		0.580		

Significant level: * $p < 0.1$. ** $p < 0.05$.

Source: Authors’ calculation.

Table 7. Indirect effect

Indirect Effect of Digital Transformation on MSMEs' Performance

Hypothesis		Coefficient	t-statistics
H4	Digital Transformation -> Innovation -> Competitive Advantage	0.154	3.284**
H8	Digital Transformation -> Competitive Advantage -> MSMEs Performance	0.234	5.206**
H9	Innovation -> Competitive Advantage -> MSMEs Performance	0.129	3.224**
H10	Digital Transformation -> Innovation -> Competitive Advantage -> MSMEs Performance	0.076	3.021**
H11	Digital Transformation -> Innovation -> MSMEs Performance	0.187	4.398**
Q2 (Predictive Relevant)		0.535 (53.5%)	

Significant level: * $p < 0.1$. ** $p < 0.05$.

Source: Authors' calculation.

Innovation can mediate the effect of digital transformation on competitive advantage and also the effect of digital transformation on women's MSMEs performance. The success of women's MSMEs can be mediated by competitive advantage in response to digital transformation and innovation. (Table 7).

4.5. Mediation effect test

To determine whether the variables of innovation and competitive advantage can mediate completely or partially, a mediation effect test was carried out. The mediating variable serves as a metaphor for the transformation process that takes place for the variable to affect the dependent variable. To determine the effect of mediation, the opinion of Zhao et al. (2010) is used to identify three consistent patterns and two consistent patterns in mediation as shown in Figure 2 below:

The mediating effect was divided into five categories by Zhao et al. (2010), If a $x \rightarrow b$ is significant, c is significant, and $a \rightarrow b \rightarrow c$ is significant, then (a) complementary (partial mediation) applies; (b) competitive (partial mediation) applies if $a \rightarrow b$ is significant, c is significant, but $a \rightarrow b \rightarrow c$ is not significant; if $a \rightarrow b$ is significant but c is not, indirect only (complete mediation); If $a \rightarrow b$ is not significant but c is, then the results are (d) direct-only (no mediation) and (e) no effect (no mediation) if $a \rightarrow b$ is not significant but c is not significant. Table 8 below presents the mediating effect in this study.

According to Table 8, innovation can partially moderate the impact of the digital transition on competitive advantage. However, it can fully mediate the effect of digital transformation on women's MSMEs' performance. The performance of women's MSMEs is affected by digital transformation and innovation, with competitive advantage serving as a partial mediator.

4.6. Discussions

Because research on SMEs is important to development given their contribution, the discussion of the study's findings is pertinent to the literature. Data was collected and analyzed, 11 hypotheses were proposed and tested. Ten of these hypotheses are accepted while one is not. Based on the predictive relevance value of 84.9%, this research model is considered suitable and acceptable as a reference in practical policy.

Table 8. Mediation effects

Variable	c	a x b	c + (a x b)	Remark
Digital Transformation -> Innovation -> Competitive Advantage	sig	sig	sig	Partial mediation
Digital Transformation -> Competitive Advantage -> MSMEs Performance	no sig	sig	sig	Full mediation
Innovation -> Competitive Advantage -> MSMEs Performance	sig	sig	sig	Partial mediation
Digital Transformation -> Innovation -> Competitive Advantage -> Performance	no sig	sig	sig	Full mediation
Digital Transformation -> Innovation -> MSMEs' performance	no sig	sig	sig	Full mediation

Source: Authors' calculation.

According to the study's findings, digital transformation specifically has a favorable and significant impact on innovation. This means that the more effectively it is implemented in women's MSMEs—as indicated by their use of digital media, adoption of new technologies, and use of those technologies—the better it will be able to enhance product and service innovation, marketing innovation, production process innovation, and product and service distribution innovation. Along with social media, MSMEs also help build relationships with customers. The best thing in doing business is a product that can be accepted by customers, innovation is needed especially by increasing the variety and quantity of products because this can contribute to market expansion. These results confirm the findings of Díaz-Chao et al. (2015), that through digital transformation, organizations will gain new ideas from communicating with their business partners. Explicitly, Ardito et al. (2021) also stated that digital technology supports the innovation performance of MSMEs. This finding also supports the research results of (Karina & Astuti, 2022; Kwon & Lim, 2012; Sainio et al., 2012).

The study's findings also indicate that digital transformation has a favorable and significant impact on competitive advantage, which means that female MSMEs who have adopted this strategy have been successful in enhancing quality, fostering innovation, and managing their businesses in a way that increases efficiency and gives them an edge over rivals. This result is in line with (Berliandaldo et al., 2020; Torres et al., 2018; Wardhana, 2015). These findings imply that digital transformation is used to change the business strategy of women's MSMEs. It also means that the use of technology helps women's MSMEs in managing businesses, ranging from information search to financial management, and increasing marketing outreach. Digital transformation is proven to be able to improve new products/services that are easily recognized by customers, update products/services according to updated market preferences, offer products/services with different designs from competitors, and make it easier to reach a wider market share.

Digital transformation was found to have no direct effect on the performance of MSME women. This means that digital transformation is not a direct determining factor in MSME performance. However, these findings are not in line with the research results of (Mubarak et al. (2019) revealing that the company performance increases with digital transformation. Companies that use digitization in their business processes will obtain more benefits. Popović-Pantić et al. (2020) said that digital transformation will contribute to the development of women's MSME businesses if used to innovate. These findings confirm the results of studies (Arvanitis & Loukis, 2016; Palacios-Marqués et al., 2015; Tajvidi & Karami, 2017; Yu et al., 2013) which found innovation to be a mediator between digital transformation and performance. It indicates that digital transformation encourages innovation that leads to excellent competitiveness. Therefore, they can improve MSMEs' performance as measured by an increasingly wider market share, high sales growth, high production capacity, and lower production cost. Consumers can receive better quality products or services to make repeat purchases. They can also increase business capital, and increase the number of customers. This empirical evidence shows that to achieve high performance, women's MSMEs must carry out digital transformations to encourage innovation in products, processes as well as services.

In general, female MSME entrepreneurs face the same business problems as men, there is great potential for learning to improve knowledge and skills to create a culture of innovation. There is a study in Europe recently European Union (2019) which emphasizes how digital transformation drives entrepreneurial innovation. These circumstances indicate that innovation is essential for women's MSMEs to achieve competitive advantage and high performance. According to empirical data, innovation directly impacts the competitive advantage of MSMEs owned and operated by women. These results support previous research findings that innovation enhances competitive advantage (Hendayana et al., 2019; Mulyono et al., 2020). The more effective the innovation, the more competitive advantage women's SMEs will have.

The analysis's findings revealed that the success of women-owned MSMEs is directly impacted by competitive advantage. According to empirical research, MSMEs run by women can perform better when they have a competitive edge. The results of this study support previous research (J. B. Barney et al., 2011; Prakash, 2014; Suhong et al., 2006; G. Wang et al., 2011; Yang et al., 2009) which states that competitive advantage and performance as indicated by sales volume, profit level, market share, and return on investment have a positive correlation. Increasing the company's competitive advantage can be used to develop or acquire improved company performance.

The performance of women's MSMEs is perfectly mediated by competitive advantage when it comes to the impact of digital transformation. According to studies (Brahmanthara & Yasa, 2017; Hajar & Sukaatmadja, 2016; Yuliantari & Pramuki, 2022), the relationship between digital transformation and MSME performance is largely mediated by competitive advantage. The findings of this empirical test support this hypothesis.

The ability of innovation pushes businesses to offer new products fast and adapt new systems; crucial to give meaning to the ongoing rivalry. Competitive advantage is also able to mediate the influence of innovation on the performance of women's SMEs (R. P. J. R. J. Rajapathirana & Hui, 2018). The empirical test of this research is in line with the findings of Octavio and Tjakrawala (2021) which reveal that competitive advantage partially mediates business models and risk management for improving MSME performance. Women MSME owners must be oriented towards winning competitions by utilizing digital technology to empower themselves and investing in developing human and technical capacities. It is hoped that this step will help MSME women to be in a position of maximum performance (Amoah et al., 2023).

Digital transformation encourages entrepreneurs to gain a competitive advantage as a determining factor in their business. Competitive advantage is also able to mediate the effect of innovation on the performance of women's MSMEs. Theoretically, this research supports the resource-based view (RBV) and expands the RBV theory in the context of digital transformation in

gender-based MSMEs by showing empirical evidence of the determinants of competitive advantage that contribute to improving the performance of women's MSMEs in Indonesia.

5. Conclusion

5.1. Main findings

There are several important findings in this research. First, digital transformation increases the innovation of women's MSMEs. Second, transformation increases the competitive advantage of women's SMEs. Third, digital transformation cannot improve the performance of women's MSMEs. Fourth, innovation can increase competitive advantage. Fifth, innovation can improve the performance of women's MSMEs. Sixth, competitive advantage can improve the performance of women's SMEs. Seventh, innovation can become a mediator for the influence of digital transformation on increasing competitive advantage and the performance of women's MSMEs. Eighth, competitive advantage can mediate the impact of digital transformation on the performance of women's MSMEs, competitive advantage can also mediate the impact of innovation on MSME performance. Ninth, digital transformation cannot improve the performance of women's MSMEs but must be mediated by innovation and competitive advantage. The results of the study deepen and expand the Resource-Based View (RBV) with the application of digital transformation and the role of innovation in producing products and services with uniqueness and high quality. So that it has high competitiveness and has an impact on improving the performance of MSMEs managed by women

5.2. Theoretical and policy implications

The results of this study suggest several things: First, the government, together with the relevant ministries, conducts digitalization training and assistance for MSMEs managed by women, both in urban and rural areas. Second, government and the Ministry of Information and Communication to improve and increase access to 3 G/4 G networks as an alternative to fast broadband access. The MSMEs in rural areas without internet accessibility via mobile, fiber, or cable services must be provisioned. Provide easy access to technology (easy network, building BTS in rural areas) to MSMEs, especially those managed by women, to facilitate digital transformation in the businesses they manage. Third, the government protects MSMEs through regulations related to data misuse. Fourth, facilitating business licensing for MSMEs managed by women is important because it has been proven that MSMEs managed by women can innovate through digital transformation and have good competitiveness and performance, thereby contributing to increasing GDP in Indonesia.

5.3. Limitations and future research

However, there are still limitations to this research since the sample of women-managed MSMEs only comes from three cities, i.e. Bandung, Jakarta, and Bogor. It did not distinguish between generations of MSME owners. The study results are not confirmed through in-depth interviews with the respondents and only tested digital transformation and innovation as determinants of competitive advantage. Therefore, further research is expected to expand the sampling area, differentiate samples based on generational groups and marital status of women managing MSMEs, and add variables to determine competitive advantage.

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No potential conflict of interest was reported by the author(s).

Authors contribution

Evi Susanti: Concept development, literature review, methodology, and discussion.
Rita Yuni Mulyanti: Conceptualization, methodology, discussion, and formal analysis.
Lela Nurlaela Wati: Proof-reading, discussion, and conclusion

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