



The Role of Government Support in Moderating The Effect of Digital Transformation, Risk Management, and Entrepreneurial Character on the Resilience of MSMEs in the Leather Craft Industry Center

Amanita Novi Yushita¹, Agatha Saputri², R. Andro Zylío Nugraha^{3*}, Dian Normalitasari Purnama⁴, Dhyah Setyorini⁵

¹⁻⁵Program Studi, Universitas Negeri Yogyakarta, Indonesia

*Penulis Korespondensi: agathasaputri@uny.ac.id

Abstract. This study analyzes whether government support moderates the effects of digital transformation, risk management, and entrepreneurial character on MSMEs resilience in the Bantul (Yogyakarta) leather craft cluster. Using a quantitative survey of 197 actively producing artisans, we employed a Likert scale questionnaire and tested the measurement and structural models with Partial Least Squares Structural Equation Modeling (PLS-SEM). Results indicate that digital transformation, risk management, and entrepreneurial character each exert a positive and significant effect on MSMEs resilience, with risk management emerging as the strongest driver of enterprise durability. Moderation tests show that government support significantly amplifies the link between entrepreneurial character and resilience, but does not significantly moderate the relationships between digital transformation or risk management and resilience. The findings imply that strengthening MSMEs resilience cannot rely solely on external support; it must be anchored in internal capacities particularly robust risk management and adaptive entrepreneurial traits. Policy should prioritize entrepreneur empowerment, digital literacy upgrading, and targeted training facilitation to enhance competitiveness and sustainability of leather-craft MSMEs in a globalized market.

Keywords: Digital Transformation; Entrepreneurial Character; Government Support; MSMEs Resilience; Risk Management.

1. INTRODUCTION

Over the past few decades, the global business landscape has faced multiple economic and social crises that have significantly affected the sustainability of micro, small, and medium enterprises (MSMEs) (Juim et al., 2021). These crises ranging from financial instability to natural disasters and global pandemics have had a lasting impact on business activities, with recovery trajectories that remain uncertain. Among the sectors most affected, MSMEs have been recognized as both vulnerable and vital, especially in developing economies such as Indonesia, where they form the backbone of local economic growth and employment (Liu et al., 2022). The COVID-19 pandemic, for instance, demonstrated how external shocks can severely disrupt MSMEs operations, forcing many business owners to either adapt or close permanently (Brown et al., 2020). In such contexts, the concept of business resilience has emerged as a critical determinant of MSMEs survival and long-term competitiveness.

Resilience, originally rooted in disciplines such as engineering and ecology, has evolved into a multidimensional concept applied across psychology, sociology, disaster management, and business administration (Putritamara et al., 2023). Within the MSMEs context, resilience refers to the ability of enterprises to absorb shocks, adapt to changing environments, and continue functioning effectively despite crises. Resilient entrepreneurs

exhibit strong self-regulation, creativity, and adaptive capabilities that enable them to transform challenges into opportunities (Pennetta et al., 2025). As highlighted by prior studies, the resilience process in MSMEs serves dual purposes: in the short term, it minimizes failure rates and operational disruptions in the long term, it strengthens sustainability by cultivating proactive adaptation, innovation, and self-reliance (Nadkarni & Prügl, 2020).

In Indonesia, MSMEs play a pivotal role in regional development, particularly in provinces with strong cultural and creative industries such as Yogyakarta (Lantu et al., 2022). Among these, the leather craft industry especially in the *Desa Wisata Pucung*, Wukirsari, Imogiri, Bantul represents a unique intersection of tradition, culture, and entrepreneurship. The village is well known for its production of leather-based crafts, particularly *wayang kulit* (shadow puppets), which embody Javanese heritage and craftsmanship passed down through generations (Surti, 2025). Through the establishment of the *Paguyuban Pengrajin Wayang Kulit Pucung*, local artisans have sought to preserve this heritage while adapting it to contemporary markets through tourism branding and cultural education.

The leather puppet (*wayang kulit*) industry in the tourism village of Pucung faces serious challenges in terms of artisan regeneration, which may threaten the continuity and future development of the craft. These challenges include (1) the declining interest of younger generations in continuing the tradition, largely due to limited understanding of *wayang* art and the intricate, time-consuming production process that requires precision and patience; (2) the lack of knowledge and technical expertise among young people; and (3) the complexity of the production process, which demands advanced skills and considerable time investment. The resilience of the *wayang kulit* industry in Pucung, Bantul, depends heavily on its ability to attract younger generations and to adapt marketing strategies through the use of modern technology (Sugiarti et al., 2019). With adequate government support and increased public awareness of the cultural significance of this heritage, it is expected that the *wayang kulit* industry will be able to survive and continue to thrive in the future (Fauzi et al., 2025).

Digital transformation represents one of the most pressing yet promising dimensions of MSMEs resilience (Tuegeh et al., 2025). Although the digital economy provides opportunities for efficiency, innovation, and market expansion, many MSMEs in Indonesia still struggle with low digital literacy, limited access to digital infrastructure, and inadequate cybersecurity measures. Data indicate that only about 20% of Indonesian MSMEs have effectively adopted digital technologies, while approximately 40% report having access barriers or a lack of digital skills (Nugroho et al., 2025). Moreover, cybersecurity threats pose new risks to small enterprises with weak protection systems. Therefore, digital transformation is not merely about

technology adoption but also about building an enabling ecosystem encompassing digital skills, government support, and risk mitigation to enhance MSMEs resilience in an increasingly volatile and competitive environment (Amalia et al., 2024).

The digital era has transformed work patterns, business models, and consumer behavior, reshaping how enterprises operate and compete (Bachtiar & Setiawan, 2023). However, digital transformation in creative industries remains challenging, especially for traditional artisans facing financial constraints, limited digital literacy, and cultural resistance. Many still rely on manual production methods that value artistry and cultural authenticity, making technological integration difficult. Thus, resilience in the digital age requires balancing cultural preservation with innovation (Mitter et al., 2022). The Pucung leather craft industry must strategically use technology to expand market access, improve production and marketing, and strengthen branding. By combining tradition and innovation, it can boost competitiveness, attract younger generations, and thrive as a modern yet culturally rooted creative industry.

Another vital aspect of MSMEs resilience lies in the effective implementation of risk management practices. In an era of rapid market changes, technological disruptions, and global uncertainty, small enterprises face diverse risks such as supply chain disruptions, financial instability, and shifts in consumer demand (Hannevig, 2025). The ability to identify, assess, and mitigate these risks systematically is crucial for ensuring business continuity and long-term sustainability. Research shows that MSMEs with proactive risk management systems are more adaptable, experience fewer financial losses, and gain stronger stakeholder trust. However, many MSMEs in Indonesia still lack awareness and capacity to apply structured risk management, often leading to reactive decisions and greater vulnerability during crises like the COVID-19 pandemic (Goodell, 2020). Therefore, integrating risk management education, digital tools, and government policy support is essential to build a culture of preparedness and strengthen MSMEs resilience against future disruptions.

Equally critical is the entrepreneurial character of MSMEs owners. Entrepreneurs who exhibit traits such as innovation, perseverance, and risk-taking tend to adapt more effectively to market changes and uncertainties (Godwin et al., 2024). During crises, these traits become the psychological foundation of resilience, influencing how entrepreneurs perceive challenges and respond strategically. Studies have emphasized that resilient entrepreneurs not only survive disruptions but also use adversity as a platform for innovation and transformation (Pratomo et al., 2025). In Indonesia, however, the *Global Entrepreneurship Index (GEI)* places the country at the 75th position globally, reflecting a relatively low level of entrepreneurial activity compared to neighboring nations (Sokhi et al., 2021). This indicates that the entrepreneurial

mindset encompassing *passion, persistence (grit), and long-term vision* remains underdeveloped among many Indonesian business owners. Building entrepreneurial grit, defined as consistent effort and perseverance toward long-term goals, is therefore vital to enhancing the endurance and competitiveness of MSMEs.

While entrepreneurial character is a personal factor, external support from government institutions plays a decisive role in enabling MSMEs resilience (Konopik et al., 2022). In Indonesia, legal frameworks such as *Law No. 20 of 2008 on Micro, Small, and Medium Enterprises* mandate the government to foster MSMEs development through credit access, production and marketing support, human resource development, and technological assistance. Government intervention through training programs, financial incentives, and market facilitation directly contributes to improving MSMEs competitiveness (Raharjo, 2024). However, in the case of the leather craft industry in Pucung, government involvement remains limited. Artisans express the need for more structured programs focusing on youth engagement, cultural education, and digital marketing. The absence of such initiatives has exacerbated the intergenerational gap and constrained innovation capacity.

Given this context, this study aims to analyze the determinants of MSMEs resilience in the Pucung leather craft industry, one of Indonesia's notable creative sectors rooted in cultural heritage. The research focuses on four main constructs: (1) digital transformation, (2) risk management, (3) entrepreneurial character, and (4) government support as a moderating factor. These factors represent the interaction between internal capabilities and external support systems in enhancing small enterprises' adaptive capacity to market dynamics. The study examines how digital transformation modernizes production and marketing, how risk management reduces business vulnerabilities, and how entrepreneurial character fosters innovation and persistence. It also explores how government support through policies, training, and financial incentives strengthens these relationships (Safitri et al., 2024).

The objectives of this study are threefold. First, it aims to identify and analyze the direct influence of digital transformation, risk management, and entrepreneurial character on the resilience of MSMEs, particularly within the context of the Pucung leather craft industry (Hamdan et al., 2025). Second, it seeks to evaluate the moderating role of government support in enhancing MSMEs resilience, emphasizing how policy interventions, capacity-building programs, and institutional assistance can strengthen the relationship between internal capabilities and business sustainability. Third, the study intends to provide empirical evidence and practical policy recommendations that can guide stakeholders in formulating sustainable development strategies for the creative MSMEs sector, especially those rooted in cultural

heritage. Through these objectives, the research aspires to contribute both theoretically and practically to the advancement of MSMEs resilience models that integrate innovation, cultural preservation, and inclusive policy support (Wahmuda et al., 2025).

This research contributes both theoretically and practically. Theoretically, it extends the literature on MSMEs resilience by integrating psychological (entrepreneurial character), managerial (risk management), and institutional (government support) dimensions within a digital transformation framework (Braumann, 2018). This holistic model addresses existing research gaps where studies often analyze these variables in isolation (Damayanti et al., 2023). Practically, the findings will inform policymakers and development agencies in designing targeted interventions such as digital upskilling, entrepreneurial training, and collaborative programs to strengthen MSMEs resilience, especially in traditional craft industries facing modernization challenges (Mitter et al., 2022).

Furthermore, this study offers novelty by contextualizing MSMEs resilience within a cultural industry setting an area that remains underexplored in resilience and digital transformation research (Mikes & Kaplan, 2015). While prior studies have focused predominantly on manufacturing or service-based MSMEs, few have examined how heritage-based creative enterprises adapt to digital transitions and intergenerational shifts (Nadkarni & Prügl, 2020). By analyzing the Pucung leather craft industry, the research provides unique insights into how cultural sustainability and business resilience intersect. The study also introduces a conceptual linkage between *entrepreneurial grit* and *resilience*, proposing that perseverance and long-term consistency are psychological mechanisms that enhance adaptive capacity among artisans.

From a policy perspective, this study highlights that government support serves not only as an external resource but also as a moderating factor that strengthens the impact of internal capabilities on MSMEs resilience (Hadi et al., 2025). Aligning government initiatives with MSMEs strengths is crucial to promote sustainable growth and adaptability. In culturally rich regions like Yogyakarta, government intervention should extend beyond financial aid to foster innovation, creativity, and long-term competitiveness through entrepreneurship education, digital literacy, and technological integration. Engaging younger generations in the creative sector can also drive innovation while preserving traditional craftsmanship (Hannevig, 2025). Thus, the government should act as a facilitator of transformation, building an ecosystem that nurtures resilience, collaboration, and innovation while safeguarding cultural identity.

MSMEs navigate an era characterized by uncertainty, competition, and digital disruption, resilience becomes a multidimensional capability that determines survival and growth (Amalia et al., 2024). The sustainability of Yogyakarta's leather craft industry, particularly in *Desa Wisata Pucung*, depends on the interplay between adaptive entrepreneurship, technological innovation, risk governance, and institutional collaboration. Strengthening these elements will not only secure the livelihood of artisans but also safeguard Indonesia's intangible cultural heritage. Through empirical examination of these interrelated factors, this study aims to provide comprehensive insights into the mechanisms of MSMEs resilience and to propose actionable strategies for building adaptive, competitive, and culturally rooted enterprises in the post-crisis era.

2. THEORETICAL FRAMEWORK

MSMEs resilience refers to the ability of micro, small, and medium enterprises to withstand, adapt to, and recover from environmental pressures and uncertainties in the business landscape. In this context, resilience reflects the extent to which business actors can maintain continuity and sustainability despite facing economic crises, technological disruptions, changing market trends, and increasing competition. To achieve such resilience, both internal and external factors are needed to strengthen the adaptive capacity and endurance of MSMEs. Theoretically and empirically, several key determinants are recognized as crucial contributors to MSMEs resilience, namely digital transformation, risk management, entrepreneurial character, and government support as a moderating factor.

Digital transformation has become one of the most influential factors shaping MSMEs resilience in the modern economy. Businesses that successfully adopt digital technologies are better equipped to adjust to market changes, expand their customer reach, enhance operational efficiency, and make data driven decisions. The ability to leverage digital tools enables MSMEs to remain agile, sustain competitiveness, and accelerate recovery from crises such as the COVID-19 pandemic. Thus, digital transformation plays a vital role in enhancing flexibility, responsiveness, and long-term adaptability to market dynamics.

Another important determinant of resilience is risk management. Effective risk management allows MSMEs to identify, assess, and mitigate potential threats that could disrupt business operations. Enterprises that apply structured and proactive risk management frameworks can anticipate market fluctuations, minimize losses, and recover more effectively after disruptions. This systematic approach strengthens their preparedness and ensures better

continuity in the face of uncertainty. Consequently, MSMEs with strong risk management capabilities are more resilient in navigating volatile economic conditions.

In addition, entrepreneurial character also contributes significantly to building MSMEs resilience. Traits such as risk-taking, innovativeness, proactiveness, and opportunity orientation enable entrepreneurs to adapt to uncertainty, recognize opportunities, and remain persistent during challenging circumstances. A strong entrepreneurial mindset fosters creativity and optimism, helping business owners sustain growth and overcome crises. This mindset not only reinforces business continuity but also drives innovation and competitiveness in dynamic markets.

While internal capabilities are essential, MSMEs often face resource limitations that restrict their ability to fully implement digital transformation or formal risk management strategies. In this regard, government support plays a crucial moderating role in strengthening MSMEs resilience. Such support may include training and capacity-building programs, financial assistance, digital infrastructure development, and policy interventions that create an enabling environment for small business growth. Government involvement helps bridge capability gaps, encourage innovation, and amplify the positive effects of internal factors on business sustainability.

Based on this theoretical and empirical framework, it can be conceptualized that digital transformation, risk management, and entrepreneurial character directly and positively influence MSMEs resilience. Meanwhile, government support serves as a moderating variable that reinforces the relationship between these independent factors and the overall resilience of MSMEs. The conceptual model derived from this framework illustrates how the integration of internal capabilities and external support can enhance the sustainability and competitiveness of MSMEs, particularly in traditional creative industries such as the Pucung leather craft sector.

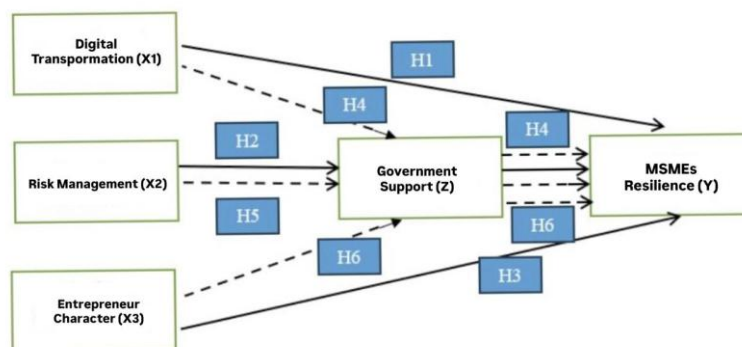


Figure 1. Conceptual Framework Model.

3. RESEARCH METHODS

This study employed an ex post facto research design with a quantitative approach, aiming to reveal the relationships among variables without providing any direct treatment or manipulation of the subjects (Amalia et al., 2024). This approach was selected because the data collected were numerical and analyzed statistically to identify patterns and causal relationships. The research was conducted at the Pucung Leather Puppet (*Wayang Kulit*) Industry Center, located in Imogiri, Bantul, over a period of five months (May–September 2025). The total population of this study consisted of 387 individuals. Based on the Slovin formula with a margin of error (e) of 5%, the minimum required sample size was calculated to ensure representative and statistically reliable results.

$$n = \frac{387}{1 + 387 (5\%)^2}$$

$$n = 197$$

The respondents consisted of 197 leather puppet artisans who had been engaged in the craft for at least five years and were members of the *Paguyuban Wisata Wayang* (Wayang Tourism Association).

Data were collected through questionnaires and open-ended questions. The questionnaire utilized a five-point Likert scale to measure the variables of MSMEs Resilience, Digital Transformation, Risk Management, Entrepreneurial Character, and Government Support, and was distributed both in printed and online formats (Putri et al., 2023). Content validity was evaluated through *expert judgment*, while construct validity was assessed using Confirmatory Factor Analysis (CFA). The reliability of each construct was tested using Cronbach's Alpha to ensure internal consistency.

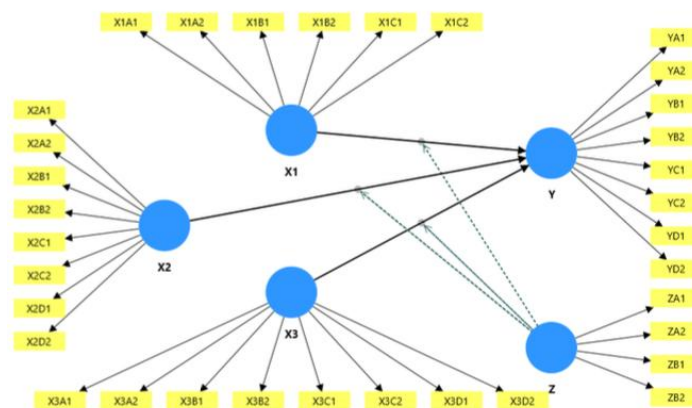
Table 1. Likert scale.

Response Option	Abbreviation	Positive Statement Score	Negative Statement Score
Strongly Agree	SA	5	1
Agree	A	4	2
Neutral	N	3	3
Disagree	D	2	4
Strongly Disagree	SD	1	5

Data analysis was carried out using Structural Equation Modeling (SEM) based on the Partial Least Squares (PLS) technique. This analytical method was applied to examine the conceptual model that explores the moderating role of government support in strengthening the effects of digital transformation, risk management, and entrepreneurial character on MSMEs resilience within the Bantul leather craft industry cluster.

4. RESEARCH FINDING AND DISCUSSION

This study examines how digital transformation (X1), risk management (X2), and entrepreneurial character (X3) influence MSMEs resilience (Y). In addition, it investigates whether government support (Z) serves as a moderating variable that strengthens the relationships among these constructs. Based on the conceptual framework, six hypotheses were formulated and tested: three hypotheses address the direct effects (H1–H3), while the other three explore the moderating effects (H4–H6). Figure 1 below illustrates the research model developed for this study.

**Figure 2.** Research Model.

The analysis employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS software. This method was selected for its suitability in predictive and exploratory research involving latent constructs and data that may not meet normality assumptions. The outer loading cut-off was set at 0.50, which is acceptable for exploratory studies, ensuring that each indicator contributes meaningfully to its construct while maintaining adequate reliability and validity for the overall model.

The evaluation of the measurement model (outer model) was carried out to ensure that the indicators used accurately represent the latent constructs under investigation. This process is crucial to confirm the reliability and validity of the measurement instruments before testing the structural relationships among variables.

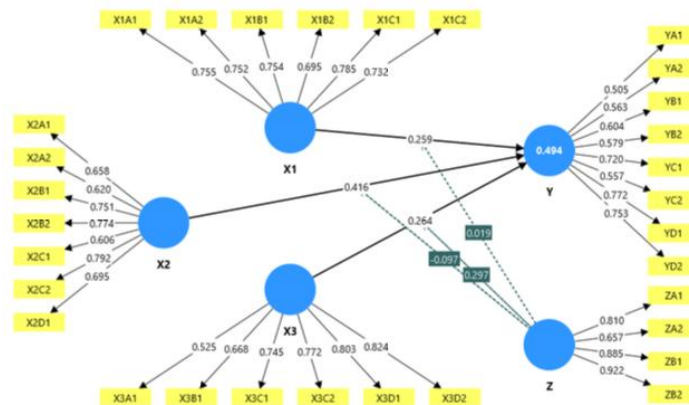


Figure 3. Output Outer Loading.

Based on the results of the structural model generated through the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis, the research model consists of four main constructs Digital Transformation (X1), Risk Management (X2), Entrepreneurial Character (X3), and Government Support (Z) as a moderating variable, with MSMEs Resilience (Y) serving as the dependent variable. Each construct is measured by several indicators with *outer loading* values ranging from 0.6 to 0.9, indicating that all indicators have a sufficiently strong and valid contribution in representing their respective constructs. The three independent variables digital transformation, risk management, and entrepreneurial character show a positive influence on MSMEs resilience, as illustrated by the directional paths leading directly to variable Y (Gold, 2025). Meanwhile, government support functions as a moderating variable that strengthens the relationships between the three independent variables and MSMEs resilience, as depicted by the dashed moderation paths in the model.

After the problematic items were removed, the next step was to evaluate the construct reliability by examining the values of Cronbach's Alpha, Composite Reliability (CR), and rho_A. These three indicators are used to assess the internal consistency of each construct, ensuring that all remaining indicators reliably measure the same underlying concept.

Table 2. Construct Reliability Test Results.

Construct	Cronbach's Alpha	Composite Reliability (CR)	rho A	Interpretation
Digital Transformation (X1)	0.846	0.883	0.857	Reliable
Risk Management (X2)	0.828	0.870	0.836	Reliable
Entrepreneurial Character (X3)	0.822	0.844	0.852	Reliable
MSMEs Resilience (Y)	0.788	0.845	0.802	Reliable
Government Support (Z)	0.845	0.893	0.920	Reliable

All constructs show Composite Reliability (CR) values greater than 0.70 and Cronbach's Alpha values above 0.70, indicating that the internal consistency of the indicators for each construct is strong. The rho_A values, which are also above 0.70, further support this finding. Thus, all constructs can be declared reliable. The construct reliability results also demonstrate consistent outcomes across all variables. Each construct recorded Cronbach's Alpha and Composite Reliability values exceeding the 0.70 threshold, confirming that the indicators within each construct possess good internal consistency. In other words, the indicators within each construct operate cohesively and uniformly in measuring the intended latent concept.

Convergent validity was evaluated using the Average Variance Extracted (AVE) value. The AVE indicates the proportion of variance in the indicators that can be explained by the construct, reflecting how well the indicators represent the underlying latent variable.

Table 3. Average Variance Extracted (AVE).

Construct	AVE	Interpretation
Digital Transformation (X1)	0.557	Valid
Risk Management (X2)	0.494	Nearly Valid
Entrepreneurial Character (X3)	0.533	Valid
MSMEs Resilience (Y)	0.408	Not Valid
Government Support (Z)	0.680	Valid

Most constructs show $AVE \geq 0.50$, except for MSMEs Resilience (Y) with an AVE of 0.408 and Risk Management (X2) slightly below the threshold at 0.494. Theoretically, an AVE of 0.50 or higher indicates good convergent validity. However, values slightly below 0.50 are still acceptable if Composite Reliability (CR) > 0.70 , as this demonstrates adequate construct reliability (Hair et al., 2017). Therefore, in this study, both constructs were retained since their reliability values remained strong, even though their convergent validity was somewhat limited.

Discriminant validity refers to the extent to which a construct is empirically distinct from other constructs in the model. In other words, each construct should measure a unique concept even if they are theoretically related. In this study, discriminant validity was evaluated using two methods the Fornell–Larcker Criterion and the Heterotrait–Monotrait Ratio (HTMT). According to the Fornell–Larcker criterion, discriminant validity is achieved when the square root of the AVE for each construct is higher than its correlation with other constructs. As shown in Table 4, all diagonal values (square roots of AVE) are greater than the inter-construct correlations, indicating satisfactory discriminant validity.

Table 4. Fornell–Larcker Criterion Test Results.

Construct	X1	X2	X3	Y	Z
Digital Transformation (X1)	0.746				
Risk Management (X2)	0.632	0.703			
Entrepreneurial Character (X3)	0.611	0.589	0.730		
MSMEs Resilience (Y)	0.572	0.671	0.413	0.825	
Government Support (Z)	0.441	0.399	0.471	0.399	0.825

The HTMT test further supports this finding. All HTMT values are below the conservative threshold of 0.85, confirming that each construct is empirically distinct and measures different concepts. All HTMT values are below 0.85, confirming that the constructs are distinct and not excessively correlated. Therefore, both the Fornell–Larcker and HTMT results indicate that the measurement model in this study possesses good discriminant validity, ensuring that each construct represents a unique conceptual dimension.

The structural model evaluation shows that the R^2 value for the endogenous construct MSMEs Resilience (Y) is 0.494, with an adjusted R^2 of 0.475, indicating a moderate level of explanatory power. The Q^2_{predict} value of 0.428 confirms the model's positive predictive relevance. The results of hypothesis testing show that Digital Transformation (H1), Risk Management (H2), and Entrepreneurial Character (H3) have a positive and significant effect on MSMEs Resilience. Meanwhile, Government Support significantly moderates only the relationship between Entrepreneurial Character and MSMEs Resilience (H6), but not the other two relationships (H4 and H5).

Table 5. Summary of Structural Paths and Effect Sizes (f^2).

Path (Hypothesis)	β	t-stat	p-value	f^2	Decision	Interpretation
X1 → Y (H1) Digital Transformation → Resilience	0.259	3.832	0.000	0.083	Accepted	Positive and significant; small–moderate effect
X2 → Y (H2) Risk Management → Resilience	0.416	3.553	0.000	0.112	Accepted	Positive and significant; strongest influence
X3 → Y (H3) Entrepreneurial Character → Resilience	0.264	2.159	0.031	0.064	Accepted	Positive and significant; small effect
Z × X1 → Y (H4) Gov. Support × Digital Transformation	0.019	0.301	0.763	0.001	Rejected	Not significant; very small effect
Z × X2 → Y (H5) Gov. Support × Risk Management	-0.097	1.056	0.291	0.006	Rejected	Not significant; negligible effect
Z × X3 → Y (H6) Gov. Support × Entrepreneurial Character	0.297	3.267	0.001	0.059	Accepted	Significant moderation; small effect

Table 6. Model Metrics Summary (R^2 , Q^2_{predict} , RMSE, MAE).

Metric	Value	Brief Interpretation
R^2 (Y = Resilience)	0.494	Moderate explanatory power
Adjusted R^2 (Y)	0.475	Moderate explanatory power
Q^2_{predict} (Y)	0.428	Positive predictive relevance
RMSE (PLS, Y)	0.763	Prediction error
MAE (PLS, Y)	0.578	Average prediction error

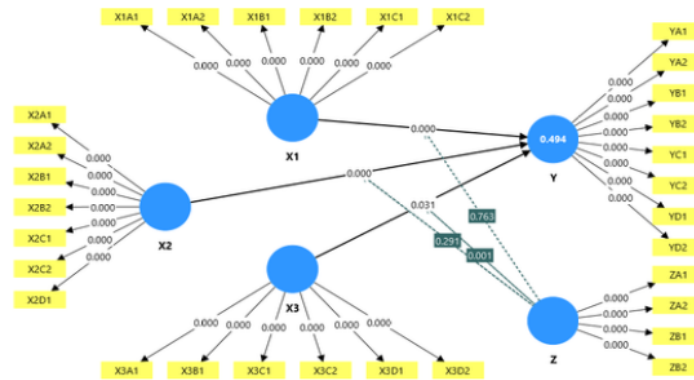


Figure 4. Inner Model Bootstrapping Results.

The results indicate that the model demonstrates a moderate explanatory power, with an R^2 value of 0.494, meaning that nearly half of the variance in MSMEs resilience is explained by digital transformation, risk management, and entrepreneurial character, including their interaction with government support. The Q^2_{predict} value of 0.428 shows that the model has positive predictive relevance, while the RMSE (0.763) and MAE (0.578) values indicate an acceptable level of prediction error.

Among the three main paths, risk management ($\beta = 0.416$; $t = 3.553$; $f^2 = 0.112$) has the strongest influence on MSMEs resilience, followed by digital transformation ($\beta = 0.259$; $t = 3.832$; $f^2 = 0.083$) and entrepreneurial character ($\beta = 0.264$; $t = 2.159$; $f^2 = 0.064$). This suggests that the ability to manage risks is the dominant factor contributing to business endurance and adaptability.

Regarding moderation effects, government support is significant only in the relationship between entrepreneurial character and resilience (H6), with $\beta = 0.297$; $t = 3.267$; $f^2 = 0.059$, indicating that government initiatives strengthen the contribution of entrepreneurial character to MSMEs resilience. However, the moderating effects of government support on digital transformation (H4) and risk management (H5) are not significant.

In total, four hypotheses were accepted and two were rejected. These findings confirm that MSMEs resilience is shaped by a combination of internal factors digitalization, risk management, and entrepreneurial character and external factors, particularly government support (Pamungkas & Risman, 2024). The results further emphasize that government assistance is most effective when directed toward strengthening entrepreneurial character, rather than focusing solely on technical aspects such as digitalization or risk management.

The Pucung leather craft center in Imogiri, Bantul recognized as an intangible cultural heritage hub faces several challenges, including fluctuating market demand, changing preferences among younger generations, limited global access, and dependence on raw material

supply chains. This study reveals that the resilience of MSMEs in this traditional craft industry is shaped by internal factors such as digital transformation, risk management, and entrepreneurial character, along with external factors such as government support (Warsiyah et al., 2024). Together, these elements determine how well local artisans can sustain their businesses and preserve cultural heritage in the face of economic and technological disruptions.

Digital transformation plays a crucial role in strengthening MSMEs resilience by enhancing flexibility, market reach, and operational continuity, particularly in the post-pandemic context. The adoption of e-commerce, social media marketing, design technology, and digital supply-chain management enables artisans to expand their customer base while maintaining authenticity (Grooss et al., 2022). However, the effectiveness of digitalization depends heavily on digital literacy, technological costs, and infrastructure availability. Similarly, effective risk management through identifying, mitigating, and monitoring potential disruptions such as price fluctuations, supply delays, and shifting consumer trends helps MSMEs remain adaptive (Fauzi et al., 2025). Practical strategies like product diversification, partnerships with galleries, and contingency planning have proven effective in building stronger resilience among Pucung artisans.

Entrepreneurial character further reinforces resilience through traits such as proactivity, innovation, risk-taking, and persistence, which enable artisans to adapt, differentiate their products, and explore new market channels, including exports (Surti, 2025). Strengthening entrepreneurial mindsets through mentoring, branding, and creative experimentation is especially vital for younger artisans. Meanwhile, government support serves as a moderating factor. The study found that such support does not significantly strengthen the effects of digital transformation or risk management likely due to generic programs and limited access (Nugroho et al., 2025). However, it significantly amplifies the influence of entrepreneurial character by providing targeted training, financial aid, incubation programs, and broader market opportunities. Therefore, government involvement is most effective when aligned with empowering entrepreneurial capacity and fostering innovation within traditional cultural industries

5. CONCLUSION

Based on the findings of the study titled “The Role of Government Support in Moderating The Effect of Digital Transformation, Risk Management, and Entrepreneurial Character on The Resilience of MSMEs in The Leather Craft Industry Center”, several conclusions can be drawn. Digital transformation has a positive and significant effect on

MSMEs resilience, enhancing their ability to adapt to business changes. Risk management also has a strong positive impact and emerges as the most dominant factor, highlighting the importance of anticipating and mitigating business risks. Entrepreneurial character likewise plays a vital role, as innovative, proactive, and risk-taking entrepreneurs are better able to sustain their businesses amid uncertainty.

Government support, however, does not moderate the relationship between digital transformation or risk management and MSMEs resilience, indicating that existing programs have not effectively strengthened these aspects. Yet, it significantly moderates the link between entrepreneurial character and resilience, suggesting that well-targeted initiatives such as training, mentoring, and incubation programs can amplify entrepreneurial capacity. Overall, MSMEs resilience is influenced by digital transformation, risk management, and entrepreneurial character, with government support serving a limited but strategic role in reinforcing entrepreneurial development.

Practically, MSMEs should enhance digital adoption, strengthen risk management systems, and cultivate an entrepreneurial mindset built on innovation and persistence. The government should align its policies with MSMEs needs, focusing on entrepreneurship development, access to finance, and digital infrastructure. This study is limited to the Pucung leather craft sector and uses a quantitative ex post facto approach; thus, future research should employ mixed methods and comparative studies across industries to provide a deeper and broader understanding of MSMEs resilience within Indonesia's creative economy.

DAFTAR REFERENSI

- Amalia, F., Dyah, A., Citraresmi, P., Rucitra, A. L., Mustaniroh, S. A., & Kartikaningrum, W. (2024). Pengaruh faktor-faktor resiliensi terhadap kesiapan transformasi digital di UKM. *Agrointek: Jurnal Teknologi Industri Pertanian*, 18(1), 67–78. <https://doi.org/10.21107/AGROINTEK.V18I1.17527>
- Bachtar, N. K., & Setiawan, A. (2023). A Bibliometric Analysis of Themes and Network Structures for Future Research in SMEs Sustainability. *Jurnal Manajemen Teori Dan Terapan| Journal of Theoretical and Applied Management*, 16(3), 522–541. <https://doi.org/10.20473/JMTT.V16I3.47284>
- Braumann, E. C. (2018). Analyzing the Role of Risk Awareness in Enterprise Risk Management. *Journal of Management Accounting Research*, 30(2), 241–268. <https://doi.org/10.2308/JMAR-52084>
- Brown, R., Rocha, A., & Cowling, M. (2020). Financing entrepreneurship in times of crisis: Exploring the impact of COVID-19 on the market for entrepreneurial finance in the United Kingdom. *International Small Business Journal*, 38(5), 380. <https://doi.org/10.1177/0266242620937464>

- Damayanti, R. A., Syarifuddin, S. B., & Zalshabila, S. C. (2023). Risk Management: The Awareness of Public Managers on Risk as a Social Construction. *International Journal of Professional Business Review*, 8(7), e02504. <https://doi.org/10.26668/businessreview/2023.v8i7.2504>
- Fauzi, F., Siregar, H., Barus, B., & Syahbana Indraprahasta, G. (2025). Empowering Msme for the Digital Era: A Comprehensive SWOT and AHP – Based Development Strategy in Bekasi Regency. *International Journal of Integrative Sciences*, 4(1), 1–16. <https://doi.org/10.55927/IJIS.V4I1.13101>
- Godwin, G., Raihana, S., Junaedi, P., Hardini, M., Purnama, S., & Korespondensi, P. (2024). Inovasi Bisnis Digital untuk Mendorong Pertumbuhan UMKM melalui Teknologi dan Adaptasi Digital. *ADI Bisnis Digital Interdisiplin Jurnal*, 5(2), 41–47. <https://doi.org/10.34306/ABDI.V5I2.1172>
- Gold, K. L. (2025). Effects of Industry 4.0 on Small and Medium-Scale Enterprises: An Analytical and Bibliometric Review. *SAGE Open*, 15(2). <https://doi.org/10.1177/21582440251336514>;ISSUE:ISSUE:DOI
- Goodell, J. W. (2020). COVID-19 and finance: Agendas for future research. *Finance Research Letters*, 35. <https://doi.org/10.1016/J.FRL.2020.101512>
- Grooss, O. F., Presser, M., & Tambo, T. (2022). Surround yourself with your betters: Recommendations for adopting Industry 4.0 technologies in SMEs. *Digital Business*, 2(2), 100046. <https://doi.org/10.1016/J.DIGBUS.2022.100046>
- Hadi, C., Mussanadah, A. U., & Kholifah, D. W. (2025). Dynamic Capabilities of SMEs: The Mediating Role of Digital Transformation in Achieving Sustainable Procurement. *Accounting and Finance Studies*, 5(2), 175–187. <https://doi.org/10.47153/AFS52.17492025>
- Hamdan, Sunaryo, D., & Edwards, J. (2025). Catalyzing SDG 4: A Strategic Management and Edupreneurship Initiatives. *Aptisi Transactions on Technopreneurship (ATT)*, 7(2), 411–423–411–423. <https://doi.org/10.34306/ATT.V7I2.670>
- Hannevig, H. (2025). The influence of CEO succession on ambidextrous strategies in family versus nonfamily SMEs: A knowledge- and resource-based view. *BRQ Business Research Quarterly*, 28(4), 885–905. <https://doi.org/10.1177/23409444251343099>;WGROU:STRING:PUBLICATION
- Juim, J., Indarti, S., & Darmi, T. (2021). Analisis Pemulihan Usaha Mikro, Kecil, dan Menengah (UMKM) Berbasis Komunitas. *Jurnal Ilmu Administrasi Negara AsIAN (Asosiasi Ilmuwan Administrasi Negara)*, 9(2), 303–313. <https://doi.org/10.47828/JIANAASIAN.V9I2.74>
- Konopik, J., Jahn, C., Schuster, T., Hoßbach, N., & Pflaum, A. (2022). Mastering the digital transformation through organizational capabilities: A conceptual framework. *Digital Business*, 2(2), 100019. <https://doi.org/10.1016/J.DIGBUS.2021.100019>
- Lantu, D. C., Rosmiati, M., Chaerudin, R., Herliana, S., & Lawiyah, N. (2022). Indonesian Leather Handicraft Trade in the International Market: SWOT analysis approach. *Journal of International Conference Proceedings*, 5(3), 206–214. <https://doi.org/10.32535/JICP.V5I3.1867>
- Liu, X., Wu, X., Wang, Q., & Zhou, Z. (2022). Entrepreneurial mindfulness and organizational resilience of Chinese SMEs during the COVID-19 pandemic: The role of

- entrepreneurial resilience. *Frontiers in Psychology*, 13, 992161. <https://doi.org/10.3389/FPSYG.2022.992161/FULL>
- Mikes, A., & Kaplan, R. S. (2015). When One Size Doesn't Fit All: Evolving Directions in the Research and Practice of Enterprise Risk Management. *Journal of Applied Corporate Finance*, 27(1), 37–40. <https://doi.org/10.1111/JACF.12102>
- Mitter, C., Postlmayr, M., & Kuttner, M. (2022). Risk management in small family firms: Insights into a paradox. *Journal of Family Business Management*, 12(2), 237–250. <https://doi.org/10.1108/JFBM-06-2020-0051>
- Nadkarni, S., & Prügl, R. (2020). Digital transformation: a review, synthesis and opportunities for future research. *Management Review Quarterly* 2020 71:2, 71(2), 233–341. <https://doi.org/10.1007/S11301-020-00185-7>
- Nugroho, C., Wulandari, A., Maulana, D., Rina, N., & Kalaloi, A. F. (2025). Digital communication and literacy for MSME empowerment: Evidence from a rural digital village in Indonesia. *International Journal of Innovative Research and Scientific Studies*, 8(3), 4523–4535. <https://doi.org/10.53894/IJIRSS.V8I3.7544>
- Pamungkas, A. C., & Risman, A. (2024). Literature Review : Manajemen Risiko Environmental, Social, And Governance (ESG) Dalam Bisnis Berkelanjutan. *Jurnal Doktor Manajemen (JDM)*, 7(2), 124–131. <https://doi.org/10.22441/JDM.V7I2.28308>
- Pennetta, S., Anglani, F., Reaiche, C., & Boyle, S. (2025). Entrepreneurial Agility in a Disrupted World: Redefining Entrepreneurial Resilience for Global Business Success. *International Journal of Entrepreneurship and Innovation*, 34(2), 221–267. <https://doi.org/10.1177/09713557251352283;PAGE:STRING:ARTICLE/CHAPTER>
- Pratomo, P. A., Jaya, T. S., & Irawan, I. (2025). Pemanfaatan Teknologi Kecerdasan Buatan untuk Meningkatkan Daya Saing UMKM di Era Ekonomi Digital. *Jurnal Masyarakat Madani Indonesia*, 4(4), 970–979. <https://doi.org/10.59025/41HMYM80>
- Putri, A. U., Mirani, D., & Khairunnisyah, T. (2023). Digital Transformation for MSME Resilience in The Era of Society 5.0. *Iapa Proceedings Conference*, 154–174. <https://doi.org/10.30589/PROCEEDINGS.2023.886>
- Putritamara, J. A., Hartono, B., Toiba, H., Utami, H. N., Rahman, M. S., & Masyithoh, D. (2023). Do Dynamic Capabilities and Digital Transformation Improve Business Resilience during the COVID-19 Pandemic? Insights from Beekeeping MSMEs in Indonesia. *Sustainability* 2023, Vol. 15, Page 1760, 15(3), 1760. <https://doi.org/10.3390/SU15031760>
- Raharjo, I. B. (2024). The Impact of Digital Transformation on Human Resource Development in the Online Business Paradigm. *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, 4(2), 580–586. <https://doi.org/10.57152/MALCOM.V4I2.1281>
- Safitri, A., Mafulla, D., Nichlah, M. W., Roykhan, R. M., Devi, S., & Absor, U. (2024). Analisis Identifikasi Risiko, Penilaian Risiko Dan Pengendalian Risiko Pada CV Sinar Jaya Mandiri. *Jurnal Ilmiah Keuangan Akuntansi Bisnis*, 3(2), 513–518. <https://doi.org/10.53088/JIKAB.V3I2.160>
- Sokhi, R. S., Singh, V., Querol, X., Finardi, S., Targino, A. C., Andrade, M. de F., Pavlovic, R., Garland, R. M., Massagué, J., Kong, S., Baklanov, A., Ren, L., Tarasova, O., Carmichael, G., Peuch, V. H., Anand, V., Arbilla, G., Badali, K., Beig, G., ... Zavala,

- M. (2021). A global observational analysis to understand changes in air quality during exceptionally low anthropogenic emission conditions. *Environment International*, 157, 106818. <https://doi.org/10.1016/J.ENVINT.2021.106818>
- Sugiarti, R., Margana, Muthmainah, & Fauzia, L. R. (2019). Leather Craft Industry and Tourism: A Symbiotic Relationship? (A Case Study of Magetan East Java Indonesia). *Harmonia: Journal of Arts Research and Education*, 19(2), 141–151. <https://doi.org/10.15294/harmonia.v19i2.21124>
- Surti, S. (2025). Implementation Gaps and Their Impact on Digital Capability and MSME Performance. *Journal of Regional Economics Indonesia*, 6(1), 1–10. <https://doi.org/10.26905/JREI.V6I1.15283>
- Tuegeh, O. D. M., Nagy, A. S., Paat, F. B., Tumiwa, J. R., & Kawet, F. (2025). Developing the Business Resilience - Technopreneur and Digital Transformation Model. *Jurnal Agroekoteknologi Terapan (Applied Agroecotechnology Journal)*, 6(2), 252–276. <https://doi.org/10.35791/JAT.V6I2.64305>
- Wahmuda, F., Zulaikha, E., & Fabroyir, H. (2025). Digital Transformation in Upcycling-based Craft Industry: *Jurnal Desain Indonesia.*, 7(1), 35–59. <https://doi.org/10.52265/JDI.V7I1.500>
- Warsiyah, Saputeri, N. P., Nurulia, E. T., & Fakhrurozi, Moh. (2024). Evaluation of the Effectiveness of Government Policy on MSMEs Through Empirical Data Analysis in Lampung. *KnE Social Sciences*, 591-601–591–601. <https://doi.org/10.18502/KSS.V9I16.16272>