TRANSFORMATION OF SMES IN WEST JAVA: BUILDING NATIONAL ECONOMIC RESILIENCE THROUGH DIGITAL INNOVATION

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Abstract

This study aims to analyze the effect of digital transformation, MSME innovation, and government policies on the sustainability of Micro, Small, and Medium Enterprises (MSMEs) in West Java, with Human Resource (HR) capacity as a moderating variable. Using a quantitative approach with a causal design, this study tests hypotheses through Structural Equation Modeling (SEM) with the help of SmartPLS software. The research population consists of active MSMEs in West Java Province, with a minimum sample of 99 respondents selected using stratified purposive sampling. The results show that digital transformation has a positive and significant effect on MSME sustainability. MSME innovation also shows a very strong and dominant positive effect on business sustainability. In addition, government policies also contribute positively and significantly to the sustainability of MSMEs, although the impact is relatively weaker. However, an important finding is that human resource capacity does not significantly moderate the relationship between digital transformation, innovation, and government policies on the sustainability of MSMEs. This is likely due to the low digital literacy of MSME human resources or because the innovations carried out are still simple and do not require high human resource skills.

Keywords: *SMEs, SME Sustainability, Digital Transformation, SME Innovation, Human Resource Capacity.*

A. INTRODUCTION

Micro, small, and medium enterprises (MSMEs) in Indonesia have long been the backbone of the national economy. With their significant potential contribution, MSMEs play a major role in the Gross Domestic Product (GDP) and in job creation. Data from the Ministry of Cooperatives and SMEs shows that more than 64 million of these business units contribute 61.07% to GDP and employ around 97% of the national workforce (Alam et al., 2023). However, despite the vital role of MSMEs in the Indonesian economy, their sustainability still faces a number of challenges, especially in an era of global uncertainty marked by the COVID-19 pandemic, energy crisis, and economic fluctuations (Zahiroh, 2022). A prominent phenomenon is the difficulty of MSMEs in adapting to digital transformation. While digital technology is developing rapidly, the adaptation of MSMEs to these changes is relatively slow. The transition from traditional business models to technology-based models, including the implementation of digital marketing and electronic payment systems, is a necessity to

remain competitive in an increasingly digitized market (Lianardo et al., 2022 ; Setiadi et al., 2025). However, MSMEs are generally still in the early stages of technology adoption, often hampered by limited digital literacy, inadequate infrastructure, and financial risks related to implementation (Yuniar et al., 2023). This creates a significant gap for MSMEs in improving their competitiveness (Qur'ani & Anshar, 2023).

Limitations in innovation are also a prominent issue. Although innovation in products, services, and business models is extremely important, many MSMEs are stuck with conventional products with low added value. Survey results show that some MSMEs face various obstacles in innovating, mainly due to a lack of human and financial resources, as well as access to the latest technology (Hardi et al., 2022). With reduced capacity for research and development (R&D), many MSME players are struggling to break through the innovation barriers expected to achieve success amid competition (Aisyah et al., 2023).

On the other hand, the role of proactive government policies is crucial for the sustainability of SMEs. Various initiatives, such as People's Business Credit (KUR) and the push for digitalization through *e-commerce* platforms, have been launched to address the challenges faced by MSMEs. However, the effectiveness of these programs is often questioned, especially in relation to access to information, complicated bureaucracy, and weak implementation in the field (Asrol et al., 2022). This raises important questions about the gap between the policies formulated and the reality on the ground in the context of MSME actors, especially in areas with a high concentration of MSMEs such as West Java (Ziółkowska, 2021).

From an academic perspective, a number of studies have examined the relationship between digital transformation, innovation, and government policy in the context of MSME sustainability. For example, research by Marconatto et al. emphasizes that digital adoption has the potential to increase the competitiveness of MSMEs in the long term (Hasan et al., 2021). In terms of innovation, other studies show that innovation is the main driver of MSME growth (Widiyarti et al., 2024) . However, these studies did not explore the role of human resource capacity as a moderating variable in this interaction, even though adequate human resource capacity plays a decisive role in the ability of MSMEs to utilize digitalization and innovate effectively (Kambau, 2024).

The gap in research that can be identified in the current literature is the lack of studies that comprehensively examine the interaction between digital transformation, MSME innovation, and government policy, taking into account human resource capacity as a moderating variable. Most studies tend to treat these variables separately and rarely emphasize the interdependence between human resource capacity and these factors (Ramadhani et al., 2023) . This study aims to bridge this gap by exploring how human resources can influence the impact of digital transformation and innovation on the sustainability of MSMEs, especially in regions rich in MSMEs such as West Java, which also faces challenges in digitalization and human resource quality (Fatimah & Mukarramah, 2023).

The novelty of this research lies in its integrative and contextual approach, focusing on the simultaneous relationship between digital transformation, innovation, and government policies in strengthening the sustainability of MSMEs. This approach also presents human resources as an influential moderating variable,

which is rarely studied in the context of MSMEs (Saleh, 2023). The context of West Java, which is one of the provinces with the highest number of SMEs but also has significant disparities in access to digitalization, provides many lessons regarding the challenges faced by this sector (Nasution et al., 2024).

Thus, this study aims not only to address the empirical issues faced by SMEs but also to develop a new theoretical perspective in understanding the contribution of digital transformation, innovation, and government policies to the sustainability of SMEs in Indonesia, particularly in West Java, with a special focus on the prominent and crucial role of human resource capacity.

B. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1. SME Sustainability

The sustainability of micro, small, and medium enterprises (MSMEs) is highly dependent on their ability to survive, grow, and develop in the long term. To achieve this sustainability, MSMEs must pay attention to economic, social, and environmental dimensions, which form the basis of the *triple bottom line* concept. This concept emphasizes that sustainability does not only focus on financial *profits*, but also on social sustainability, which includes workforce empowerment and contributions to the community (people), as well as environmental sustainability through the efficient and environmentally friendly use of resources (planet) (Andruk & Altinay, 2021; Prakash et al., 2023) .

The triple bottom line consists of three main pillars: profit, people, and planet, which are interrelated and inseparable. The sustainability of a business in the context of MSMEs means how they can generate sufficient profits, provide significant social benefits to the surrounding community, and keep the environment livable. (Poerwanto et al., 2021; Utami & Novianti, 2021). In this case, it is important for MSMEs to adapt to the ever-changing dynamics of the business environment, taking into account the interests of various stakeholders, including the community and the environment (Suroso et al., 2021).

Sustainability indicators for micro, small, and medium enterprises (MSMEs) are an important tool for assessing the extent of business sustainability. To create a comprehensive framework, a number of indicators used in MSME sustainability research include: economic (Kurnia et al., 2023), social (Lyaskovskaya et al., 2023), and environmental (Maragita et al., 2024).

2. Human Resource Capacity

Human resource capacity refers to the abilities, skills, knowledge, and competencies possessed by individuals or groups of workers in an organization or business unit to effectively carry out their functions, responsibilities, and roles to achieve established goals. This capacity includes technical, managerial, and social competencies, as well as the ability to adapt to changes in the external environment. Improving HR capacity is one of the important pillars in advancing the organization and achieving the desired goals. This HR capacity, as part of *capacity development*, explains that individual development is very important for acquiring, absorbing, and utilizing resources in an effort to manage sustainable development. Effectiveness in utilizing HR is very important for organizations, especially for MSMEs, which often

face limitations in terms of skills and HR quality (Maulana & Suyono, 2023). Having quality human resources is the key to improving the performance of SMEs, and research shows that improving skills and managerial abilities can have a positive impact on business operational results (Wirawan & Karmini, 2023).

Human resource capacity indicators cover various aspects that are important for measuring individual effectiveness in an organizational context. This study uses indicators from several studies, such as: competencies (Fitri et al., 2022), managerial skills (Daud & Jalal, 2022), innovation (Aminullah & Ali, 2020), learning capacity (Suherman et al., 2023), as well as commitment and integrity (Fitriyani et al., 2020). Each indicator plays an important role in building quality human resources in various sectors.

3. Digital Transformation

Digital transformation is the process of integrating digital technology into all aspects of an organization's business and operations, thereby changing the way they operate and deliver value to customers (Ramadan et al., 2023). This includes changes in culture, business models, and operational processes. It shows that digital transformation is not just about implementing new technological tools, but also about creating better and more relevant value for users and customers. Digital transformation serves as a catalyst that not only changes the way businesses operate, but also reshapes social and cultural interactions. This requires the adoption of the right technology and in-depth strategy adjustments in all sectors (Sulaiman et al., 2021).

Digital transformation is an important step that must be taken by all entities, both in the private and public sectors, in response to the dynamics of the environment and rapid technological developments. This transformation does not only rely on technological tools, but requires a commitment to changing the way people interact, collaborate, and run their business processes, as well as building a culture that supports innovation and adaptation (Ramadhany et al., 2023). This shows that success in digital transformation requires good integration between technology, people, and processes (Asrol et al., 2022).

Digital transformation indicators are various aspects and variables that show the extent to which an organization or agency has adopted and implemented digital technology in their structure and processes. Several indicators in this study that can be mentioned include: Technology Adoption Level (Barus et al., 2024) , Human Resource Readiness (Suryawidjaja et al., 2023) , Business Process Efficiency (Barus et al., 2024), Quality of Customer Service (Muhajir et al., 2023) , Innovation in Products and Services (Zulkifli et al., 2023), Digital Security (Suryawidjaja et al., 2023), Stakeholder Participation (Manik & Juwono, 2024), Availability of Digital Infrastructure (Kurniawan et al., 2021).

4. MSME Innovation

Innovation in the context of Micro, Small, and Medium Enterprises (MSMEs) refers to the ability to develop and implement new changes in products, services, processes, or business models to improve business performance and competitiveness (Sari et al., 2023). This innovation is very important for MSMEs because they often

have limited resources and must adapt quickly to market changes and consumer needs. Innovation acts as an important mediator between business strategy and MSME performance. Through innovation, including the use of accounting information systems, strategies based on product uniqueness and quality can be improved to drive performance.

Although risky, innovation requires careful calculation and system support to reduce failure and align organizational goals (Latifah et al., 2020). A green market orientation that encourages green innovation has also been shown to improve performance by balancing economic, social, and environmental aspects (Tjahjadi et al., 2020). Furthermore, sustainable digital transformation strengthens innovation through technology and stakeholder collaboration (Martínez-Peláez et al., 2023). Overall, innovation in SMEs is not only about developing new products or services, but also involves changes in business models and operational processes, all of which aim to improve business performance and competitiveness in the market.

Innovation indicators in Micro, Small, and Medium Enterprises (MSMEs) are variables and metrics used to assess the level of innovation applied in these organizations. In the context of MSMEs, these indicators are important for determining their ability to adapt to market changes, increase productivity, and maintain competitiveness in an increasingly digital era. Some indicators in this study that can be used to measure innovation in MSMEs include: Application of New Technology (Hossain et al., 2022), Development of New Products and Services (Mushtaq et al., 2024), Digital Training and Skills (Cheng et al., 2023), Speed of Adaptation to Market Changes (Rupeika-Apoga et al., 2022), Digital Marketing Innovation (Kouam, 2025), Sustainable Practices (Hossain et al., 2022).

5. Government Policy

Government policy is a series of decisions made by public authorities with the aim of regulating and providing solutions to problems faced by society. The definition of public policy varies, but generally includes all actions taken by the government, both proactive and reactive, in response to issues faced by society. Public policy arises as the authority of the government in carrying out its duties and functions, which are basically oriented towards the public interest and aim to organize society in various aspects (Aulia et al., 2021). Policies are activities that are proposed and implemented to solve problems in order to achieve specific goals in government that serve optimally and improve the welfare of the community (Zulfia et al., 2023). This implies in-depth analysis and planning regarding the situation that needs to be changed or improved.

Policies also include in-depth regulations on various sectors, including education, health, economy, and social policies. Policies are created to address issues faced by the public, making them relevant and acceptable to common sense (Febriyani, 2021). Thus, understanding public policy requires a comprehensive analysis that considers the dynamics of society and the involvement of various stakeholders. Finally, it is important to remember that government policies are not static; they must be evaluated and adjusted in line with changes in the situation and the needs of the community. By looking at the definition and understanding of government policy from these various perspectives, we can interpret policy as a dynamic tool for improving the quality of life of the community.

Government policy indicators for Micro, Small, and Medium Enterprises (MSMEs) can be interpreted as parameters that are measured to assess the effectiveness and impact of the policies implemented, as well as to determine the success in supporting the development of MSMEs(S. Yusuf et al., 2022). These indicators are very important because MSMEs are a significant economic pillar in Indonesia, contributing to economic growth, employment, and poverty reduction, among other things (S. Yusuf et al., 2022) : Access to Financing, Capacity and Skill Building, Innovation and Technology Support, Involvement in Supply Chains, Satisfaction and Participation Surveys, Economic Growth, and Job Creation.

6. Hypothesis

Based on the results of the literature review and conceptual framework described in the previous section, the research hypothesis can be formulated as follows:

H1: Digital transformation has a positive effect on the sustainability of MSMEs.
H2: MSME innovation has a positive effect on MSME sustainability.
H3: Government policies have a positive impact on the sustainability of SMEs.
H4: Human resource capacity moderates the impact of digital transformation on SME sustainability.
H5: Human resource capacity moderates the effect of MSME innovation on MSME sustainability.
H6: Human resource capacity moderates the effect of government policy on the sustainability of MSMEs.

C. METHOD

This study is directed at testing and empirically analyzing the influence of Digital Transformation, MSME Innovation, and Government Policy on MSME Sustainability, with Human Resource Capacity acting as a moderating variable. The research design uses a causal approach, which aims to identify the cause-and-effect relationship between the variables studied. This study is explanatory in nature, as it seeks to provide an in-depth explanation of the observed phenomenon through testing previously formulated hypotheses. The research approach is quantitative, with the collection and analysis of numerical data to test the conceptual model that has been constructed.

The research population consists of active MSMEs in West Java Province. The sampling technique uses stratified purposive sampling based on regencies/cities and the food and beverage sector to be more specific, with a total of 8,414 MSME data from Diskuk Jabar in 2024. The sample size was determined using the Slovin formula with a margin of error (e) = 10% = 0.10, resulting in a minimum sample size of 99 respondents. Respondents were selected based on their ability to provide a comprehensive picture of the extent to which digital transformation, innovation levels, and government policy support contribute to the sustainability of MSMEs, from economic, social, and environmental aspects. The instrument used in this study was a questionnaire, which was then analyzed to ensure its validity and reliability. Furthermore, the collected data was processed using the Structural Equation Modeling (SEM) method with the help of SmartPLS software.

D. RESULTS AND DISCUSSION

1. Measurement Model (Outer Model) and Structural Model (Inner Model)

This study involved 32 manifest variables (indicators) and 5 latent variables. The analysis was conducted through a measurement model (Outer Model) and a structural model (Inner Model), which were then used to test the Structural Equation Model (SEM) using the Partial Least Square (PLS) method.

In structural modeling, the measurement model plays an important role in assessing the validity and reliability of latent constructs through observable indicators. Confirmatory factor analysis is used to ensure the suitability of indicators with the hypothesized constructs (Judijanto et al., 2023; Setiadi, et al., 2025). Convergent and discriminant validity evaluations are also necessary to examine the relationships between latent variables and their indicators. Through the SEM-PLS approach, model testing can be conducted more comprehensively, enabling the handling of analytical complexity while strengthening research findings (Mohamed et al., 2021).

Validity testing in research uses two main techniques, namely convergent validity and discriminant validity. Convergent validity serves to ensure that indicators related to latent constructs show the expected positive correlation, measured through high factor loading values in confirmatory factor analysis (Andriyani, 2021). Discriminant validity, on the other hand, tests the extent to which indicators have a higher correlation with the construct being measured compared to other constructs in the same model.

Convergent validity is an essential criterion in testing analytical models using SmartPLS. Specifically, factor loading values are expected to be above 0.70 for confirmatory research, while values above 0.60 are still acceptable in exploratory research (Suyanti et al., 2024). Furthermore, an Average Variance Extracted (AVE) exceeding 0.5 confirms that the indicators used are able to measure the construct effectively (Suyanti et al., 2024). In the path representation, the causal diagram shows the relationship between constructs and the factor loading values of each indicator, which are the main components in assessing the validity of the measures used:

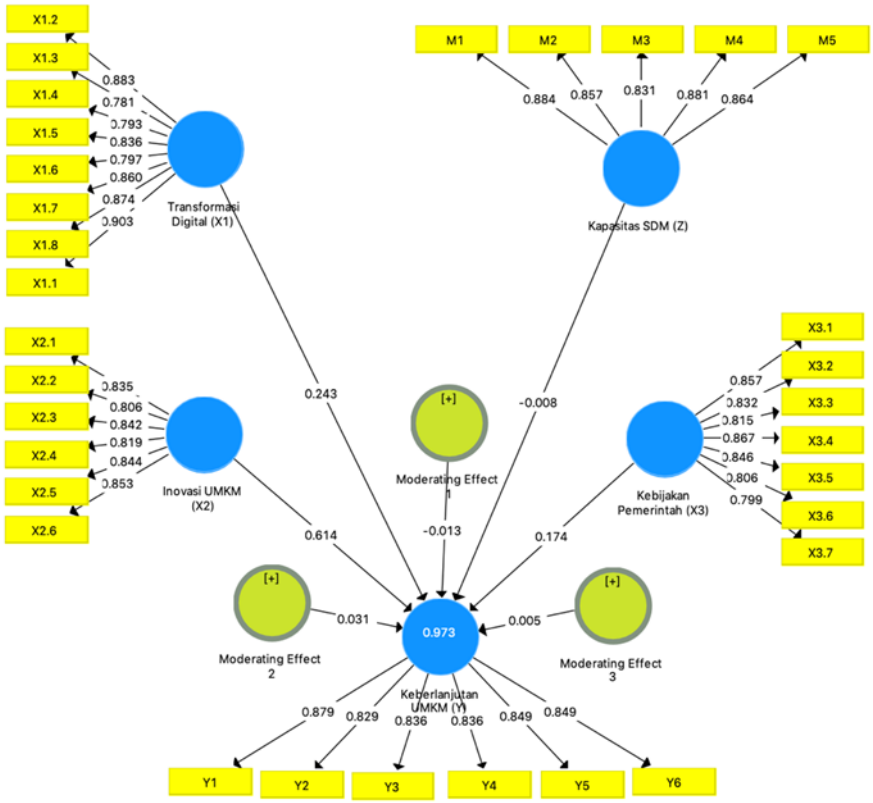

Figure 2. Outer Model

Source: Processed Using SMART PLS3 (2025)

Figure 2 shows the results of convergent validity testing analyzed using PLS software. The evaluation process was carried out by looking at *the factor loading* values of each indicator in the construct under study. A construct is considered to meet convergent validity requirements if the *factor loading* value is above 0.70 and the *Average Variance Extracted* (AVE) value exceeds 0.50. Based on the analysis results, all indicators tested were found to meet these requirements.

Table 1. Final Factor Loadings

Variable	Indicator	Factor Loadings	Description
Digital Transformation (X1)	X1.1	0.903	Valid
	X1.2	0.883	
	X1.3	0.781	
	X1.4	0.793	
	X1.5	0.836	
	X1.6	0.797	
	X1.7	0.860	
	X1.8	0.874	
MSME Innovation (X2)	X2.1	0.835	Valid
	X2.2	0.806	
	X2.3	0.842	
	X2.4	0.819	
	X2.5	0.844	
	X2.6	0.853	
Government Policy (X3)	X3.1	0.857	Valid
	X3.2	0.832	
	X3.3	0.815	
	X3.4	0.867	

	X3.5	0.846	
	X3.6	0.806	
	X3.7	0.799	
Human Resource Capacity (Z)	M1	0.884	Valid
	M2	0.857	
	M3	0.831	
	M4	0.881	
	M5	0.864	
MSME Sustainability (Y)	Y1	0.879	Valid
	Y2	0.829	
	Y3	0.836	
	Y4	0.836	
	Y5	0.849	
	Y6	0.849	

Source: Data Processed by the Researcher (2025)

Based on the final factor loading table, all indicators in the Digital Transformation (X1), MSME Innovation (X2), Government Policy (X3), Human Resource Capacity (Z), and MSME Sustainability (Y) variables have values above 0.7. This shows that all indicators are convergent valid and suitable for use in the research model.

Table 2. AVE Values

Variable	AVE Value
Digital Transformation (X1)	0.709
MSME Innovation (X2)	0.694
Government Policy (X3)	0.692
Human Resource Capacity (Z)	0.746
MSME Sustainability (Y)	0.716

Source: Data Processed by the Researcher (2025)

Based on the *Average Variance Extracted* (AVE) calculation results, all variables have values above 0.50, namely Digital Transformation (0.709), MSME Innovation (0.694), Government Policy (0.692), Human Resource Capacity (0.746), and MSME Sustainability (0.716). This indicates that all constructs meet the criteria for convergent validity.

Discriminant validity is an important aspect in the evaluation of latent constructs, where constructs must reflect unique features that do not overlap with one another. In assessing discriminant validity, two main approaches are used: cross-loading factor analysis and evaluation of the Average Variance Extracte*d* (AVE) value compared to the correlation between latent variables (Handrianto et al., 2023).

Table 3. Cross-Loading Factor

Indicator	MSME Innovation (X2)	Human Resource Capacity (Z)	MSME Sustainability (Y)	Government Policy (X3)	Digital Transformation (X1)
X1.1	0.862	0.861	0.872	0.875	**0.903**
X1.2	0.857	0.854	0.861	0.856	**0.883**
X1.3	0.743	0.729	0.749	0.756	**0.781**
X1.4	0.776	0.769	0.773	0.742	**0.793**
X1.5	0.828	0.815	0.816	0.806	**0.836**
X1.6	0.804	0.803	0.806	0.788	**0.797**
X1.7	0.804	0.827	0.816	0.836	**0.860**
X1.8	0.794	0.816	0.826	0.812	**0.874**

X2.1	**0.835**	0.785	0.770	0.785	0.761
X2.2	**0.806**	0.787	0.741	0.779	0.760
X2.3	**0.842**	0.828	0.879	0.821	0.847
X2.4	**0.819**	0.786	0.829	0.770	0.806
X2.5	**0.844**	0.815	0.836	0.817	0.808
X2.6	**0.853**	0.805	0.836	0.770	0.818
X3.1	0.814	0.825	0.849	**0.857**	0.833
X3.2	0.808	0.800	0.849	**0.832**	0.808
X3.3	0.761	0.776	0.747	**0.815**	0.771
X3.4	0.816	0.824	0.810	**0.867**	0.835
X3.5	0.825	0.821	0.814	**0.846**	0.808
X3.6	0.746	0.746	0.761	**0.806**	0.773
X3.7	0.749	0.725	0.742	**0.799**	0.770
M1	0.841	**0.884**	0.845	0.834	0.849
M2	0.842	**0.857**	0.838	0.815	0.833
M3	0.802	**0.831**	0.789	0.790	0.790
M4	0.832	**0.881**	0.840	0.843	0.845
M5	0.834	**0.864**	0.818	0.812	0.838
Y1	0.842	0.828	**0.879**	0.821	0.847
Y2	0.819	0.786	**0.829**	0.770	0.806
Y3	0.844	0.815	**0.836**	0.817	0.808
Y4	0.853	0.805	**0.836**	0.770	0.818
Y5	0.814	0.825	**0.849**	0.857	0.833
Y6	0.808	0.800	**0.849**	0.832	0.808

Source: Data Processed by the Researcher (2025)

The cross-loading results show that each indicator has the highest loading value on the construct being measured compared to other constructs. Indicators, X1.1–X1.8 are stronger in Digital Transformation, X2.1–X2.6 in MSME Innovation, X3.1–X3.7 in Government Policy, M1–M5 in Human Resource Capacity, and Y1–Y6 in MSME Sustainability. This proves the fulfillment of discriminant validity in the research model.

Composite Reliability (CR) and Cronbach's Alpha (CA) are the two most commonly used metrics for assessing reliability in Partial Least Squares Structural Equation Modeling (PLS-SEM) models. Both assess the internal consistency of measurement instruments, which is very important to ensure the validity of research results (Zahid & Rao, 2022). A good CR value is usually above 0.70 and accompanied by a CA value of at least 0.70 to indicate that the instrument has adequate reliability (Awang et al., 2022).

Table 4. Composite Reliability (CR) and Cronbach's Alpha (CA)

Variable	Cronbach's Alpha	Composite Reliability
Digital Transformation (X1)	0.941	0.951
MSME Innovation (X2)	0.912	0.932
Government Policy (X3)	0.926	0.940
Human Resource Capacity (Z)	0.915	0.936
MSME Sustainability (Y)	0.921	0.938

Source: Data Processed by the Researcher (2025)

Cronbach's Alpha and Composite Reliability values for all variables are above 0.70, namely Digital Transformation (0.941; 0.951), MSME Innovation (0.912; 0.932),

Government Policy (0.926; 0.940), Human Resource Capacity (0.915; 0.936), and SME Sustainability (0.921; 0.938). This indicates excellent construct reliability.

Measurements in the structural model using the Partial Least Squares (PLS) method aim to evaluate the relationship between latent variables. This evaluation is carried out by analyzing the path values generated after the bootstrapping process, which provides an understanding of the significance of the influence between variables in the study (Dwitayanti & Armaini, 2024). PLS-SEM, which is often used in this context, allows research to handle complex relationships between latent variables by providing more accurate estimates even in studies with small samples.

The following figure displays the bootstrapping analysis results obtained based on the findings of this study:

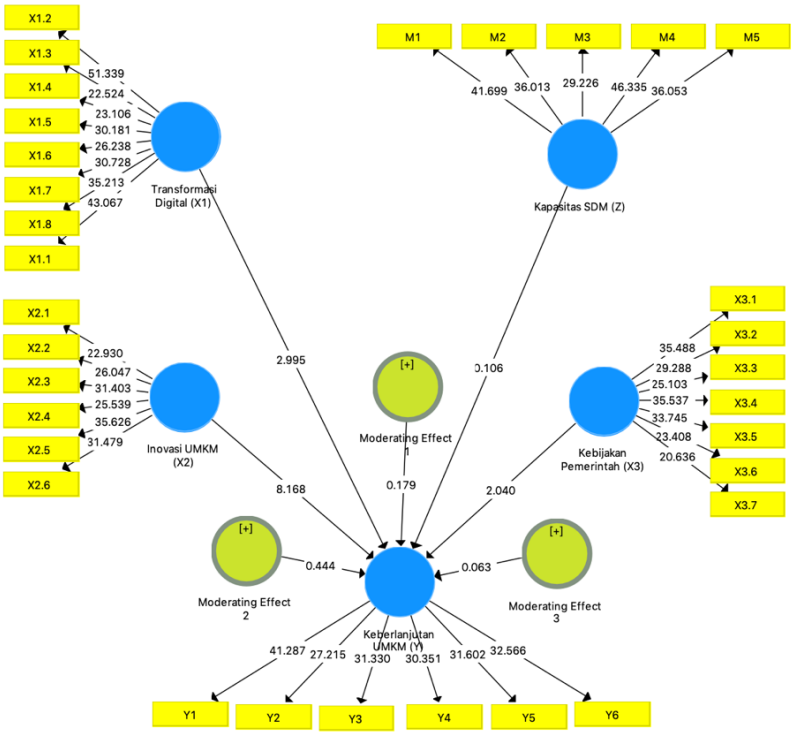

Figure 3. Bootstrapping

Source: Processed by Smart PLS 3 (2025)

Figure 3, Bootstrapping results show that Digital Transformation (X1) has a significant effect on MSME Sustainability (Y) with a t-statistic value of 2.995 > 1.96. The MSME Innovation variable (X2) has the most dominant influence with a t-statistic value of 8.168 > 1.96, confirming that innovation is a key factor in maintaining sustainability. Government Policy (X3) is also proven to be significant with a t-statistic value of 2.040 > 1.96, although its contribution is relatively smaller than innovation. In contrast, Human Resource Capacity (Z) as a moderating variable obtained a t-statistic value of 0.106 < 1.96, so it does not have a significant direct effect.

2. R-Square Test

The structural model (inner model) test with SMARTPLS 3 aims to analyze the relationship between latent constructs. R-Square is used to assess the ability of independent variables to explain dependent variables (Firmansyah et al., 2023). The t-statistic test is conducted to measure the significance of the path coefficients (Yusuf,

2022). Through the bootstrap method, hypotheses are tested with higher accuracy, comparing the t-statistic with the critical value (Sadiq et al., 2022). The estimated R-Square values resulting from this analysis process are presented in the following table:

Table 5. R Square Results

Variable	R Square
Sustainability of MSMEs (Y)	0.973

Source: Processed by Smart PLS 3 (2025)

The R-Square value of 0.973 for the SME Sustainability (Y) variable indicates that this research model has a very high explanatory power. This means that 97.3% of the variation in SME sustainability can be explained by the variables of Digital Transformation, SME Innovation, Human Resource Capacity, and Government Policy, either directly or through moderating effects. Meanwhile, the remaining 2.7% is explained by other factors outside the model.

3. Predictive Relevance

The Q^2 (Q Square) value is an important measure in Partial Least Squares (PLS) analysis that indicates the efficiency of the model in predicting observed values. Evaluation criteria show that a Q^2 value greater than 0 indicates good predictive power, while a Q^2 value below 0 indicates that the model is not reliable for prediction (Lahay et al., 2021). A Q^2 value above 0.25 indicates moderate predictive relevance, and a Q^2 greater than 0.50 indicates a significant model in the context of prediction (Lukman, 2022).

Table 6. Q-square

Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
Sustainability of MSMEs	594,000	190,567	0.679

Source: Processed by Smart PLS 3 (2025)

Based on Table 6, the calculation results show that the Q^2 value for the SME Sustainability variable is 0.679. This value indicates that the model has excellent predictive ability, as it is greater than 0. Thus, the value of 0.679 indicates that this research model has high predictive relevance in explaining the SME Sustainability variable.

4. Evaluation of Model Goodness of Fit

The use of Goodness of Fit (GoF) as a measure of model fit in PLS analysis adds a more comprehensive dimension of evaluation and complements the analysis performed through R^2 and Q-square. GoF provides an important indicator of the extent to which the model is able to complexify the observed data well and can assist researchers in validating the construct (Liu, 2023). A GoF value ranging from 0.10 indicates low fit, 0.25 indicates moderate fit, and 0.36 or higher indicates high fit (Vasli et al., 2022). In addition to GoF, Standardized Root Mean Square Residual (SRMR) is also used in PLS SEM models to assess how well the correlation matrix predicted by the model matches the empirical data correlation matrix (Le et al., 2022). The recommended SRMR value is less than 0.08 (Le et al., 2022 ; Setiadi, Maulana, et al., 2025).

Table 6. SRMR

	Saturated Model	Estimated Model
SRMR	0.054	0.054

Source: Processed by Smart PLS 3 (2025)

The SRMR value in the saturated and estimated models is the same, namely 0.054, indicating a good level of model suitability because it is below the limit of 0.08. This indicates that the structural model tested has validity and can adequately represent the relationship between variables.

Table 7. GoF Index

Average AVE	Average R Square	Goodness of Fit Index
0.7114	0.973	**0.832**

Source: processed by Smart PLS 3 (2025)

The Goodness of Fit (GoF) calculation results show a value of 0.832, which is in the high category. This finding indicates that the research model has a very strong level of fit, so that it is able to explain the relationship between constructs well and supports the overall validity of the model.

5. Hypothesis Testing

Hypothesis testing in data analysis using the bootstrapping method is increasingly popular, especially in the context of applications such as SmartPLS 3. Bootstrapping is an effective resampling technique because it eliminates the need for normal distribution assumptions and large sample sizes, which are often limitations in traditional hypothesis testing (Plinio, 2022). Through bootstrapping, researchers can easily determine path coefficient values as well as t-values or p-values, which are used to measure the influence between variables in the model (Cavaliere & Rahbek, 2020).

Table 9. Path Significance Test

Variable	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Digital Transformation (X1) → Sustainability of MSMEs (Y)	0.243	2.995	0.003
MSME Innovation (X2) → Sustainability of MSMEs (Y)	0.614	8.168	0.000
Government Policy (X3) → Sustainability of MSMEs (Y)	0.174	2,040	0.042
Moderating Effect 1 →Sustainability of MSMEs (Y)	-0.013	0.179	0.858
Moderating Effect 2 →Sustainability of MSMEs (Y)	0.031	0.444	0.657
Moderating Effect 3 →Sustainability of MSMEs (Y)	0.005	0.063	0.950

Source: Processed by Smart PLS 3 (2025)

This study uses a significance level of 95%, with a two-tailed test criterion. A path coefficient is considered significant if the t-statistic value is > 1.96. Based on the estimated path coefficient and t-statistic in the test table, the direct effects between variables can be summarized as follows:

a. Hypothesis 1 (Digital Transformation → MSME Sustainability)
   The original sample value of 0.243 indicates a positive effect of digital transformation on MSME sustainability. With a t-statistics value of 2.995 > 1.96 and a p-value of 0.003 < 0.05, this effect is statistically significant. This means that the higher the implementation of digital transformation, the greater the

chance for MSMEs to survive and be sustainable. Thus, Hypothesis 1 is accepted.

b. Hypothesis 2 (MSME Innovation → MSME Sustainability)
The original sample value of 0.614 with t-statistics of 8.168 > 1.96 and a p-value of 0.000 < 0.05 indicates a very strong and significant positive effect. s are a dominant factor driving SME sustainability. This confirms that innovation, creativity, and the ability to create uniqueness are the main determinants of SME sustainability amid competition. Thus, Hypothesis 2 is accepted.

c. Hypothesis 3 (Government Policy → MSME Sustainability)
The original sample value of 0.174 with t-statistics of 2.040 >1.96 and a p-value of 0.042 < 0.05 indicates a significant but relatively weak positive effect. This means that government policy support does contribute to SME sustainability, but its influence is not as great as innovation or digital transformation. Thus, Hypothesis 3 is accepted.

d. Hypothesis 4 (Moderation of Human Resource Capacity on the relationship between Digital Transformation → MSME Sustainability)
The original sample value of -0.013, t-statistics of 0.179 < 1.96, and p-value of 0.858 > 0.05 indicate that there is no moderating effect. This means that human resource capacity does not strengthen or weaken the effect of digital transformation on MSME sustainability. This is likely due to the low level of digital literacy among MSME human resources. Thus, Hypothesis 4 is rejected.

e. Hypothesis 5 (Moderation of HR Capacity on the relationship between Innovation → MSME Sustainability)
The original sample value is 0.031, with t-statistics of 0.444 < 1.96 and a p-value of 0.657 > 0.05, also indicating insignificant results. This means that HR capacity does not strengthen the relationship between innovation and sustainability. Most likely, the innovations carried out by SMEs are mostly simple in nature and do not require high human resource capabilities. Thus, Hypothesis 5 is rejected.

f. Hypothesis 6 (Moderation of HR Capacity on the Relationship between Government Policy → MSME Sustainability)
With an original sample value of 0.005, t-statistics of 0.063 < 1.96, and a p-value of 0.950 > 0.05, the moderating effect is also insignificant. This means that even with government policy support, human resource capacity does not play an important role in strengthening its influence on MSME sustainability. Thus, Hypothesis 6 is rejected.

The results show that digital transformation has a positive and significant effect on the sustainability of MSMEs, meaning that the higher the use of digital technology, the greater the chance for MSMEs to survive in the long term. Digital transformation enables MSMEs to expand market access, improve operational efficiency, and accelerate adaptation to changes in the business environment.

These findings are in line with studies showing that digitization increases the competitiveness and operational efficiency of MSMEs and accelerates adaptation to increasingly complex market changes (Khalil et al., 2022; Teng et al., 2022; Zhang et al., 2022). This indicates that the adoption of digital technology is crucial for the resilience of SMEs, suggesting that digitalization strengthens business sustainability

by creating more integrated supply chains and technology-based innovations. Therefore, developing appropriate digital strategies among SMEs is vital to improving their performance and sustainability in competitive markets (Kadárová et al., 2023; Roman & Rusu, 2022).

Innovation has a very strong and significant positive impact on the sustainability of MSMEs. This confirms that innovation, whether in the form of products, processes, or business models, is a key factor in maintaining business continuity. Innovative MSMEs tend to be more adaptive, capable of creating added value, and more easily meet dynamic consumer preferences. MSMEs that are able to innovate are more adaptive, tend to create added value, and are more responsive to changes in consumer preferences, confirming that innovation serves as the key to creating sustainable competitive advantage and demonstrating that an orientation towards innovation has a positive effect on the performance of MSMEs in the culinary sector.

This is also supported by Yuniarti et al. (2022), Nurmala (2022), who found evidence that innovation can increase the competitiveness of MSMEs in highly competitive industries. Therefore, understanding and implementing innovation is very important for the sustainability of MSMEs amid current market challenges.

Government policies have a significant impact on the sustainability of Micro, Small, and Medium Enterprises (MSMEs), although the impact can vary and is often considered relatively weak compared to other factors such as innovation and digital transformation. Support through regulations, tax incentives, access to financing, and training programs is recognized as contributing to the continuity of MSME businesses. However, several studies show that although government policies can create a supportive business environment, their contribution is more effective in the short term if not balanced with an increase in the internal capabilities of business actors (Judijanto, 2024; Riyanti et al., 2022). Therefore, even though they function as facilitators, the effectiveness of government policies in supporting the sustainability of MSMEs remains limited without strategies that increase the internal capacity of business actors (Dani et al., 2024; Mightyn et al., 2022).

Human resource capacity does not act as a moderating variable in the relationship between digital transformation and SME sustainability. This indicates that even though SMEs adopt digital technology, its benefits are not greatly influenced by the quality of human resources. Most likely, the digital literacy of SME human resources is still low, so their role in strengthening the impact of digitalization has not been felt optimally.

Research by Syahrial et al.(2024) supports this finding by describing low digital skills as a major obstacle to optimizing digital transformation in Indonesia. This finding contradicts the *resource-based view* theory, which emphasizes the importance of internal capabilities as a driver of competitiveness. On the contrary, empirical evidence shows that to maximize the positive impact of digitalization, MSMEs must improve their human resource capabilities and skills (Vrontis et al.,2022; Wu et al.,2024). Therefore, improving digital training and education is crucial for MSMEs to reap the benefits of digitalization more effectively.

Human resource capacity does not play a significant role in moderating the relationship between innovation and MSME sustainability. This indicates that the

innovations carried out by MSMEs are mostly simple innovations, such as packaging modifications, marketing strategies, or product variations, which do not require high human resource skills.

Research on MSMEs shows that low human resource capacity is an obstacle to optimizing innovation. This research is in line with that conducted by Talahi & Ie (2024) ,Ibrahim et al.(2024), Mandalika et al.(2024) which states that although innovation has an influence on sustainability, low human resource capacity means that the effectiveness of this relationship is not maximized. Therefore, it is important for SMEs to focus on developing human resource skills so that the innovations they undertake can be more sustainable.

Human resource capacity does not play a significant role in moderating the relationship between government policy and MSME sustainability. This means that even though government policy is a form of support, its impact on MSME sustainability is not influenced by the quality of human resources. This condition is likely due to the general nature of government policy, which is not directly linked to improving the competence of MSME actors.

These findings are in line with the research by Badawi & Nugroho (2022), which explains that the effectiveness of government policies on MSMEs is often hampered by the lack of readiness of human resources to access and utilize the facilities provided. The inability of human resources to utilize existing policies shows the need to emphasize human resource capacity building as an integral part of MSME sustainability strategies.

E. CONCLUSION

This study, which focuses on Micro, Small, and Medium Enterprises (MSMEs) in West Java, analyzes the influence of digital transformation, MSME innovation, and government policies on MSME sustainability, with human resource (HR) capacity as a moderating variable. The main results show that digital transformation has a positive and significant influence on MSME sustainability. Greater use of digital technology increases the chances of MSMEs surviving in the long term, as it can expand market access, improve operational efficiency, and accelerate adaptation to complex changes in the business environment.

Furthermore, MSME innovation has a very strong and positive effect on business sustainability. Innovation, whether in the form of products, processes, or business models, is a key factor that enables MSMEs to be more adaptive, create added value, and be responsive to the dynamics of consumer preferences. Government policy support has also been shown to have a positive impact on MSME sustainability. Various initiatives such as regulations, tax incentives, access to financing, and training programs contribute to the continuity of MSME businesses, although their impact may be relatively weaker than innovation or digital transformation.

However, another important finding is that human resource capacity does not play a significant role as a moderating variable in the relationship between digital transformation, innovation, and government policy on the sustainability of MSMEs. This indicates that human resource capacity does not substantially strengthen or weaken the influence of these variables. This is most likely due to the low digital literacy of MSME human resources or because the innovations carried out by MSMEs

are still simple and do not require high human resource skills. Therefore, although digital transformation, innovation, and government policies are very important, this study highlights the crucial need to improve human resource capabilities and skills so that MSMEs can maximize the benefits of digitalization and innovation. HR development must be an integral part of the sustainability strategy of MSMEs in Indonesia, especially in West Java, to overcome the challenges of digitization and existing HR quality.

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