

Sustainability of MSMEs: An Empirical Study of Digital Literacy, Sustainable Business Practices, and Competitive Advantage in Culinary Businesses in Makassar City

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ABSTRACT. This study aims to analyze the influence of digital literacy and sustainable business practices on the sustainability of Micro, Small, and Medium Enterprises (MSMEs) in the culinary sector in Makassar City, with competitive advantage as a mediating and moderating variable. This study is motivated by the increasing demands for technological adaptation and sustainable practices in maintaining the existence of MSMEs in the digital economy era. A quantitative approach was used with a survey method of 215 culinary MSMEs. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the relationship between variables. The results show that digital literacy has a positive and significant effect on the sustainability of MSMEs, both directly and indirectly through competitive advantage. Sustainable business practices have also been shown to strengthen sustainability performance through increased operational efficiency and social reputation. In addition, competitive advantage moderates the relationship between digital literacy and sustainability, where the effect of digital literacy is stronger in MSMEs with high competitiveness. These findings emphasize the importance of synergy between digital capabilities, sustainability orientation, and competitive strategy to create inclusive, adaptive, and sustainable culinary business growth in the digital era.

KEYWORDS: Digital Literacy, Sustainable Business Practices, Competitive Advantage, MSME Sustainability, Culinary Business

I. INTRODUCTION

Micro, small, and medium enterprises (MSMEs) in the culinary industry are crucial to the global economy, particularly in developing countries. In addition to providing numerous jobs, this industry supports regional income, product innovation, and the preservation of cultural heritage through culinary diversity (Rakib et al., 2024; Ervani et al., 2024; Nurlina et al., 2023). However, culinary MSMEs frequently face a number of challenges that can threaten their business continuity, such as intense competition, shifting consumer tastes, fluctuating raw material prices, and limited access to resources (Aji, 2023; Sufa et al., 2024).

The rapid advancement of digital technology and growing awareness of sustainability issues have significantly transformed the global corporate landscape in recent years. MSMEs now have additional options for expanding their customer base, improving operational effectiveness, and accessing new markets thanks to the digital era (Ervani et al., 2024; Rahmanto, 2024). However, MSMEs must have an adequate level of digital literacy, including the capacity to use digital technology wisely and effectively, in order to take advantage of this opportunity (Sufa et al., 2024; Nurlina et al., 2023).

Digital literacy includes the ability to find, assess, use, and exchange information in an ethical and efficient manner in addition to the ability to use digital devices and applications (Aji, 2023; Sufa et al., 2024; Rahmanto, 2024). Digital literacy for culinary MSMEs includes the use of social media for marketing, e-commerce for sales, mobile applications for ordering and delivery, and data analysis tools to understand client behavior and improve company tactics (Ervani et al., 2024; Nurlina et al., 2023). Unfortunately, many culinary MSMEs still struggle to compete in the digital market due to low levels of digital literacy, particularly in developing countries (Aji, 2023; Rahmanto, 2024). In addition to digital literacy, sustainable business practices are becoming increasingly important for the long-term survival of MSMEs in the culinary industry.

Consumers are becoming more concerned about sustainability issues and prefer companies that are socially and environmentally responsible (Sufa et al., 2024). Sustainability is not just about protecting the environment; it is also about creating long-term economic and social value (Nurlina et al., 2023). Sustainable business practices encompass a range of initiatives, such

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as the use of local and organic raw materials, reducing food waste, energy efficiency, fair labor practices, and supporting local communities.

Thus, culinary MSMEs can enhance their brand image, attract new clients, and increase customer loyalty by using sustainable business practices (Nurlina et al., 2023) . For culinary MSMEs to thrive in the face of increasingly fierce competition, they must have their own competitive edge. Many factors, including product quality, competitive pricing, exceptional customer service, product innovation, and brand differentiation, can provide a competitive advantage (Wibowo et al., 2023) . Through the use of digital technologies, such as personalized marketing, consumer data analysis, or the creation of creative mobile applications, culinary MSMEs can also gain a competitive advantage in the digital era (Ervani et al., 2024) .

Moreover, as more and more customers seek out socially and ecologically conscious companies, sustainable business practices can also provide a competitive advantage (Nurlina et al., 2023) (Sufa et al., 2024) . Numerous studies have shown that competitive advantage, sustainable business practices, and digital literacy all improve the performance of MSMEs (Ervani et al., 2024; Nurlina et al., 2023) . The impact of these characteristics on the sustainability of culinary MSMEs, especially in developing countries, has not been well researched, although (Aji, 2023; Rahmanto, 2024) . In addition, current research often ignores the interactions between these factors and only concentrates on one or two factors.

Therefore, by examining in-depth the impact of digital literacy, sustainable business practices, and competitive advantage on the sustainability of culinary MSMEs, this study seeks to close this gap. MSMEs in the culinary industry must be actively involved in initiatives such as training to improve their online or digital business capabilities. 1 Post the global Covid-19 pandemic, digital and financial literacy of culinary MSMEs has become a catalyst for economic recovery (Rahmanto, 2024) . It is important to conduct research on MSME sustainability, particularly related to digital literacy, sustainable business practices, and competitive advantage in the culinary industry in Makassar City. This can contribute significantly to the MSME economy both at the local and national levels.

The main problem in this research is how digital literacy, sustainable business practices, and competitive advantage interact to influence the sustainability of culinary MSMEs. Digital literacy has become a major focus in research on MSMEs in the digital era. Digital literacy is the foundation for MSME growth in the digital era. Research highlights that businesses with strong digital capabilities are more likely to succeed in online marketing, customer engagement, and process automation (Wayan Sri Maitri, Komang Widhya Sedana Putra, Kadek Wulandari Laksmi, 2024; Noor & Sriyono, 2024) . For example, a study in Bali found that social media innovation significantly improves business sustainability when moderated by high levels of digital literacy. Another study concluded that digital literacy increases productivity by enabling MSMEs to optimize social media for marketing strategies (Ervani et al., 2024) .

Sustainability is no longer an option but a necessity for businesses seeking long-term success. Key findings include: Sustainable practices such as waste reduction and energy efficiency contribute to cost savings while enhancing brand image.⁴ Green intellectual capital and organizational culture also play a crucial role in ensuring business continuity (Surjadi et al., 2024) .

Competitive advantage allows a business to differentiate itself in a competitive market: Research shows that intangible assets such as innovation capabilities are critical to maintaining a competitive position³. Competitive strategies rooted in differentiation or cost leadership can increase resilience to market disruptions (Asytuti et al., 2024) .

Integration of Factors. Recent studies have shown that combining these elements—digital literacy, sustainability, and competitive advantage—will create synergies that strengthen the impact of each element: Digital transformation supported by knowledge sharing will improve human resource development and business sustainability.⁸ Digital literacy acts as a moderating variable that strengthens the impact of other strategic initiatives on business outcomes (Surjadi et al., 2024) .

This research offers novelty by integrating three important variables into one comprehensive study. It not only examines the influence of each variable separately but also explores the interaction between digital literacy and sustainable business practices and their impact on competitive advantage.

II. MATERIALS & METHODS

This study uses a quantitative approach to analyze the influence of digital literacy, sustainable business practices, and competitive advantage on the sustainability of MSMEs. A quantitative approach was chosen because it allows for objective measurement and statistical analysis of the data obtained.

The population in this study is all MSMEs operating in the culinary sector registered with the Makassar City Tourism Office. The sample will be taken using a random sampling method, where respondents are selected based on certain criteria such as: a) Having a business that has been operating for at least one year, b) Using digital technology in business operations, and c)

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Implementing sustainable business practices. The sample size is 215 respondents, which is considered sufficient for valid statistical analysis.

This study employed a causal research design with a *cross-sectional approach*. This design was chosen because it allows for testing the causal relationship between digital literacy, sustainable business practices (independent variables), competitive advantage (mediator variable), and MSME sustainability (dependent variable).

The main instrument in this study is a questionnaire containing statements measuring the research variables. The questionnaire will be structured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The questionnaire will be tested for validity and reliability before being used for data collection.

Data was collected through a survey using a questionnaire distributed *online* (e.g., via Google Forms) to a sample of culinary business owners. The collected data will be analyzed using descriptive statistical analysis techniques and path analysis.

III. RESULTS AND DISCUSSION

A. RESULT

1. Respondent Characteristics

Table 1. Respondent Characteristics Based on Gender

No	Gender	Frequency	Percentage (%)
1	Man	59	27.2
2	Woman	156	71.9
Amount		215	100

Source: Research Questionnaire Instrument, processed 2025.

Table 1 shows that of the 215 respondents, 156 (71.9%) were female, followed by 59 (27.2%). These findings indicate that women play a dominant role in MSME activities, particularly in home-based, creative, and local service-based sectors such as culinary, crafts, and small trade. This demonstrates that women's entrepreneurship is a crucial factor in supporting the economic sustainability of families and local communities.

Table 2. Respondent Characteristics Based on Age

No	Respondent Age	Frequency	Percentage (%)
1.	< 20 years	13	6.0
2.	20 – 30 years	155	71.4
3.	31-40 years old	18	8.3
4.	> 40 years	29	13.4
Amount		215	100

Source: Research Questionnaire Instrument, processed 2025

Based on Table 2, it can be seen that of the 215 respondents, the majority were respondents in the age group under 20 years with a total of 13 respondents or 6.0 percent, followed by the age group of 20 to 30 years with 155 people or 71.4 percent, then the age group of 31-40 years with 18 people or 8.3 percent and the age group above 40 years also with 29 people or 13.4 percent. The majority of respondents were in the productive age (20-30 years), which is a positive indicator for the sustainability of MSMEs. The younger generation has great potential in driving innovation, digitalization, and business competitiveness. However, to ensure long-term sustainability, there needs to be synergy between the enthusiasm of the younger generation and the experience of the older generation, as well as ongoing support from educational institutions, the government, and financial institutions.

Table 3. Respondent Characteristics Based on Product Type

No	Types of products	Frequency	Percentage (%)
1.	Snack	48	22.1
2.	Trendy Drinks	53	24.4
3.	Frozen Food	12	5.5
4.	Processed Foods	78	35.9

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5. Bread and Cake	24	11.1
Amount	215	100

Source: Research Questionnaire Instrument, processed 2025

Based on Table 3, it can be seen that of the 215 respondents, the dominant type of processed food business is a business that sells chicken-based menus, meat, noodles, fried rice, and others, amounting to 78 or 35.9 percent, then the least Frozen Food business such as sausages, nuggets, meatballs, and dim sum that are ready to be processed at home, the number is only 12 respondents with 5.5 percent. This distribution reflects that processed food businesses in Makassar City, which are generally culinary businesses in the field of processed food and are easy to run by micro-entrepreneurs.

Table 4. Respondent Characteristics Based on Length of Business

No	Length of Business	Frequency	Percentage (%)
1	< 1 year	14	6.5
2	15 years	162	74.7
3	6 – 10 years	22	10.1
4	>10 years	17	7.8
Amount		215	100

Source: Research Questionnaire Instrument, processed 2025.

Based on Table 4, it can be seen that the most common length of business is between 1 and 5 years. This is evidenced by the results of a survey of 215 respondents, with 74.7 percent choosing the length of business. This distribution indicates that the majority of MSMEs are still in the development and stabilization stage, which is a crucial phase in determining long-term business sustainability.

2. Data Presentation and Analysis

a. Descriptive Analysis

Analysis was carried out on the minimum, maximum, average and standard deviation value parameters for each indicator and the total value of the variable.

1) Digital Literacy

The descriptive digital literacy variable includes four indicators. The indicators and questionnaire results can be seen in the table below.

Table 5. Descriptive Statistics on Digital Literacy Variables

Variables/Indicators	N	Range	Min	Max	Mean	Std.
Access capabilities	215	12	3	15	12.73	2,265
Evaluation skills	215	12	3	15	12.50	2,273
Ability to use	215	12	3	15	12.21	2,515
Participants in the training	215	12	3	15	11.52	2,838
Digital Literacy	215	48	12	60	48.96	9,000

Source: Research Questionnaire Instrument, processed 2025.

Table 5 shows that digital literacy is supported by access, evaluation, use, and participation in training. Overall, the statistics indicate that MSMEs have a high level of digital literacy, particularly in terms of technology access, evaluation, and use. This is a positive indicator for MSME sustainability, as digital literacy strengthens adaptability, innovation, and business efficiency.

2) Sustainable Business Practices

The descriptive variables for sustainable business practices include four indicators. The indicators and questionnaire results are shown in the following table.

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Table 6. Descriptive Statistics on Sustainable Business Practices

Variables/Indicators	N	Range	Min	Max	Mean	Std.
use of resources	215	12	3	15	12.50	1,977
Corporate social responsibility	215	12	3	15	12.42	2,047
Sustainable product innovation	215	12	3	15	12.34	2,067
Sustainability certification	215	12	3	15	12.60	1,810
Sustainable Business Practices	215	48	12	60	49.87	7,184

Source: Research Questionnaire Instrument, processed 2025.

Table 6 shows that sustainable business practices are supported by efficient resource use, corporate social responsibility, sustainable product innovation, and sustainable certification. Overall, the statistical results indicate that MSMEs have implemented sustainable business practices effectively. The high average scores for efficiency, innovation, and certification indicate a shift in mindset from simply seeking profit to long-term business sustainability. This indicates that MSMEs are not only drivers of the local economy but also agents of change toward sustainable development. To strengthen this, support in the form of green business training, certification incentives, and sustainable innovation mentoring is needed so that sustainable business practices become more institutionalized in MSME activities.

3) Competitive Advantage

The descriptive variables of competitive advantage include 4 indicators which can be seen in the table below.

Table 7. Descriptive Statistics on Competitive Advantage

Variables/Indicators	N	Range	Min	Max	Mean	Std.
Product quality	215	12	3	15	12.85	1,700
Service differentiation	215	12	3	15	12.43	1,882
Customer satisfaction	215	12	3	15	12.80	1,994
Market share	215	12	3	15	12.45	1,868
Competitive Advantage	215	48	12	60	50.53	6,658

Source: Research Questionnaire Instrument, processed 2025.

Based on Table 7, the total average value of the competitive advantage variable is 50.53 out of a maximum score of 60, indicating that MSMEs have a high level of competitive advantage. A high average value for each indicator indicates that MSMEs have a solid competitive advantage, particularly in terms of product quality and customer satisfaction. This advantage is a crucial factor in supporting business sustainability, as MSMEs that are able to provide added value to consumers will have a strong market position and long-term growth prospects. Thus, competitive advantage is not only the result of economic efficiency, but also of innovative strategies, quality services, and a focus on customer satisfaction, which are at the core of MSME sustainability.

4) Sustainability of MSMEs

The descriptive variables for MSME sustainability include four indicators. The indicators and questionnaire results are shown in the table below.

Table 8. Descriptive Statistics on MSME Sustainability

Variables/Indicators	N	Range	Min	Max	Mean	Std.
Revenue growth	215	12	3	15	12.45	1,888
Operational stability	215	12	3	15	12.52	1,800
Market resilience	215	12	3	15	12.34	1,928
Community involvement	215	12	3	15	12.22	1,921
Sustainability of MSMEs	215	48	12	60	49.53	6,697

Source: Research Questionnaire Instrument, processed 2025.

Based on the table above, the average total value of the MSME sustainability variable is 49.53, indicating that the level of sustainability of MSME businesses is in the high category. This indicates that most MSMEs have been able to maintain their business continuity through various aspects such as revenue, operational stability, market resilience, and social engagement.

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Overall, the results in Table 8 indicate that MSMEs have a high level of sustainability, with operational stability and revenue growth as key strengths. This reflects the ability of MSMEs to manage their businesses adaptively and socially responsibly. Efforts to improve sustainability can continue by strengthening innovation capacity, digital literacy, and community partnerships, enabling MSMEs to survive and grow amidst a dynamic business environment.

b. Path Analysis

1) Measurement Model Analysis (Outer Model)

In this study, data analysis used the *Partial Least Squares* (PLS) approach. PLS is a *structural equation modeling* (SEM) model based on components or variants. The path diagrams for the outer and inner models in this study are depicted as follows.

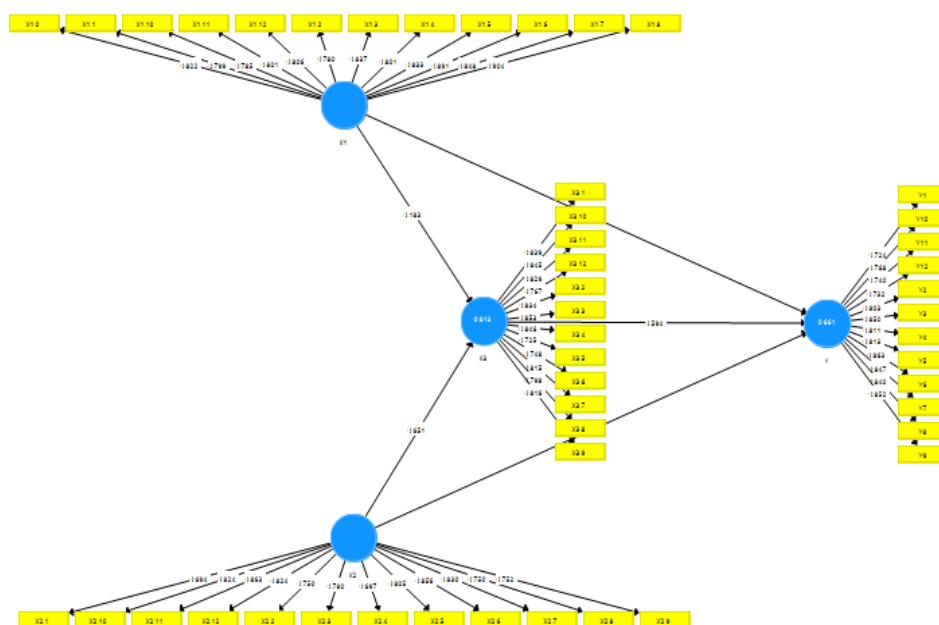


Figure 1. Outer Model and Inner Model

The criteria for using Smart PLS 4 data analysis techniques to assess the outer model include convergent validity, discriminant validity, composite reliability, and Cronbach's alpha. For the inner model, bootstrapping was used to obtain statistical T-test parameters to predict causality.

Analysis of the measurement model analysis model or outer model uses two stages of testing, including:

1) Validity and Reliability of the Construct

a. Discriminant Validity

(1) Construct reliability and validity

Convergent validity is the loading factor value on the latent variable and its indicators .

Table 9. Outer Loading

	Digital Literacy	Sustainable Practices	Business	Competitive Advantage	Sustainability of MSMEs
X1.0	0.822				
X1.1	0.799				
X1.10	0.785				
X1.11	0.801				
X1.12	0.806				
X1.2	0.780				
X1.3	0.837				
X1.4	0.801				
X1.5	0.833				
X1.6	0.891				

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	Digital Literacy	Sustainable Practices	Business	Competitive Advantage	Sustainability of MSMEs
X1.7	0.848				
X1.8	0.904				
X2.1		0.694			
X2.10		0.824			
X2.11		0.863			
X2.12		0.824			
X2.2		0.750			
X2.3		0.780			
X2.4		0.697			
X2.5		0.805			
X2.6		0.856			
X2.7		0.830			
X2.8		0.750			
X2.9		0.752			
X3.1				0.839	
X3.10				0.845	
X3.11				0.829	
X3.12				0.767	
X3.2				0.834	
X3.3				0.853	
X3.4				0.846	
X3.5				0.725	
X3.6				0.748	
X3.7				0.815	
X3.8				0.798	
X3.9				0.816	
Y1					0.724
Y10					0.768
Y11					0.740
Y12					0.732
Y2					0.803
Y3					0.850
Y4					0.811
Y5					0.813
Y6					0.863
Y7					0.847
Y8					0.840
Y9					0.852

Source: Smart PLS 3 Processed Results, 2025.

the outer loading factor values for all indicators are above 0.7, there is a value of 0.6, but there are experts who say that this value is still considered valid, so it is concluded that all indicators have met the requirements for convergent validity. and valid indicators to be used in measuring the four research variables.

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(2) Discriminant Validity

The following are the results of the calculation or testing of Discriminant Validity.

Table 10. Discriminant Validity (Cross Loading)

	Digital Literacy	Sustainable Practices	Business	Competitive Advantage	Sustainability of MSMEs
X1.0	0.822	0.490		0.510	0.439
X1.1	0.799	0.527		0.463	0.350
X1.1 0	0.785	0.528		0.439	0.485
X1.1 1	0.801	0.493		0.421	0.389
X1.1 2	0.806	0.520		0.416	0.423
X1.2	0.780	0.484		0.442	0.364
X1.3	0.837	0.513		0.504	0.433
X1.4	0.801	0.570		0.609	0.457
X1.5	0.833	0.632		0.549	0.515
X1.6	0.891	0.542		0.501	0.447
X1.7	0.848	0.558		0.546	0.467
X1.8	0.904	0.587		0.569	0.476
X2.1	0.398	0.694		0.544	0.490
X2.1 0	0.534	0.824		0.726	0.619
X2.1 1	0.525	0.863		0.661	0.582
X2.1 2	0.500	0.824		0.620	0.560
X2.2	0.477	0.750		0.604	0.515
X2.3	0.691	0.780		0.698	0.639
X2.4	0.501	0.697		0.467	0.512
X2.5	0.472	0.805		0.577	0.612
X2.6	0.496	0.856		0.616	0.623
X2.7	0.516	0.830		0.635	0.573
X2.8	0.580	0.750		0.552	0.544
X2.9	0.448	0.752		0.517	0.494
X3.1	0.474	0.647		0.839	0.649
X3.1 0	0.575	0.654		0.845	0.718
X3.1 1	0.576	0.722		0.829	0.679
X3.1 2	0.500	0.630		0.767	0.636
X3.2	0.458	0.616		0.834	0.661
X3.3	0.478	0.673		0.853	0.653
X3.4	0.517	0.670		0.846	0.704
X3.5	0.477	0.534		0.725	0.617
X3.6	0.535	0.568		0.748	0.604
X3.7	0.421	0.605		0.815	0.593
X3.8	0.410	0.557		0.798	0.600
X3.9	0.466	0.586		0.816	0.603
Y1	0.398	0.538		0.542	0.724

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	Digital Literacy	Sustainable Practices	Business	Competitive Advantage	Sustainability of MSMEs
X1.0	0.822	0.490		0.510	0.439
Y10	0.376	0.557		0.606	0.768
Y11	0.490	0.513		0.570	0.740
Y12	0.541	0.515		0.536	0.732
Y2	0.432	0.592		0.622	0.803
Y3	0.484	0.666		0.714	0.850
Y4	0.422	0.604		0.687	0.811
Y5	0.345	0.546		0.649	0.813
Y6	0.442	0.608		0.676	0.863
Y7	0.406	0.582		0.654	0.847
Y8	0.418	0.574		0.686	0.840
Y9	0.419	0.634		0.707	0.852

Source: Smart PLS 3 Processed Results, 2025.

Based on the data above, the *cross-loading values* for all construct indicators are greater than 0.700, meaning each indicator is valid and has passed discriminant validity. However, some experts argue that 0.6 is still considered valid.

According to Fornell and Larkell, if the square root value of the Average Variance Extracted (AVE) of each variable is greater than the correlation value between the variable and other variables in the model, then the model is said to have good discriminant validity.

Table 11. Fornel-Lacker Criterion Values

	Digital literacy	Sustainable business practices	Competitive advantage	Sustainability of MSMEs
Digital Literacy	0.827			
Sustainable Business Practices	0.653	0.787		
Competitive Advantage	0.608	0.770	0.811	
Sustainability of MSMEs	0.533	0.720	0.796	0.805

Source: Smart PLS 3 Processed Results, 2025.

The results of the Fornell-Lacker Criterion show that the lowest value is digital sustainable entrepreneurship at 0.818 and the highest value is digital competence at 0.666.

(3) Construct Reliability

To measure the internal consistency of a measuring instrument in PLS, a reliability test is used. According to (Sugiyono, 2019), this is measured using three criteria: Cronback's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE).

The following presents the composite reliability values for each variable.

Table 12 . Composite Reability

Variables	Composite Reliability
Digital Literacy	0.963
Sustainable Business Practices	0.951
Competitive Advantage	0.958
Sustainability of MSMEs	0.957

Source: Smart PLS 3 Processed Results, 2025.

Based on the data presented in Table 12, it can be concluded that all constructs have met the reliability criteria, as evidenced by *composite reliability values* greater than 0.9. All indicators consistently measure the five variables. The following are Cronbach's Alpha values: for each variable.

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Table 13. Cronbach's Alpha

Variables	Cronbach's Alpha
Digital literacy	0.958
Sustainable business practices	0.944
Competitive advantage	0.952
Sustainability of MSMEs	0.950

Source: Smart PLS 3 Processed Results, 2025.

A variable is considered reliable if its composite reliability value is above 0.7. Based on the data presented in Table 13, it can be concluded that all constructs meet the reliability criteria, as evidenced by a Cronbach's Alpha value greater than 0.7. All indicators consistently measure the three research variables.

Table 14. Average Variance Extracted (AVE)

Variables	Average Variance Extracted (AVE)
Digital literacy	0.683
Sustainable business practices	0.620
Competitive advantage	0.657
Sustainability of MSMEs	0.648

Source: Smart PLS 3 Processed Results, 2025.

Based on the data generated in Table 14, the AVE values for all variables are greater than 0.5. Some values fall below 0.4, but are still considered valid, thus all variables are considered reliable. All indicators reflect the three measured variables. If all indicators are standardized, the AVE value will equal the average block communalities value.

2) Structural Model Analysis (Inner Model)

a) R – Square (R^2)

The R-Square value is listed to see how big the impact of the independent latent variable is on the dependent variable.

Table 15. R-square Test Results

Variables	R Square	R Square Adjusted
Competitive advantage	0.613	0.609
Sustainability of MSMEs	0.661	0.656

Source: Smart PLS 3 Processed Results, 2025.

b) Effect Size (F-Square)

The F-Square (F^2) value is used to determine the influence of the predictor variable (X) on the dependent variable (Y). The F-Square value ranges from $0.02 \leq F^2 < 0.15$ indicating that the variable has a weak influence, $0.15 \leq F^2 < 0.35$ indicating that the variable has a moderate influence, and $F^2 \geq 0.35$ indicating that the variable has a high influence.

Table 16. F-Square Test Results

Variables	Digital Literacy	Sustainable Business Practices	Competitive Advantage	Sustainability of MSMEs
Digital Literacy			0.049	0.000
Sustainable Business Practices			0.628	0.071
Competitive Advantage				0.403
Sustainability of MSMEs				

Source: Smart PLS 3 Processed Results, 2025.

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3) Hypothesis Testing

The following table of calculations of the results for inner weights can present the calculation of the value of the hypothesis as follows.

Table 17. Results for Inner Wights Hypothesis Research

Relationship Model	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Digital Literacy -> Competitive Advantage	0.183	0.188	0.060	3,025	0.003
Digital Literacy -> MSME Sustainability	0.002	0.003	0.074	0.022	0.983
Sustainable Business Practices -> Competitive Advantage	0.651	0.647	0.075	8,672	0.000
Sustainable Business Practices -> MSME Sustainability	0.261	0.264	0.101	2,594	0.010
Competitive Advantage -> Sustainability of MSMEs	0.594	0.588	0.082	7,209	0.000

Source: Smart PLS 3 Processed Results, 2025.

Based on the data processed using Smart PLS 3, each hypothesized relationship was tested using simulations. In this case, the bootstrap method was used on the sample. Bootstrap testing aims to minimize the problem of data abnormality in the study.

B. DISCUSSION

1. The Impact of Digital Literacy on the Sustainability of MSMEs

Digital literacy has become a strategic factor in maintaining the sustainability of micro, small, and medium enterprises (MSMEs), particularly in the highly dynamic and competitive culinary sector. Digital literacy encompasses not only the ability to use technological devices but also skills in managing information, conducting digital marketing, and utilizing online platforms for business innovation and operational efficiency. In the context of culinary MSMEs, digitalization capabilities have been proven to expand market reach, improve production and distribution efficiency, and strengthen sustainable customer relationships (Rakib et al., 2024).

Research by Rakib et al. (2024) shows that digital literacy significantly impacts the sustainability and competitiveness of MSMEs in Indonesia. Digital literacy encourages MSMEs to adapt to changes in the business environment, utilize digital technology for innovation, and build long-term competitive advantage. In the context of culinary MSMEs, the ability to utilize social media, marketplaces, and digital payment systems plays a crucial role in strengthening business resilience and consistently retaining customers.

Digital literacy has become a key competency for MSMEs in the digital economy era. According to Kahveci (2025), digital capabilities encompass the use of information technology to support production, marketing, finance, and customer management activities. MSMEs with high digital literacy can adapt more quickly to changes in consumer behavior, especially in the post-pandemic context where economic activity is increasingly shifting to online platforms. Digital literacy has been shown to *positively influence* MSME sustainability through economic (growth and revenue), operational (efficiency and stability), innovative (new products/services), and resilience. Recent empirical evidence suggests this positive relationship is consistent across various developing and transition country contexts—but the effect is often mediated by technology adoption and moderated by infrastructure and policy support (Kim & Jin, 2024).

The discussion on the influence of digital literacy on the sustainability of MSMEs shows that the ability of business actors to understand, manage, and utilize digital technology is a crucial factor in maintaining business existence in the digital economy era. Digital literacy enables MSMEs to improve operational efficiency, expand markets through online platforms, and innovate in business models. Research by Kahveci (2025) also highlights that MSMEs with good digital literacy tend to have higher resilience to crises and market changes. Thus, digital literacy not only improves economic performance but also contributes to the social and environmental dimensions of business sustainability. Efforts to improve digital literacy through training and mentoring are an important strategy to ensure the sustainability of MSMEs amidst the ever-growing digital transformation. Satar et al., (2024) in *Innovation and Development* emphasize that high adoption of digital technology can encourage sustainable and environmentally friendly business practices.

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The findings of this study also align with those of Novela et al. (2024), who found that digital literacy directly contributes to business performance and sustainability of MSMEs by increasing efficiency, transaction transparency, and online market penetration.

However, not all culinary MSMEs are able to maximize the benefits of digital literacy. Barriers such as limited internet access, technology investment costs, and low managerial capacity remain major obstacles. Rakib et al. (2024) emphasized that digital literacy will only have a significant impact if accompanied by training support, access to financing, and digital strategies tailored to the local context. Therefore, efforts to improve digital literacy must be carried out systematically through collaboration between the government, universities, and the private sector to ensure the sustainability of culinary MSMEs in an inclusive and highly competitive manner.

Thus, digital literacy is not only a technical support factor but also a strategic component in building the sustainability of culinary MSMEs. Digital literacy enables business actors to innovate, adapt to changes in the business environment, and sustainably increase efficiency and profitability. Going forward, digital literacy is expected to be the main foundation for strengthening the culinary MSME ecosystem towards an inclusive and sustainable digital economy.

2. The Impact of Sustainable Business Practices on the Sustainability of MSMEs

Sustainable business practices are a crucial strategy for achieving sustainability for micro, small, and medium enterprises (MSMEs). In this context, sustainability encompasses not only economic aspects but also environmental and social aspects, in line with the triple bottom line concept. Implementing sustainable business practices helps MSMEs increase efficiency, strengthen their brand image, and add competitive value necessary to survive in increasingly fierce competition (Basit, A. et al., 2024).

According to Rakib et al., (2024), sustainable business practices are an integral part of the transformation efforts of MSMEs in Indonesia to enable them to survive amidst market changes and technological disruption. Rakib emphasized that the sustainability orientation in MSME business strategies depends not only on the intentions of business actors, but also on their ability to integrate sustainable values such as energy efficiency, waste management, and social responsibility into daily operations. Thus, business sustainability is not only measured by economic growth, but also by the business's ability to maintain balance with the environment and society.

Recent international research supports this view. Cristina et al. (2024) showed that sustainable practices in manufacturing MSMEs, such as waste reduction, energy efficiency, and collaboration with green suppliers, significantly impact business performance and long-term sustainability. In the service and culinary sectors, Fauzan et al. (2025) found that adopting a sustainable supply chain and green innovation can increase customer loyalty and business reputation, ultimately strengthening financial sustainability.

Furthermore, the social dimension of sustainable business practices also contributes to the sustainability of MSMEs. Sulaeman & Kurniawati (2025) emphasize that sustainability-oriented leadership—which prioritizes employee well-being, business ethics, and community involvement—is directly linked to organizational resilience and the sustainability of small businesses. In this context, MSMEs that build good relationships with local communities and pay attention to the welfare of their workforce will have strong social legitimacy, thereby increasing their resilience to external changes.

However, the effectiveness of sustainable business practices is still influenced by a number of supporting factors. Rakib et al. (2024) highlighted that without adequate capital, training, and infrastructure support, the implementation of sustainable practices at the MSME level is often partial and has not had a significant impact on long-term performance. This is in line with the findings of Basit, A. et al. (2024), whose systematic review showed that limited resources and low technical knowledge are the main obstacles for MSMEs in adopting sustainable strategies. Therefore, increasing managerial capacity and sustainability literacy is key for MSMEs to implement truly sustainable and productive business practices.

In addition to internal factors, external support such as government policies and collaboration between business actors also plays a crucial role. Cristina et al. (2024) emphasized the importance of technological collaboration and partnerships in the supply chain to strengthen the adoption of sustainable practices among MSMEs. In Indonesia, government and educational institution initiatives in the form of sustainable entrepreneurship training can accelerate this transformation process (Rakib et al., 2024). Therefore, the integration of internal factors (motivation, capacity, leadership) and external factors (policy support, technology, and market networks) is key to the successful implementation of sustainable business practices, which has implications for MSME sustainability.

Overall, sustainable business practices positively impact the sustainability of MSMEs through increased efficiency, innovation, and social responsibility. However, these effects will not be optimal without adequate ecosystem support, including regulatory, financing, and human resource capacity building. By strengthening these dimensions, MSMEs are expected to integrate

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sustainability principles into their business models, thereby enabling inclusive, environmentally friendly, and long-term competitive economic growth.

3. The Influence of Competitive Advantage on the Sustainability of MSMEs

Competitive advantage is a key element determining the sustainability of micro, small, and medium enterprises (MSMEs) amidst increasingly dynamic and global market competition. Competitive advantage reflects the ability of MSMEs to create unique added value, difficult for competitors to imitate, and relevant to consumer needs. In this context, competitive advantage is the main foundation for business sustainability because it plays a role in increasing efficiency, innovation, and resilience to changes in the economic and technological environment (Wang et al., 2025; Budiarto et al., 2024) .

According to Rakib et al. (2024) , competitive advantage in Indonesian MSMEs is formed through a combination of digital literacy, business innovation, and adaptive capacity to technological change. In his research on MSMEs in Makassar City, Rakib found that competitive advantage serves as a bridge between digital literacy and business sustainability. This means that the greater the ability of MSMEs to utilize digital technology to strengthen the value of their products, the greater the competitiveness and business sustainability they can achieve. Thus, competitive advantage is not only the result of innovation but also a strategic instrument in maintaining business existence amidst economic disruption.

International research supports this view. (Wang et al. (2025) explained that service and product innovation is a major source of competitive advantage that positively influences the sustainability of MSMEs, because innovation allows small businesses to adapt to changing consumer preferences. A similar point was made by Cristina et al. (2024) , who emphasized that technological collaboration and supply chain efficiency create *sustainable competitive advantage* that has direct implications for improving long-term performance and financial stability. By having an innovation-based competitive advantage, MSMEs are not only able to retain customers, but also expand the market and strengthen the business reputation.

Furthermore, competitive advantage also impacts sustainability from a social and environmental perspective. A study by Setyaningrum et al. (2023) found that green competitive advantage, based on environmentally friendly innovation, can improve the sustainability of MSMEs by encouraging efficient and environmentally responsible business practices. MSMEs that adopt green production processes, efficient energy use, and proper waste management will gain a positive reputation and higher consumer loyalty. In this context, competitive advantage plays a role not only as an economic tool but also as a moral and social mechanism that supports long-term sustainability.

However, the influence of competitive advantage on MSME sustainability is not automatic. Budiarto et al. (2024) explain that the positive effects of competitive advantage are highly dependent on managerial capabilities, innovation capacity, and external support such as government policies, financing, and access to global markets. Rakib et al. (2024) also highlight that without digital literacy and a sustainable innovation strategy, MSMEs' competitive advantage tends to be temporary and easily eroded by more adaptive competitors. Therefore, to ensure competitive advantage significantly contributes to sustainability, MSMEs need to strengthen internal capabilities and build a collaborative ecosystem that supports sustainable business transformation.

Furthermore, the social dimension of competitive advantage is also worth considering. Sulaeman & Kurniawati (2025) emphasized that sustainability-oriented leadership that emphasizes business ethics, employee welfare, and community involvement can strengthen the social legitimacy of small businesses. When MSMEs develop advantages that are not solely profit-oriented but also encompass social and environmental responsibility, long-term sustainability can be achieved more stably.

Overall, the literature synthesis indicates that competitive advantage positively impacts the sustainability of MSMEs, across economic, social, and environmental dimensions. Competitive advantage built through innovation, efficiency, digital collaboration, and social responsibility can strengthen long-term business competitiveness and resilience. However, these positive effects will be more optimal if supported by supporting factors such as digital literacy, access to capital, managerial training, and supportive public policies. Therefore, strategies to strengthen competitive advantage based on innovation and digitalization are key to creating resilient, competitive, and sustainable MSMEs in the modern economic era.

4. How do digital literacy, sustainable business practices, and competitive advantage interact to influence the sustainability of culinary MSMEs?

The development of the digital economy requires Micro, Small, and Medium Enterprises (MSMEs) to be able to adapt to technological changes and consumer preferences. In this context, digital literacy, sustainable business practices, and competitive advantage interact to influence MSME sustainability. These three aspects are not standalone but function synergistically to create innovative, inclusive, and crisis-resilient business models (Rakib et al., 2024) .

First, digital literacy plays a key role in driving business transformation and the sustainability of MSMEs. Digital literacy enables MSMEs to utilize information technology for online marketing, customer management, and data-driven decision-making.

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According to Rakib et al. (2024), increased digital literacy contributes to innovation capabilities and strengthened competitive advantage, ultimately strengthening the existence and sustainability of MSMEs amidst dynamic market changes. Similarly, Purnomo (2024) emphasized that digitalization accelerates business adaptation, minimizes operational costs, and expands market reach, enabling MSMEs to survive and grow sustainably.

Second, sustainable business practices are a crucial dimension in building public trust and social legitimacy. Implementing sustainability principles—such as energy efficiency, waste reduction, and corporate social responsibility—can enhance reputation and customer loyalty. Basit, A. et al. (2024) demonstrated through a systematic review that operational sustainability strengthens the long-term performance of MSMEs when supported by adequate managerial and digital capabilities. With digital literacy, sustainable practices can be widely communicated to consumers through social media and digital platforms, creating added value that differentiates them from competitors.

Third, competitive advantage is both a result and a reinforcement of the previous two factors. Competitive advantage based on innovation, quality, and sustainability values enables MSMEs to maintain a strategic position in the market (Wang et al., 2025). When digital literacy is high, MSMEs can create unique product and service innovations, while sustainable business practices add differentiated value that is difficult for competitors to imitate. Thus, competitive advantage acts as a link between digital transformation and long-term sustainability.

The interaction between these three variables creates a sustainable mechanism: digital literacy enhances the ability to implement sustainable practices; sustainable practices strengthen competitive advantage; and competitive advantage generates resources for expanding digitalization and innovation. A study by Becerra-Bizarrón & Gomez-Brnal (2025) confirmed that MSMEs that integrate digitalization, green innovation, and differentiation strategies demonstrate higher levels of sustainability than MSMEs that focus solely on operational aspects.

However, this synergy will not be optimal without adequate policy and infrastructure support. Barriers such as limited capital, low digital training, and access to technology remain major challenges for MSMEs in developing countries. Therefore, government and educational institution intervention is needed in the form of integrated digital training, incentives for adopting green practices, and strengthening digital market networks. With this approach, digital literacy, sustainable business practices, and competitive advantage can interact synergistically to ensure the sustainability of MSMEs in the digital economy era.

5. Competitive advantage moderates the relationship between digital literacy and MSME sustainability

Competitive advantage plays a crucial role in strengthening the relationship between digital literacy and MSME sustainability. In the context of digital economic transformation, digital literacy not only reflects a business actor's ability to operate technology but also encompasses the strategic ability to utilize digital technology as a tool for innovation, efficiency, and market development (Rakib et al., 2024). However, the positive impact of digital literacy on sustainability is not uniform; it can be amplified when MSMEs possess a strong competitive advantage, whether through product differentiation, brand reputation, or continuous innovation.

According to Rakib et al., (2024), digital literacy contributes to business existence and sustainability through increased efficiency and innovation, but competitive advantage serves as a lever that extends these benefits. MSMEs with a strong competitive advantage are better able to optimize digital technology to strengthen added value and customer relationships, thereby ensuring business sustainability. This aligns with the findings of Lu (2024), who showed that digital capabilities will have a significant impact on sustainability if accompanied by innovation-based competitive advantages and organizational capabilities.

Furthermore, research by Adisaksana (2022) confirms that competitive advantage can act as a moderating variable, strengthening the relationship between digital transformation and business performance. MSMEs with differentiation strategies and unique value propositions will more easily leverage technology to expand their markets and strengthen customer loyalty. In other words, digital literacy provides the tools, while competitive advantage determines how effectively those tools are used to achieve sustainability goals.

However, this moderating effect is not automatic. If competitive advantage is static—for example, relying solely on physical assets without digital innovation—then digital literacy will not have a significant impact on sustainability. This is confirmed by (Alzaghal et al., 2024), who found that digital literacy provides optimal benefits for MSMEs that possess competitive advantages based on knowledge, creativity, and sustainable innovation. Therefore, the combination of improving digital literacy and strengthening competitive strategies is key to MSMEs' survival and sustainable growth in the digital economy era.

Thus, competitive advantage serves as a moderating factor in the relationship between digital literacy and MSME sustainability. When competitive advantage is high, the impact of digital literacy on sustainability increases significantly because MSMEs are able to transform digital capabilities into tangible innovations and long-term economic value. Therefore, MSME

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development strategies should not only focus on improving digital literacy but also on strengthening competitive advantages based on innovation, quality, and sustainability.

IV. CONCLUSION

The research results show that the sustainability of Micro, Small, and Medium Enterprises (MSMEs) in the culinary sector of Makassar City is strongly influenced by the synergy between digital literacy, sustainable business practices, and competitive advantage. *First*, digital literacy has been shown to play a significant role in improving operational efficiency, expanding market reach, and strengthening customer interactions through the use of digital technology. MSMEs with high levels of digital literacy are able to adapt more quickly to changes in consumer behavior and market dynamics, thus having a better chance of maintaining business sustainability. *Second*, sustainable business practices contribute significantly to increasing business resilience and reputation. The implementation of sustainability principles, such as energy efficiency, waste management, and social responsibility, helps culinary MSMEs build a positive image and gain social legitimacy from the community. *Third*, competitive advantage functions as a mediating and moderating variable that strengthens the relationship between digital literacy and MSME sustainability. This means that mastery of digital technology will have a greater impact on sustainability if supported by product differentiation strategies, service innovation, and a superior quality orientation.

Overall, the findings of this study confirm that the sustainability of culinary MSMEs in Makassar City is determined not only by their ability to adapt digitally, but also by their commitment to sustainable business practices and efforts to maintain a competitive advantage. Therefore, ongoing support from local governments, educational institutions, and the private sector is needed in the form of digital training, innovation mentoring, and incentives for implementing sustainability principles to enable MSMEs to grow inclusively, resiliently, and be highly competitive in the digital economy era.

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