Research Journal in Advanced Humanities

RJAH

https://doi.org/10.58256/w2nqee35

Open Access

Check for updates

RESEARCH ARTICLE **Section:** *Digital Humanities*

Digital transformation, gender, and entrepreneurial resilience: A study of women-led SMEs

Muhammad Bangun Siregar[1], Ritha F Dalimunthe[1]*, Prihatin Lumbanraja[1] & Endang Sulistya Rini[1]

[1]Department of Doctoral Management Science, Faculty of Economics and Business, Universitas Sumatera Utara, Indonesia

*Correspondence: ritha.dalimunthe@usu.ac.id

ABSTRACT

Women-led SMEs play a crucial role in promoting inclusive economic growth; however, they often operate within broader social and gendered structures that shape access to resources, opportunities, and digital participation. These conditions frequently limit their competitive advantage, particularly in terms of digital adoption and access to resources. This study aims to examine the mediating role of digitalization in the relationship between entrepreneurial resilience and competitive advantage in women-led SMEs. Using a quantitative, explanatory research design, data were collected from 150 women-led SMEs in North Sumatra, Indonesia. The analysis was conducted using Structural Equation Modeling based on Partial Least Squares (SEM-PLS). The results indicate that entrepreneurial resilience has a significant positive effect on digitalization and competitive advantage. Digitalization also has a strong and significant effect on competitive advantage. Furthermore, digitalization has been shown to mediate the relationship between entrepreneurial resilience and competitive advantage. These findings suggest that resilience alone is not sufficient to generate a competitive advantage unless it is transformed through digital capabilities. This study contributes to the literature by integrating perspectives on entrepreneurial resilience and digital transformation within a competitive advantage framework, particularly in the context of women-led SMEs. Practically, the findings highlight the importance of strengthening digital adoption to enhance the competitiveness of women entrepreneurs. Beyond firm-level outcomes, this study also underscores the role of digitalization in supporting broader processes of inclusion and socio-economic empowerment among women entrepreneurs.

KEYWORDS: digital transformation, entrepreneurial resilience, women-led SMEs, competitive advantage, digitalization, dynamic capabilities, gender and entrepreneurship, SEM-PLS

Research Journal in Advanced Humanities

Volume 7, Issue 1, 2026

ISSN: 2708-5945 (Print)

ISSN: 2708-5953 (Online)

ARTICLE HISTORY

Submitted: 01 **March 2026**

Accepted: 21 **March 2026**

Published: 21 **March 2026**

HOW TO CITE

Siregar, M. B., Dalimunthe, R. F., Lumbanraja, P., & Sulistya Rini, E. (2026). Digital transformation, gender, and entrepreneurial resilience: A study of women-led SMEs. *Research Journal in Advanced Humanities*, 7(1). https://doi.org/10.58256/w2nqee35

Published in Nairobi, Kenya by Royallite Global, an imprint of Royallite Publishers Limited

Introduction

Women-led small and medium-sized enterprises (SMEs) are increasingly recognized as a key driver of inclusive economic growth, particularly in developing countries. The role of women-led SMEs is not limited to job creation; they also contribute to improving family well-being, strengthening local economies, and promoting social empowerment within communities. Nevertheless, women entrepreneurs still face various structural barriers, such as limited access to financing, limited business networks, gender bias, and low rates of digital technology adoption. These conditions result in women-led SMEs being less competitive than businesses managed by men (Brush, 2019; Minniti & Naudé, 2010).

> *Beyond their economic role, women-led SMEs also reflect broader social realities shaped by gender norms, cultural expectations, and unequal access to resources and technology. These structural conditions influence not only business performance but also how women entrepreneurs participate in and benefit from the digital economy.*

In an increasingly dynamic and uncertain (VUCA) business environment, the ability to survive and adapt has become a key factor in business sustainability. Consequently, entrepreneurial resilience has emerged as an increasingly important concept in the entrepreneurship literature. Entrepreneurial resilience reflects the ability of entrepreneurs to cope with external pressures, manage uncertainty, and capitalize on opportunities through adaptation and innovation. Previous studies have shown that resilience is influenced by adaptive capacity, social networks, and effective leadership, which significantly support business survival during crises (Paredes-Aguirre et al., 2025; Venkata Ganesan & Kalaivani, 2014). Although resilience can enhance survival, not all resilient businesses achieve a sustainable competitive advantage.

On the other hand, advancements in digital technology have driven fundamental transformations in how organizations operate and compete. Digitalization has become a key strategic factor enabling companies to improve operational efficiency, expand market access, and foster technology-driven innovation. Digitalization encompasses the use of digital platforms such as e-commerce, social media, and financial technology, as well as the use of data in business decision-making. Research shows that digital transformation can improve company performance through enhanced dynamic capabilities, innovation, and organizational flexibility (Kumari et al., 2025; Vial, 2019). For women-owned SMEs, digitalization also plays a crucial role in overcoming market access limitations and strengthening economic inclusion.

> *In this context, digital transformation is not merely a technological shift but also a social process that shapes how women entrepreneurs engage with markets, build networks, and negotiate their economic roles. The ability to adopt digital technologies therefore reflects both capability and access, making it a critical dimension of gendered participation in the digital economy.*

Furthermore, recent literature indicates that digitalization serves not only as an operational tool but also as a strategic mediating mechanism that links internal capabilities to organizational performance. In this context, digitalization enables entrepreneurial resilience to be converted into a competitive advantage through increased efficiency, innovation, and product or service differentiation. In other words, digitalization serves as a bridge, transforming adaptive capabilities into strategic advantages in competitive markets (Nambisan, 2017; Warner & Wäger, 2019a).

However, despite the immense potential of digitalization, the rate of digital technology adoption among women-led SMEs remains relatively low and tends to be supportive rather than fully transformational. This is due to various factors, such as limited digital literacy, limited access to technology training, resource constraints, and social and cultural barriers that continue to limit women's participation in digital transformation (Gehmacher, 2009; Karatas-Ozkan et al., 2024). This situation indicates that a gap remains between the potential of digitalization and its implementation to enhance the competitiveness of women-led SMEs.

Furthermore, from an academic perspective, there remains a research gap in integrating the relationships among entrepreneurial resilience, digitalization, and competitive advantage into a single comprehensive model. Most previous studies have examined these variables separately and thus have not been able to explain the

mechanisms by which resilience can generate competitive advantage through digitalization. Furthermore, research specifically focused on women-led SMEs remains relatively limited, particularly studies employing quantitative approaches based on structural models such as SEM-PLS.

Based on the above discussion, this study aims to develop and test a conceptual model examining the mediating role of digitalization in the relationship between entrepreneurial resilience and competitive advantage among women-led SMEs. This study is expected to make a theoretical contribution by integrating the Resource-Based View (RBV) and Dynamic Capability Theory to explain how internal capabilities can be converted into competitive advantage through digital transformation. Furthermore, this study also offers practical contributions to policymakers and business practitioners in designing more inclusive and effective digital strategies to enhance the competitiveness of women-led SMEs in the digital economy.

Although the literature on entrepreneurial resilience, digitalization, and competitive advantage has grown significantly, several important gaps remain that require further attention.

First, most previous studies have examined entrepreneurial resilience and competitive advantage separately, without explaining the transformational mechanisms that link the two. Earlier studies have emphasized the role of resilience in sustaining business operations but have not fully explained how such resilience can translate into sustainable competitive advantage (Paredes-Aguirre et al., 2025; Venkata Ganesan & Kalaivani, 2014). Second, although digitalization has been recognized as a key factor in improving organizational performance, most studies still treat it as an independent or moderating variable. Research that specifically examines digitalization as a mediating variable in the relationship between entrepreneurial resilience and competitive advantage remains very limited, particularly in the context of SMEs (Vial, 2019; Warner & Wäger, 2019b). Third, the existing literature is still dominated by general studies that do not consider gender perspectives in depth. In fact, women-led SMEs have different characteristics, challenges, and dynamics compared to SMEs in general. Limited access to technology, social bias, and cultural barriers make the digital transformation process for women-led SMEs uniquely complex—a complexity that has not been extensively explored in previous research (de las Mercedes Barrachina Fernández et al., 2021; Ogunjemilusi et al., 2021). Fourth, most previous studies have employed a cross-sectional approach, and thus have not been able to capture the dynamic relationship between resilience, digitalization, and competitive advantage over the long term. This opens opportunities for research using structural equation modeling to test causal relationships among variables more comprehensively. Based on the identified research gaps, this study offers several significant innovations from both conceptual and empirical perspectives. First, this study develops an integrative model that links entrepreneurial resilience, digitalization, and competitive advantage within a comprehensive structural framework. Unlike previous studies that examined these variables in isolation, this study provides a more holistic understanding of the mechanism by which internal capabilities transform into competitive advantage. Second, this study explicitly positions digitalization as a mediating variable, thereby explaining how entrepreneurial resilience not only sustains business operations but also translates into a strategic advantage through the use of digital technology. This approach enriches the literature, which has largely positioned digitalization as an independent or moderating variable.

Furthermore, this study makes a contextual contribution by focusing its analysis on women-led SMEs, which have distinct characteristics, challenges, and dynamics compared to SMEs in general. Thus, this study not only expands the entrepreneurship literature but also integrates a gender perspective into the analysis of digital transformation and competitive advantage. From a theoretical perspective, this study contributes to strengthening the Resource-Based View (RBV) by demonstrating that resilience, as an internal resource, requires transformation mechanisms to generate strategic value, and to developing Dynamic Capability Theory by positioning digitalization as a dynamic capability that enables organizations to adapt to changes in the business environment. Methodologically, the use of the SEM-PLS approach in this study also provides an empirical contribution by more comprehensively testing the structural relationships among variables. Thus, this study is expected to make a significant contribution to both theoretical development and practice in enhancing the competitiveness of women-owned SMEs in the digital era.

2. Literature Review and Hypotheses Development

2.1 Entrepreneurial Resilience and Competitive Advantage

Entrepreneurial resilience refers to the ability of individuals and organizations to survive, adapt, and thrive in the face of uncertainty and pressures from the business environment. Resilience reflects not only the capacity to withstand crises but also the ability to capitalize on opportunities through innovation and business strategy transformation (Ayala & Manzano, 2014; Doern et al., 2019). In the context of women-led SMEs, resilience is often shaped by broader social and structural conditions, including gender norms, limited access to resources, and unequal opportunities, which influence how entrepreneurs respond to challenges and pursue growth.

From the Resource-Based View (RBV) perspective, entrepreneurial resilience can be viewed as a valuable, scarce, and difficult-to-imitate internal resource, thereby potentially serving as a source of competitive advantage. Previous research indicates that entrepreneurs with high levels of resilience are better able to manage risks, maintain business performance, and generate sustainable innovation. These capabilities ultimately enhance competitive advantage, whether through cost efficiency, product differentiation, or market responsiveness (Gashi Nulleshi, 2024). Thus, the higher the level of entrepreneurial resilience possessed by business owners, the greater the opportunity to achieve a competitive advantage.

H1: Entrepreneurial resilience has a positive effect on competitive advantage.

2.2 Entrepreneurial Resilience and Digitalization

In the era of digital transformation, entrepreneurial resilience also plays a crucial role in driving the adoption of digital technologies. Resilient entrepreneurs tend to be more open to change, possess an innovation-oriented mindset, and demonstrate a greater willingness to integrate new technologies into their business processes. Resilience enables organizations to respond to technological disruptions more quickly and effectively, thereby accelerating the digitalization process (Mariani et al., 2023).

However, in the context of women-led SMEs, the process of digital adoption is not solely determined by individual capability but is also influenced by access to digital skills, infrastructure, and supportive networks. These factors are often shaped by socio-cultural conditions that may constrain women's participation in the digital economy. In this regard, entrepreneurial resilience becomes essential not only for adapting to technological change but also for overcoming structural barriers to digital engagement.

Furthermore, from the perspective of Dynamic Capability Theory, the ability to adapt to technological change is part of the dynamic capabilities that enable organizations to remain relevant in a rapidly changing business environment. Therefore, entrepreneurial resilience can serve as a key driver of digitalization among MSMEs.

H2: Entrepreneurial resilience positively affects digitalization.

2.3 Digitalization and Competitive Advantage

Digitalization has become one of the key factors in creating competitive advantage in the digital economy. The use of digital technology enables companies to improve operational efficiency, expand market reach, and drive technology-based innovation. It also allows firms to access and utilize data in real time, thereby improving decision-making quality and responsiveness to customer needs (Desai et al., 2024; Vial, 2019).

Beyond its technological function, digitalization also reshapes how businesses interact with markets, customers, and networks. For women entrepreneurs, digital platforms can serve as alternative spaces that reduce traditional barriers related to mobility, access to markets, and limited business networks. As such, digitalization not only enhances firm performance but also supports broader processes of inclusion and participation in the digital economy.

Furthermore, digitalization enhances dynamic capabilities, enabling organizations to adapt more quickly to changes in the business environment. In the context of SMEs, particularly those led by women, digitalization helps address limitations in market access and resources, thereby strengthening business competitiveness.

H3: Digitalization positively affects competitive advantage.

2.4 The Mediating Role of Digitalization

Although entrepreneurial resilience plays a crucial role in enhancing the ability to survive and adapt, these capabilities do not automatically translate into competitive advantage without mechanisms that convert them into strategic value. In this context, digitalization serves as a mediating variable linking entrepreneurial resilience and competitive advantage.

Digitalization enables entrepreneurs to translate adaptive capabilities into more effective business strategies by increasing efficiency, fostering innovation, and driving product differentiation. More importantly, in the context of women-led SMEs, digitalization provides a pathway through which resilience—often developed under structural constraints—can be transformed into tangible economic outcomes. This highlights the role of digitalization not only as a technological tool but also as a transformative mechanism bridging internal capabilities and market performance.

Thus, entrepreneurial resilience will be more effective in generating competitive advantage when supported by the strategic use of digital technology (Warner & Wäger, 2019b).

H4: Digitalization mediates the relationship between entrepreneurial resilience and competitive advantage.

3.1 Conceptual Framework

This study develops a conceptual framework explaining the relationship among entrepreneurial resilience, digitalization, and competitive advantage in the context of women-led SMEs. The model integrates two major theoretical perspectives: the Resource-Based View (RBV) and Dynamic Capability Theory. From the RBV perspective, competitive advantage stems from an organization's ability to leverage internal resources that are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991). In this context, entrepreneurial resilience is conceptualized as a strategic internal resource that enables entrepreneurs to survive, adapt, and respond effectively to uncertainty in the business environment.

However, possessing resources alone is insufficient to create a sustained competitive advantage. Dynamic Capability Theory emphasizes that organizations must be able to integrate, build, and reconfigure internal and external resources to generate strategic value in rapidly changing environments (Teece, 2017). Within this framework, digitalization is positioned as a dynamic capability that facilitates the transformation of entrepreneurial resilience into competitive advantage.

In the context of women-led SMEs, this transformation process is particularly significant, as both resilience and digital capability are shaped by broader socio-economic and gendered conditions. Limited access to resources, technology, and networks often constrains the direct conversion of internal capabilities into market success. Therefore, digitalization plays a critical role in bridging this gap by enabling more inclusive access to markets, information, and innovation opportunities.

Thus, this research model assumes that entrepreneurial resilience not only has a direct effect on competitive advantage but also an indirect effect through digitalization as a mediating variable.

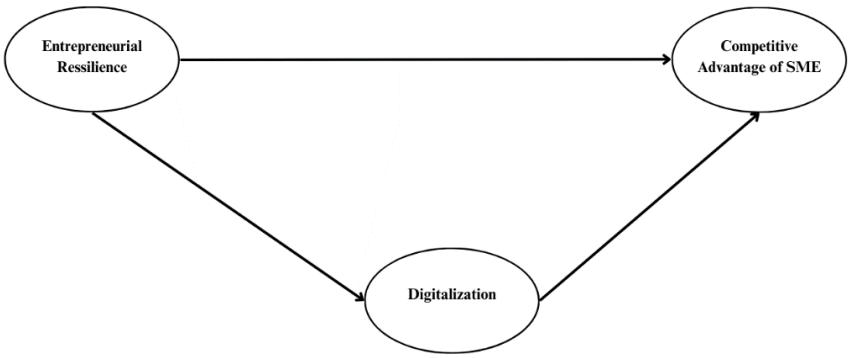

Figure 1. Conceptual Framework

This conceptual framework posits that entrepreneurial resilience serves as the foundational capability for navigating business uncertainty, enabling entrepreneurs to survive and adapt in dynamic environments. However, to achieve a sustainable competitive advantage, this capability must be transformed through the effective use of digital technologies.

In this context, digitalization functions as a transformative mechanism that links adaptive capabilities to the attainment of strategic advantage. Through digitalization, entrepreneurs can improve operational efficiency, expand market access, and develop technology-driven innovations that enhance competitiveness. Moreover, digital platforms provide alternative channels through which women entrepreneurs can overcome traditional constraints related to mobility, resource access, and market participation.

Thus, the relationship between entrepreneurial resilience and competitive advantage is both direct and indirect, with digitalization acting as a key mediating variable. This model further emphasizes that, in the context of women-led SMEs, digitalization is not only an operational tool but also a strategic enabler that supports inclusion, participation, and long-term business competitiveness in the digital economy.

4. Research Methodology

4.1 Research Design

This study employs a quantitative approach with an explanatory research design to examine the causal relationships among entrepreneurial resilience, digitalization, and competitive advantage in women-led MSMEs. This approach was selected to provide an empirical understanding of the relationships among variables within the proposed structural model.

The analysis method used in this study is Partial Least Squares Structural Equation Modeling (SEM-PLS) using SmartPLS software. SEM-PLS was chosen because it is well-suited for analyzing complex models involving multiple constructs and indicators, particularly with relatively small sample sizes and without strict assumptions of data normality (Hair et al., 2021). In addition, SEM-PLS is appropriate for predictive and exploratory research, making it suitable for examining mediating relationships within the proposed framework.

4.2 Population and Sample

The population in this study consists of women-led SMEs. The criteria for respondents include:

1. The owner or primary manager is a woman
2. The business has been in operation for at least one year
3. The business has adopted or is familiar with digital technology in its operations
4. The business is classified as an SME

The sampling technique used was purposive sampling, in which respondents were selected based on specific criteria relevant to the research objectives. This approach ensures that the selected participants possess the characteristics necessary to provide meaningful insights into the relationship between resilience, digitalization, and competitive advantage.

The sample size was determined using the SEM-PLS rule of thumb, specifically a minimum of 10 times the largest number of indicators used to measure a single construct (Hair et al., 2019). Based on this criterion, the required sample size ranged from 120 to 200 respondents, which is considered adequate for SEM-PLS analysis.

4.3 Data Collection Method

Data for this study were collected using a survey method through structured questionnaires distributed both offline and online (via Google Forms). This dual approach was adopted to increase response rates and reach a broader range of women entrepreneurs.

A 5-point Likert scale was used to measure respondents' perceptions, with the following scale:

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

The research instruments were developed based on indicators adapted from relevant prior studies. These instruments have been widely used and validated in previous research, ensuring their reliability and validity in measuring the constructs of interest.

4.4 Measurement of Variables

The variables in this study were operationalized using measurement items adapted from established literature and assessed using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The constructs include entrepreneurial resilience, digitalization, and competitive advantage.

Table 4.1 Measurement of Variables

Variable	Code	Indicator	Reference
Entrepreneurial Resilience	ER1	Able to adapt to changing business conditions	(Paredes-Aguirre et al., 2025)
	ER2	Stay resilient in the face of business pressures and uncertainties.	
	ER3	Having the ability to overcome challenges in running a business	
	ER4	Able to find solutions when faced with business challenges	
	ER5	Able to bounce back after experiencing business failure	
	ER6	Demonstrating perseverance in running a business despite facing obstacles	
Digitalization	DI1	Using digital technology in business operations	(Vial, 2019)
	DI2	Using digital media for product marketing	
	DI3	Using digital systems in business transactions	
	DI4	Integrating digital technology into business processes	
	DI5	Using digital data to support decision-making	
	DI6	Adopting digital technology to improve business efficiency	
Competitive Advantage	KB1	Has more efficient operating costs than its competitors	(Porter, 1985)
	KB2	Offering products or services that are different from those of competitors	
	KB3	Offering superior product/service quality	
	KB4	Able to respond quickly to market changes	
	KB5	Having better product/service innovations	
	KB6	Has a stronger market position than its competitors	

4.5 Data Analysis Technique (SEM-PLS)

Data analysis was conducted using SEM-PLS, following a two-stage approach: evaluation of the measurement model (outer model) and evaluation of the structural model (inner model).

1. Evaluation of Measurement Model (Outer Model)

This stage assesses the validity and reliability of the constructs:

a) Convergent Validity → Outer loading > 0.70, AVE > 0.50
b) Reliability → Cronbach's Alpha > 0.70, Composite Reliability > 0.70
c) Discriminant Validity → HTMT < 0.90 or Fornell-Larcker criterion

2. Evaluation of Structural Model (Inner Model)

This stage examines the relationships among variables:

a) R-Square (R^2) → indicates the explanatory power of the model
b) Path Coefficient (β) → shows the direction and strength of relationships
c) T-Statistic & P-Value → assess statistical significance (bootstrapping)
d) Effect Size (f^2) → evaluates the contribution of each exogenous variable
e) Predictive Relevance (Q^2) → assesses the model's predictive capability

3. Mediation Analysis

Mediation analysis was conducted to examine the role of digitalization in the relationship between entrepreneurial resilience and competitive advantage using the following procedures:

a) Indirect effect (Entrepreneurial Resilience → Digitalization → Competitive Advantage)
b) Significance testing using bootstrapping
c) Determination of mediation type (full or partial mediation)

4.6 Research Model Equation

The structural model in this study is formulated as follows:

a) Digitalization = β1 (Entrepreneurial Resilience) + e1

b) Competitive Advantage = β2 (Entrepreneurial Resilience) + β3 (Digitalization) + e2

4. Results

4.1 Respondent Characteristics

A total of 150 valid responses were collected from women-led SMEs in North Sumatra, Indonesia. The respondents represent diverse business sectors, including culinary, retail trade, educational services, fashion, and handicrafts.

In terms of demographics, the majority of respondents were aged 19–29 years (40.7%), followed by those aged 30–39 years (30.0%), indicating that most women entrepreneurs are within their productive age range. Regarding educational background, most respondents had completed senior high school (42.6%), followed by undergraduate education (24.7%), suggesting a moderate level of formal education.

From a business perspective, the majority of respondents operated in the culinary sector (42.1%), followed by retail trade and other sectors. Most businesses were categorized as micro-enterprises (87.9%), with annual income predominantly below IDR 2 billion (89.3%). In addition, nearly all businesses employed 1–4 workers (99.3%), indicating small-scale operations. In terms of business experience, most respondents had been operating for 1–3 years (30.5%), reflecting relatively early-stage business development.

Overall, this profile suggests that women-led SMEs in this study are predominantly micro-scale enterprises with limited resources but strong entrepreneurial potential.

Table 1. Respondent Characteristics

Characteristic	Items	Total	Percentage (%)
Age	19–29 Years	61	40.7
	30–39 Years	45	30.0
	40–49 Years	26	17.3
	50–59 Years	14	9.3
	≥60 Years	4	2.7
Education	Elementary School	4	2.1
	Junior High School	9	4.7
	Senior High School	81	42.6
	Diploma	3	1.6
	Degree (S1)	47	24.7
	Master	4	2.1
	Doctor (S3)	2	1.1
Business Type	Culinary (food & beverage)	80	42.1
	Retail trade	14	7.4
	Informal education services	13	6.8
	Fashion (clothes, hijab, etc.)	9	4.7
	Small farms (fisheries)	6	3.2
	Others (craft, digital, agriculture, etc.)	28	14.7
Business Capital	Micro (< Rp 1 Billion)	133	87.9
	Small (> Rp 1–5 Billion)	17	12.1
Business Income	Micro (< Rp 2 Billion)	134	89.3
	Small (> Rp 2–15 Billion)	16	10.7
Labor	1–4 Persons	149	99.3
	20–99 Persons	1	0.7
Length of Business	< 1 Year	39	20.5
	1–3 Years	58	30.5
	4–6 Years	18	9.5

4.2 Measurement Model Assessment

The measurement model was evaluated to assess the validity and reliability of the constructs. The evaluation included factor loadings, convergent validity (Average Variance Extracted/AVE), and reliability (Composite Reliability and Cronbach's Alpha).

Table 2. Reliability and Validity of Constructs

Construct	Item	Loading Factor	AVE	CR (ρc)	Cronbach's Alpha
Competitive Advantage	KB1	0.816	0.703	0.934	0.915
	KB2	0.852			
	KB3	0.780			
	KB4	0.876			
	KB5	0.852			
	KB6	0.852			
Digitalization	DI1	0.711	0.657	0.920	0.895
	DI2	0.777			
	DI3	0.870			
	DI4	0.791			
	DI5	0.851			
	DI6	0.852			
Entrepreneurial Resilience	ER1	0.855	0.757	0.949	0.936
	ER2	0.900			
	ER3	0.861			
	ER4	0.892			
	ER5	0.857			
	ER6	0.853			

The results in Table 2 indicate that all indicators have outer loading values above 0.70, demonstrating that each indicator adequately reflects its respective latent construct. The highest loading value is observed in indicator ER2 (0.900), while the lowest is in DI1 (0.711); however, all values remain above the acceptable threshold, and thus no indicators were removed.

Furthermore, the AVE values for all constructs exceed the minimum threshold of 0.50, with values of 0.703 for competitive advantage, 0.657 for digitalization, and 0.757 for entrepreneurial resilience. This confirms that each construct explains more than 50% of the variance of its indicators, thereby satisfying convergent validity.

In terms of reliability, both Composite Reliability (CR) and Cronbach's Alpha values exceed 0.70 for all constructs, with most values approaching or exceeding 0.90. Specifically, the CR values are 0.949 (entrepreneurial resilience), 0.934 (competitive advantage), and 0.920 (digitalization), while Cronbach's Alpha values are 0.936, 0.915, and 0.895, respectively. These results indicate strong internal consistency.

Overall, the findings confirm that the measurement model meets the criteria for both validity and reliability, and is therefore suitable for further analysis.

Discriminant Validity

Tabel 3. HTMT

	Competitive Advantage of SME	Digitalization	Entrepreneurial Resilience
Competitive Advantage of SME			
Digitalization	0.823		
Entrepreneurial Resilience	0.636	0.607	

The discriminant validity of the constructs was assessed using the Heterotrait-Monotrait Ratio (HTMT). All HTMT values are below the threshold of 0.90, namely:

- Digitalization ↔ Competitive Advantage = 0.823
- Entrepreneurial Resilience ↔ Competitive Advantage = 0.636
- Entrepreneurial Resilience ↔ Digitalization = 0.607

These results indicate that each construct is empirically distinct from the others, thereby satisfying the HTMT criterion for discriminant validity.

Tabel 4. Fornell-Lacker Criterion

	Competitive Advantage of SME	Digitalization	Entrepreneurial Resilience
Competitive Advantage of SME	0.839		
Digitalization	0.749	0.810	
Entrepreneurial Resilience	0.594	0.565	0.870

The Fornell-Larcker criterion further confirms discriminant validity. The square root of AVE (√AVE) for each construct is higher than its correlations with other constructs. Specifically:

- Competitive Advantage = 0.839
- Digitalization = 0.810
- Entrepreneurial Resilience = 0.870

Each of these values exceeds the corresponding inter-construct correlations, indicating that the constructs share more variance with their own indicators than with other constructs.

Based on both HTMT and Fornell-Larcker results, all constructs demonstrate adequate discriminant validity. Therefore, the measurement model satisfies all required criteria and can proceed to structural model evaluation.

4.3 Structural Model Assessment

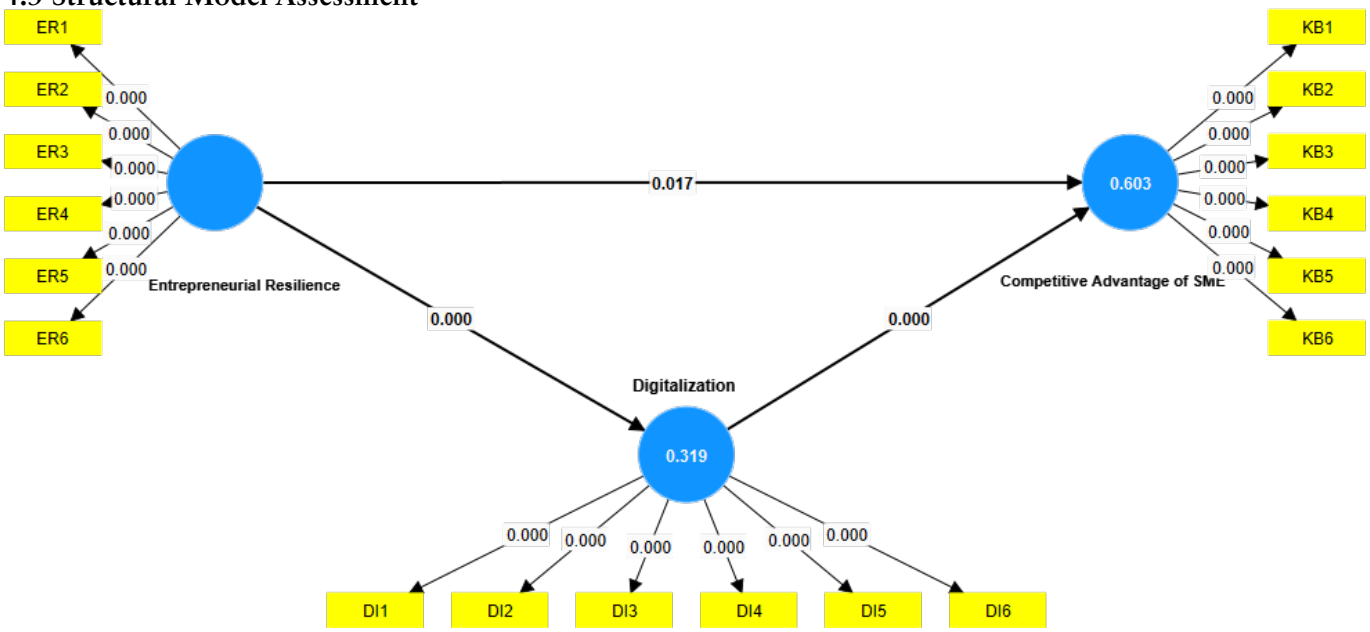

Figure 2. Structural Model Results

Figure 2 presents the results of the structural model analysis examining the relationships among entrepreneurial resilience, digitalization, and competitive advantage.

The results indicate that entrepreneurial resilience has a significant positive effect on digitalization, and digitalization has a significant positive effect on competitive advantage. Additionally, entrepreneurial resilience also has a direct effect on competitive advantage, although the effect is weaker compared to the indirect effect through digitalization.

The R^2 value for digitalization is 0.319, indicating that entrepreneurial resilience explains 31.9% of its variance. Meanwhile, the R^2 value for competitive advantage is 0.603, suggesting that entrepreneurial resilience and digitalization jointly explain 60.3% of the variance in competitive advantage. These values indicate moderate to substantial explanatory power of the model.

Table 5. Hypotheses Testing

Hypothesis	Path	β (Original Sample)	t-value	p-value	Decision
H1	Digitalization → Competitive Advantage	0.607	7.181	0.000	Supported
H2	Entrepreneurial Resilience → Competitive Advantage	0.251	2.395	0.017	Supported
H3	Entrepreneurial Resilience → Digitalization	0.565	6.699	0.000	Supported
H4	Entrepreneurial Resilience → Digitalization → Competitive Advantage	0.343	5.453	0.000	Supported

The results of hypothesis testing show that all proposed relationships are positive and statistically significant. Digitalization has a strong effect on competitive advantage ($\beta = 0.607$, $p < 0.001$), while entrepreneurial resilience significantly affects both competitive advantage ($\beta = 0.251$, $p = 0.017$) and digitalization ($\beta = 0.565$, $p < 0.001$). Furthermore, the indirect effect of entrepreneurial resilience on competitive advantage through digitalization is also significant ($\beta = 0.343$, $p < 0.001$), indicating the presence of a mediating effect. This suggests that digitalization plays a crucial role in strengthening the relationship between entrepreneurial resilience and competitive advantage.

5. Discussion

This study aims to examine the role of entrepreneurial resilience in enhancing competitive advantage through digitalization among women-led SMEs. The findings indicate that all hypothesized relationships are significant, thereby offering important contributions to the literature on entrepreneurship and digital transformation, both theoretically and practically.

First, the results show that digitalization has a positive and significant effect on competitive advantage. This finding confirms that digital transformation is a key driver of competitiveness in SMEs, particularly within an increasingly technology-driven economy. Digitalization enables businesses to improve operational efficiency, expand market access, and develop technology-based innovations that are difficult for competitors to replicate. This is consistent with the Resource-Based View (RBV), which posits that competitive advantage arises from the effective utilization of valuable, rare, and inimitable resources (Barney, 1991). In addition, digital technologies facilitate value creation and value capture in modern business environments (Teece, 2017). Therefore, digitalization functions not only as an operational tool but also as a strategic resource that supports sustained competitive advantage.

Second, the findings indicate that entrepreneurial resilience has a significant positive effect on digitalization. This suggests that entrepreneurs with higher levels of resilience are more adaptable to environmental changes and more capable of adopting digital technologies. In conditions of high uncertainty, often characterized as a VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) environment, resilience becomes a critical capability that enables entrepreneurs to both survive and transform. Resilient individuals are more likely to cope with pressure, learn from failure, and identify emerging opportunities, including those related to digital innovation (Irene et al., 2021; Paredes-Aguirre et al., 2025). From a theoretical perspective, this finding reinforces the view that resilience can be understood as a dynamic capability that facilitates organizational transformation.

Third, the results also show that entrepreneurial resilience has a direct effect on competitive advantage; however, this effect is relatively weaker than its indirect effect through digitalization. This indicates that while resilience is an important internal resource, it is not sufficient on its own to generate competitive advantage without being translated into concrete strategic actions. In line with Dynamic Capability Theory, internal resources must be integrated, reconfigured, and applied effectively to create value (Teece et al., 1997). Thus, without alignment with technological adoption and innovation, resilience may primarily support business survival rather than superior performance.

Fourth, the key finding of this study is that digitalization significantly mediates the relationship between entrepreneurial resilience and competitive advantage. This suggests that the influence of resilience on firm performance largely operates through the adoption and utilization of digital technologies. In this regard, digitalization functions as a critical bridge that connects individual-level capabilities with firm-level strategic outcomes. This finding supports prior research emphasizing that, in the digital era, the ability to leverage technology is essential for transforming internal resources into competitive advantage (Hewa-Wellalage et al., 2022; Vial, 2019).

Importantly, in the context of women-led SMEs, these findings carry broader implications. Women entrepreneurs often encounter structural constraints, including limited access to financial resources, digital infrastructure, and professional networks (Woldesenbet Beta et al., 2024). As a result, entrepreneurial resilience becomes a crucial asset that enables them to navigate and overcome these challenges. However, this study demonstrates that resilience alone is insufficient to ensure competitiveness. Instead, its impact becomes meaningful when combined with digitalization. Digital platforms, including e-commerce and social media, provide alternative pathways for women entrepreneurs to expand market access, enhance business visibility, and participate more actively in the digital economy (Mariani et al., 2023).

Overall, this study contributes to the entrepreneurship literature by demonstrating that the relationship between entrepreneurial resilience and competitive advantage is not purely direct but is significantly mediated by digitalization. By integrating perspectives from resilience theory, the Resource-Based View, and Dynamic Capability Theory, this study offers a more comprehensive understanding of how internal capabilities are transformed into strategic outcomes. Furthermore, the findings highlight that, in the context of women-led SMEs, enhancing competitiveness requires not only strengthening individual resilience but also accelerating digital transformation as a strategic priority.

6. Conclusion

This study aims to analyze the role of entrepreneurial resilience in enhancing competitive advantage through digitalization among women-led SMEs. The findings indicate that digitalization has the strongest influence on competitive advantage, while entrepreneurial resilience plays a significant role both directly and indirectly through digitalization.

The results confirm that digitalization serves as a key mechanism for transforming entrepreneurial resilience into competitive advantage. In other words, resilience alone does not automatically lead to superior competitiveness; rather, it must be translated into strategic value through the effective adoption and utilization of digital technologies. Thus, digitalization functions as a critical mediating factor linking internal capabilities with firm-level performance.

From a theoretical perspective, this study contributes by integrating entrepreneurial resilience and digital transformation within a competitive advantage framework, particularly in the context of women-led SMEs. The findings extend the entrepreneurship literature by demonstrating that the effect of resilience on performance is largely indirect and contingent upon digital capabilities as a mediating mechanism.

From a practical standpoint, the results suggest that enhancing the competitiveness of women-led SMEs requires not only strengthening individual entrepreneurial capacity but also accelerating digital adoption. Therefore, policymakers and practitioners should focus on promoting digital literacy programs, improving access to digital infrastructure, and fostering inclusive digital ecosystems that support women entrepreneurs.

Despite its contributions, this study has several limitations. First, the use of cross-sectional data limits the ability to capture dynamic changes over time. Second, the focus on a specific regional context may restrict the generalizability of the findings. Future research is therefore encouraged to adopt longitudinal approaches and expand the geographical scope. In addition, further studies could incorporate additional variables, such as digital innovation, access to finance, and institutional support, to provide a more comprehensive understanding of the factors influencing the competitiveness of women-led SMEs.

Acknowledgments

The authors would like to express their sincere gratitude to the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia through the Directorate of Research and Community Service (DPPM) for funding this research under the Program Magister menuju Doktor untuk Sarjana Unggul (PMDSU) scheme. The authors also acknowledge Universitas Sumatera Utara for its institutional support throughout the research process. In addition, the authors would like to thank all respondents from women-led SMEs in North Sumatra for their valuable participation and contribution to this study.

References

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Brush, C. (2019). Growth-oriented women entrepreneurs: Strategies for raising money. In *Go-to-Market Strategies for Women Entrepreneurs: Creating and Exploring Success* (pp. 271–281). Emerald Group Publishing Ltd. https://doi.org/10.1108/978-1-78973-289-420191031

de las Mercedes Barrachina Fernández, M., del Carmen García Centeno, M., & Patier, C. C. (2021). Analysis of the European Women Entrepreneurship in STEM Fields. In *Contributions to Management Science* (pp. 47–60). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-030-83792-1_3

Desai, A. D., Sensarma, R., & Thomas, A. (2024). Roles of financial literacy and entrepreneurial orientation in economic empowerment of rural women entrepreneurs. *Oxford Development Studies*, *52*(3), 243–260. https://doi.org/10.1080/13600818.2024.2403066

Gashi Nulleshi, S. (2024). How do women entrepreneurs influence the strategic orientation of family businesses? A typology of Swedish decision-making in the Småland community. *Journal of Enterprising Communities*, *18*(2), 117–144. https://doi.org/10.1108/JEC-06-2022-0091

Gehmacher, E. (2009). Social capital - Chances and limits of the methodology. *SWS - Rundschau*, *49*(1), 103–109. https://www.scopus.com/inward/record.uri?eid=2-s2.0-63349093997&partnerID=40&md5=2081eb7134d8f89968300773d6850ba7

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*. Springer.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. In *European Business Review* (Vol. 31, Issue 1, pp. 2–24). Emerald Group Publishing Ltd. https://doi.org/10.1108/EBR-11-2018-0203

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, *20*, 277–319. https://doi.org/10.1108/S1474-7979(2009)0000020014

Hewa-Wellalage S.; Hunjra A. I.; Verhoeven P., N. B. (2022). The gender gap in access to finance: Evidence from the COVID-19 pandemic. *Finance Research Letters*, *46*. https://doi.org/10.1016/j.frl.2021.102329

Irene, B. N., Murithi, W. K., Frank, R., & Mandawa-Bray, B. (2021). From empowerment to emancipation: Women's entrepreneurship cooking up a stir in South Africa. In *Women's Entrepreneurship and Culture: Socio-cultural Context, Traditional Family Roles and Self-determination* (pp. 109–139). Edward Elgar Publishing Ltd. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85130194791&partnerID=40&md5=ca6d2f146457949ef00d3055de2fc187

Karatas-Ozkan, M., Tunalioglu, R., Ibrahim, S., Ozeren, E., Grinevich, V., & Kimaro, J. (2024). Actioning sustainability through tourism entrepreneurship: Women entrepreneurs as change agents navigating through the field of stakeholders. *Central European Management Journal*, *32*(1), 31–56. https://doi.org/10.1108/CEMJ-12-2021-0159

Kumari, Q., Ghosh, S., & Rath, S. R. (2025). Empowering Rural Women Entrepreneurs: Insights from Bihar. *Indian Journal of Extension Education*, *61*(2), 25–29. https://doi.org/10.48165/IJEE.2025.6105

Mariani, M. M., Machado, I., & Nambisan, S. (2023). Types of innovation and artificial intelligence: a systematic quantitative literature review and research agenda. *Journal of Business Research*, *155*. https://doi.org/10.1016/j.jbusres.2022.113364

Minniti, M., & Naudé, W. (2010). What do we know about the patterns and determinants of female entrepreneurship across Countries? *European Journal of Development Research*, *22*(3), 277–293. https://doi.org/10.1057/ejdr.2010.17

Nambisan, S. (2017). Digital entrepreneurship: toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, *41*(6), 1029–1055. https://doi.org/10.1111/etap.12254

Ogunjemilusi, K. D., Johnston, K., & Boyd, B. (2021). An exploration and critique of the entrepreneurial financial ecosystem facing female entrepreneurs in Northern Ireland. In E. T. Pereira, C. Costa, & Z. Breda (Eds.), *Proceedings of the International Conference on Gender Research* (pp. 365–369). Academic Conferences and Publishing International Limited. https://doi.org/10.34190/IGR.21.092

Paredes-Aguirre, M., Hernández-Pozas, O., Ayala, Y., & Campoverde Aguirre, R. (2025). The stress-busting power of Digital Self-Efficacy: Does training format matter for workers? *Current Research in Behavioral Sciences*, *8*. https://doi.org/10.1016/j.crbeha.2024.100161

Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance. Free Press*.

Teece, D. J. (2017). Dynamic capabilities and (digital) platform lifecycles. In *Advances in Strategic Management* (Vol. 37, pp. 211–225). https://doi.org/10.1108/S0742-332220170000037008

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Venkata Ganesan, K. A., & Kalaivani, N. (2014). Impact of microfinance on the empowerment of living standards and poverty alleviation of rural women entrepreneurs in Tirunelveli District, Tamil Nadu. *International Journal of Applied Business and Economic Research*, *12*(2), 441–449. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84947944440&partnerID=40&md5=e76d249ab16a76d59477afef9ce388d2

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, *28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Warner, K. S. R., & Wäger, M. (2019a). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, *52*(3), 326–349. https://doi.org/10.1016/j.lrp.2018.12.001

Warner, K. S. R., & Wäger, M. (2019b). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, *52*(3), 326–349. https://doi.org/10.1016/j.lrp.2018.12.001

Woldesenbet Beta, K., Mwila, N. K., & Ogunmokun, O. (2024). A review of and future research agenda on women entrepreneurship in Africa. *International Journal of Entrepreneurial Behaviour and Research*, *30*(4), 1041–1092. https://doi.org/10.1108/IJEBR-10-2022-0890