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The impact of digital customer engagement, product adaptation, and brand trust on the business sustainability of culinary MSMEs in Medan

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ABSTRACT

This study aims to analyze the effects of Digital Customer Engagement, Product Adaptation, and Brand Trust on the business sustainability of culinary MSMEs. This study employs a quantitative approach using an associative-causal research design. Data were collected via a questionnaire from 100 culinary MSME operators in the city of Medan, selected using purposive sampling, and then analyzed using multiple linear regression with the aid of IBM SPSS Statistics. The results show that Digital Customer Engagement and Product Adaptation do not have a significant effect on business sustainability. Conversely, Brand Trust has a positive and significant effect on business sustainability. Simultaneously, Digital Customer Engagement, Product Adaptation, and Brand Trust have a significant effect on business sustainability, with an Adjusted R-Square value of 0.655. This study contributes to the development of business sustainability strategies for culinary MSMEs by demonstrating the importance of integrating digital customer engagement, product adaptation, and brand trust. The findings highlight brand trust as a key factor in supporting business sustainability, while the three factors collectively provide a basis for developing more comprehensive, customer-oriented, and sustainable business strategies. Therefore, culinary MSME operators should prioritize building customer trust while continuously improving digital customer interactions and adapting products to market needs. This study was conducted only on food-related MSMEs in the city of Medan, using three independent variables; therefore, the findings cannot yet be generalized to other business sectors or regions.

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1. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a vital role in maintaining stability and supporting national economic growth. According to 2025 data from the Ministry of Cooperatives and MSMEs of the Republic of Indonesia, the MSME sector contributes 60.5% to the Gross Domestic Product (GDP) and accounts for more than 97% of the national workforce. Despite this significant contribution, the sustainability of MSMEs still faces various challenges. Business sustainability is not only related to a business's ability to remain operational but also encompasses the ability to retain

customers, adapt to market changes, and maintain competitiveness in the long term. Various studies indicate that weak digital marketing strategies, limited ability to adapt to market changes, and insufficient efforts to build customer trust are among the factors that can hinder business sustainability. These conditions highlight a gap between the immense potential of MSMEs nationwide and the reality on the ground, where businesses still face various limitations in business management. This phenomenon is also evident among culinary MSMEs in the city of Medan. As one of the largest metropolitan cities on the island of Sumatra, Medan has experienced rapid growth in the culinary sector, driven by changes in people's lifestyles and rising consumption of food and beverages. This growth is fueled by strong consumer demand for products that are practical, innovative, and easily accessible through various digital platforms. However, this development has also been accompanied by increased competition among business operators. These conditions require food-related MSMEs not only to offer high-quality products but also to understand consumer needs and build strong relationships with customers. Consequently, business sustainability no longer depends solely on product quality but is also influenced by business owners' ability to implement adaptive, customer-oriented business strategies.

Advances in information technology have also transformed the way businesses interact with their customers. According to a 2025 report by the Indonesian Internet Service Providers Association (APJII), the national internet penetration rate has reached over 79%, including an increase in the North Sumatra region. This trend presents opportunities for MSMEs to expand their markets through social media, online marketplaces, and food delivery services such as GoFood and GrabFood. In addition, consumers today tend to use digital platforms to search for product information, read customer reviews, and make purchases. This shift in behavior is encouraging food-related MSMEs to utilize digital technology not only as a promotional tool but also as a means of building relationships with customers to support business sustainability.

Although opportunities for digitalization are increasingly available, preliminary observations indicate that its utilization by culinary MSME operators is still not optimal. Based on observations and structured interviews conducted on May 2–4, 2026, with culinary SME operators in three areas of Medan City namely, Medan Johor Subdistrict (Jl. Karya Wisata), Medan Denai Subdistrict (Jl. Denai), and Medan Kota Subdistrict (Jl. Sisingamangaraja) several issues related to business sustainability were identified. Regarding Digital Customer Engagement, Ms. Rina, owner of Rice Bowl Dapur Rina in Medan Johor, noted that social media is still primarily used as a one-way promotional tool, resulting in suboptimal customer interaction. Regarding Product Adaptation, Mr. Andi Saputra, owner of Kedai Kopi Denai, explained that product innovation typically occurs only when sales decline, so it has not yet become part of a sustainable business strategy. Meanwhile, regarding Brand Trust, Ms. Siska Ramadhani, owner of Dessert Box Medan, highlighted the challenges of building consumer trust through digital media particularly in maintaining consistent communication and leveraging customer reviews as social proof. These findings indicate that a gap still exists between the available opportunities for digitalization and the capacity of MSME owners to implement them effectively to support business sustainability.

One factor believed to influence business sustainability is Digital Customer Engagement (DCE). According to (Hollebeek, 2011), customer engagement refers to the level of cognitive, emotional, and behavioral involvement consumers have with a brand through ongoing interactions. In the digital context, DCE describes a business's ability to build interactive, responsive, and meaningful relationships with customers through various digital platforms. High customer engagement can increase loyalty, retain customers, and create long-term value for the company. (Kim's, 2023) research shows that the strategic use of social media can increase customer engagement. These findings are consistent with the research by (Nurmilah & Djakasaputra, 2024)), who found that customer engagement has a positive effect on the performance of culinary SMEs. Furthermore, (Lestari, 2025) also states that customer engagement through social media can strengthen consumer loyalty. However, since most culinary SMEs in Medan still rely on one-way communication, low customer engagement has the potential to hinder business sustainability.

In addition to digital customer engagement, product adaptation is also a key factor in ensuring business sustainability amid increasingly rapid market changes. Product adaptation refers to a business's ability to tailor its products to meet consumer needs, preferences, and changing trends. In the food industry, this adaptation can be achieved through menu innovation, expanding product variety, packaging development, or price adjustments. (Paransa, 2024) states that the ability to adapt to market changes is one of the key factors determining the growth of SMEs in the digital era. This view is supported by (Sahrul & Nuringsih, 2023), who explain that successful business transformation requires continuous product innovation. Furthermore, (Mulia et al., 2023) also emphasize that product adaptation and innovation are among the strategies SMEs can employ to face competition and ensure the sustainability of their businesses. However, some food-related SMEs in Medan City still adapt their products inconsistently and do not fully base these changes on market needs, which risks reducing their competitive edge.

Another factor that influences business sustainability is Brand Trust. In the food industry, customer trust is shaped not only by product quality and price but is also influenced by service quality, product hygiene, consistent quality, digital reputation, and transparent communication. Based on the Commitment-Trust Theory proposed by (Morgan & Hunt, 1994), trust forms the foundation of long-term relationships between companies and customers. High brand trust can reduce consumers' perception of risk, increase repurchase intention, and strengthen a business's resilience in the face of competition. Research by (Wardati et al., 2024) shows that the implementation of Customer Relationship Management (CRM) and communication via social media can increase customer trust. These findings are supported by (Rajiman et al., 2025), who state that brand trust has a positive effect on business performance by increasing customer loyalty.

Conceptually, Digital Customer Engagement, Product Adaptation, and Brand Trust are three interrelated factors that support business sustainability. Customer engagement through digital media provides feedback that businesses can use to tailor their products to market needs. Appropriate product adaptation will increase customer satisfaction, thereby fostering trust in the brand. Conversely, high trust will encourage customers to continue interacting with the business through various digital platforms. Although the relationships among these variables have been extensively studied, most previous research has examined each variable separately, focusing primarily on customer loyalty or financial performance, and using MSMEs as the general subject. Research that examines all three variables simultaneously to explain business sustainability particularly among culinary SMEs in Medan remains relatively limited.

The novelty of this study lies in the integration of Digital Customer Engagement, Product Adaptation, and Brand Trust into a single research model to examine their influence on the business sustainability of culinary MSMEs in Medan. Unlike previous studies that tend to examine these factors separately or focus on customer loyalty and business performance, this study simultaneously analyzes their individual and combined effects on business sustainability. Furthermore, the study provides specific empirical evidence from culinary MSMEs in Medan, offering a contextual understanding of how digital customer interactions, product adaptation, and customer trust contribute to long-term business sustainability. Previous studies have examined Digital Customer Engagement, Product Adaptation, and Brand Trust in relation to customer loyalty and business performance. However, limited research has examined these three variables simultaneously in relation to the business sustainability of culinary MSMEs, particularly in Medan. This empirical gap highlights the need to investigate how these factors collectively contribute to MSME business sustainability. Given these circumstances, this study is important to analyze the influence of Digital Customer Engagement, Product Adaptation, and Brand Trust on the business sustainability of culinary MSMEs in Medan, both partially and simultaneously. The results of this study are expected to provide insights for MSME operators in formulating business strategies that are more adaptive, customer-oriented, and sustainable. In addition, this study is also expected to enrich scientific research in the fields of digital marketing management and entrepreneurship, while also serving as a basis for local governments to formulate policies for the development of digital-based MSMEs.

2. RESEARCH METHOD

This study employs a quantitative approach using an associative-causal research design to analyze the influence of Digital Customer Engagement, Product Adaptation, and Brand Trust on the business sustainability of culinary MSMEs in Medan. The quantitative approach was chosen because it allows researchers to objectively measure relationships between variables through statistical analysis, while the associative-causal research design was used to determine the influence of independent variables on the dependent variable. The population in this study consists of all culinary MSME operators in Medan City who utilize digital media in their business activities. The sampling technique employed was purposive sampling, which involves selecting a sample based on specific criteria aligned with the study's objectives. The criteria for respondents in this study include: (1) culinary SME operators located in the city of Medan; (2) businesses that have been operating for at least one year; (3) businesses that use social media or digital platforms in their business activities; and (4) businesses willing to participate as research respondents. The sample size was determined based on the findings of (Hair et al., 2019), who stated that an appropriate sample size for multivariate research ranges from 5 to 10 times the number of indicators used. This study used 20 statement indicators; therefore, the minimum required sample size was 100 respondents.

The selection of 100 respondents was based on the sample size guidelines proposed by Hair et al. (2019), which recommend a minimum of five respondents for each research indicator in multivariate analysis. Since this study employed 20 indicators, a minimum of 100 respondents was considered adequate to meet the analytical requirements. Furthermore, purposive sampling ensured that respondents met the established criteria and had relevant experience in managing culinary MSMEs in Medan. Therefore, the sample was considered appropriate for examining the research variables and achieving the study objectives.

The types of data used in this study consist of primary and secondary data. Primary data was obtained directly from respondents through the distribution of questionnaires to culinary MSME operators in the city of Medan. The questionnaires were distributed both in person and online using Google Forms to facilitate the research data collection process. Meanwhile, secondary data was obtained from books, scientific journals, articles, previous studies, and various other literature sources related to Digital Customer Engagement, Product Adaptation, Brand Trust, and the Sustainability of MSME Businesses. The research instruments were developed based on variable indicators adapted from previous studies and measured using a five-point Likert scale, ranging from a score of 1 (strongly disagree) to a score of 5 (strongly agree). [Reviewer 1] Construct validity was assessed using the Pearson Product-Moment correlation test by comparing the calculated r-value with the table r-value at a 5% significance level. Indicators were considered valid when the calculated r-value exceeded 0.1966.

Table 1. Research indicators

No	Variable	Dimensions Used	Item	Sources from Previous Research
1.	Digital Customer Engagement	Behavioral Engagement	I actively engage with customers through my business's social media accounts.	(Hollebeek et al., 2023)
		Customer Participation	I encourage customers to engage with the digital content I post.	(Roy et al., 2023)
		Emotional Engagement	Digital media helps me build closer relationships with customers.	(Hollebeek et al., 2023)
		Cognitive Engagemen	I use digital media to understand customer needs.	(Hollebeek et al., 2023)
			I use information from digital media to make business decisions.	(Hollebeek et al., 2023)
2	Product Adaptation	Product Innovation	I regularly engage in product development to meet customer needs.	(Smuts et al., 2024)
			I periodically introduce product innovations to keep up with market trends.	(Smuts et al., 2024)
		Market Adaptation	I adapt my products to meet changing customer needs.	(Smuts et al., 2024)

No	Variable	Dimensions Used	Item	Sources from Previous Research
		Product Development	I make improvements to my products based on customer feedback.	(Smuts et al., 2024)
		Market Responsiveness	The products I offer keep pace with current market trends.	(Smuts et al., 2024)
3	Brand Trust	Credibility	My business has a good reputation among customers.	(Lee, H. J., 2025)
			Customers trust the quality of the products I offer.	(Lee, H. J., 2025)
		Integrity	I provide honest and transparent product information to customers.	(Lee, H. J., 2025)
		Reliability	I consistently maintain product quality.	(Lee, H. J., 2025)
		Benevolence	I prioritize customer interests and satisfaction in running my business.	(Lee, H. J., 2025)
4	Business Sustainability	Business Continuity	My business is able to thrive under various business conditions.	(Hariyono & Narsa, 2024)
		Business Growth	My business has shown positive growth over time.	(Hariyono & Narsa, 2024)
		Competitiveness	My business is able to compete with similar food businesses.	(Hariyono & Narsa, 2024)
		Adaptability	I am able to adapt my business strategy to changes in the business environment.	(Smuts et al., 2024)
		Future Sustainability	I am confident that my business will continue to thrive in the long term.	(Hariyono & Narsa, 2024)

Data analysis was conducted using IBM SPSS Statistics. Prior to hypothesis testing, instrument quality tests were first conducted, including validity and reliability tests. Next, classical assumption tests were performed, consisting of normality, multicollinearity, and heteroscedasticity tests, to ensure the data met the requirements for regression analysis. Hypothesis testing was performed using multiple linear regression analysis to determine the effects of Digital Customer Engagement, Product Adaptation, and Brand Trust on the business sustainability of culinary MSMEs in Medan. Subsequently, a t-test was conducted to determine the partial effect of each independent variable on the dependent variable, an F-test to determine the simultaneous effect of the independent variables on the dependent variable, and the coefficient of determination (R^2) to measure the ability of the independent variables to explain the variation in the dependent variable.

3. RESULTS AND DISCUSSIONS

Validity Test

A validity test is a test conducted to determine the extent to which a research instrument is able to accurately measure the variables under study. According to (Ghozali, 2021), a valid instrument indicates that each statement item in the questionnaire is capable of measuring the construct consistent with the research objectives. Furthermore, (Sugiyono, 2022) states that validity describes the degree of accuracy between the data obtained by the researcher and the actual conditions of the research subjects. Validity testing in this study was conducted by comparing the calculated r value with the table r value at a 5% significance level ($\alpha = 0.05$). The table r-value is determined based on the degrees of freedom (df) using the formula df = n – 2, where n is the sample size. The sample size used in this study was 100 respondents, resulting in a df value of 98. Based on this value, the table r-value was calculated to be 0.1966. A statement item is considered valid if the calculated r value is greater than the table r value. The results of the validity test are shown in the following table.

Table 2. Results of the validity test for the digital customer engagement variable (x1)

Variable	Indicator	Calculated r	Table r	Notes
Digital Customer Engagement	X1.1	0,830	0,1966	Valid
	X1.2	0,807	0,1966	Valid
	X1.3	0,814	0,1966	Valid

Variable	Indicator	Calculated r	Table r	Notes
	X1.4	0,706	0,1966	Valid
	X1.5	0,752	0,1966	Valid
Product Adaptation	X2.1	0,825	0,1966	Valid
	X2.2	0,764	0,1966	Valid
	X2.3	0,755	0,1966	Valid
	X2.4	0,715	0,1966	Valid
	X2.5	0,723	0,1966	Valid
Brand Trust	X3.1	0,682	0,1966	Valid
	X3.2	0,649	0,1966	Valid
	X3.3	0,804	0,1966	Valid
	X3.4	0,784	0,1966	Valid
	X3.5	0,746	0,1966	Valid
Business Sustainability	Y.1	0,767	0,1966	Valid
	Y.2	0,663	0,1966	Valid
	Y.3	0,730	0,1966	Valid
	Y.4	0,530	0,1966	Valid
	Y.5	0,715	0,1966	Valid

Source: SPSS-Processed Data (2026)

Based on the validity test results in Table 2 it is evident that all statement items in the Digital Customer Engagement variable (X1) have calculated r values greater than the table r value of 0.1966. Thus, all statement items in the Digital Customer Engagement variable are deemed valid and suitable for use as a research instrument. All statement items used to measure the Product Adaptation variable (X2) have calculated r values greater than the table r values. These results indicate that each indicator is effective in measuring the Product Adaptation variable; therefore, all statement items are deemed valid and can be used in the data collection process.

It can be seen that all statement items in the Brand Trust variable (X3) have a calculated r-value greater than the critical r-value of 0.1966. Thus, all statement items are deemed valid and suitable for use as a research instrument to measure the Brand Trust variable. It can be seen that all statement items in the Business Sustainability variable (Y) have a calculated r value greater than the table r value of 0.1966. This indicates that all statement items are valid and can be used as a research instrument to measure the Business Sustainability variable.

Reliability Test

A reliability test was conducted to determine the level of consistency of a research instrument in measuring the variables under study. A reliable instrument indicates that the measurement tool is capable of producing consistent results when used in repeated measurements. According to Hair et al. (2019), reliability is used to assess the extent to which indicators within a construct are capable of producing stable and consistent measurements. Reliability testing in this study was conducted using Cronbach's Alpha. A variable is considered reliable if it has a Cronbach's Alpha value > 0.60. The results of the reliability test are shown in the following table.

Table 6. Reliability test

Variable	Cronch's Alpha	Koefisien Cronch's Alpha	Notes
Digital Customer Engagement (X1)	0,60	0,837	Reliable
Product Adaptation (X2)	0,60	0,811	Reliable
Brand Trust (X3)	0,60	0,785	Reliable
Business Sustainability (Y)	0,60	0,712	Reliable

Source: SPSS-Processed Data (2026)

Based on the reliability test results in Table 6, it is evident that the variables Digital Customer Engagement (X1), Product Adaptation (X2), Brand Trust (X3), and Business Sustainability (Y) each have a Cronbach's Alpha value greater than 0.60. This indicates that all research variables have met the reliability criteria. Thus, all research instruments are deemed reliable and can be used as data collection tools; they are also suitable for testing in the next stage.

Normality Test

A normality test was conducted to determine whether the residual data in the regression model follow a normal distribution. A normal data distribution is one of the prerequisites for regression analysis to produce valid estimates. According to (Hair et al., 2019), a normality test is necessary to ensure that the basic assumptions of regression analysis are met. In this study, the normality test was performed using the One-Sample Kolmogorov-Smirnov Test with the assistance of IBM SPSS software. The data are considered to be normally distributed if the significance value (Asymp. Sig., 2-tailed) is greater than 0.05. The results of the normality test are presented in the following table.

Table 7. Results of the normality test

		Unstandardized Residual
N		100
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	,30736468
Most Extreme Differences	Absolute	,092
	Positive	,092
	Negative	-,088
Test Statistic		,092
Asymp. Sig. (2-tailed)[c]		,051

Source: SPSS-Processed Data (2026)

Based on the results of the normality test shown in Table 7, an Asymp. Sig. (2-tailed) value of 0.051 was obtained. This value is above the significance threshold of 0.05; therefore, it can be concluded that the residual data in this study are normally distributed. Consequently, the regression model used satisfies the normality assumption and can be used for further analysis.

Heteroscedasticity Test

A heteroscedasticity test was conducted to determine whether there is unequal variance in the residuals of the regression model. A good regression model is one that does not exhibit heteroscedasticity. In this study, the heteroscedasticity test was performed using the Glejser test by examining the significance (Sig.) values of each independent variable. According to (Hair et al., 2019) a regression model is considered free of heteroscedasticity if the significance value for each independent variable is greater than 0.05. The results of the heteroscedasticity test are presented in the following table.

Table 8. Results of the glejser test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	*Std. Error*	Beta		
1	(*Constant*)	5,030	,590		8,531	,000
	X2	-,089	,059	-,284	-1,512	,134
	X3	-,069	,054	-,210	-1,277	,205
	X1	-,037	,039	-,136	-,960	,339

a. *Dependent Variable*: ABS_RES

Source: SPSS-Processed Data (2026)

Based on the results of the heteroscedasticity test using the Glejser method in Table 8, it is evident that the significance values for the variables Digital Customer Engagement (X1), Product Adaptation (X2), and Brand Trust (X3) are each greater than 0.05. These results indicate that there are no signs of heteroscedasticity in the regression model used. Thus, the assumption of homoscedasticity in this study has been met.

Multicollinearity Test

The multicollinearity test is used to identify whether there are strong relationships among the independent variables in a regression model. The presence of multicollinearity can cause regression estimates to be less accurate because the independent variables influence one another. In

this study, the test was conducted using the Tolerance and Variance Inflation Factor (VIF) values. According to (Ghozali, 2021), a regression model is considered free of multicollinearity if its Tolerance value is greater than 0.10 and its VIF value is less than 10. The results of the multicollinearity test are shown in the following table.

Table 9. Results of the multicollinearity test

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
X1	,307	3,262
X2	,185	5,408
X3	,249	4,015

Source: SPSS-Processed Data (2026)

Based on the results of the multicollinearity test in Table 9, it is evident that the Digital Customer Engagement variable (X1) has a Tolerance value of 0.307 and a VIF value of 3.262. The Product Adaptation variable (X2) has a Tolerance value of 0.185 and a VIF value of 5.408, while the Brand Trust variable (X3) has a Tolerance value of 0.249 and a VIF value of 4.015. All variables have Tolerance values greater than 0.10 and VIF values less than 10. Thus, it can be concluded that the regression model in this study does not exhibit multicollinearity, thereby satisfying the classical assumptions and is suitable for multiple linear regression analysis.

Multiple Linear Regression Analysis

Multiple linear regression analysis is used to determine the effects of more than one independent variable on a dependent variable. Through this analysis, the direction of the relationship and the magnitude of each independent variable's effect on the dependent variable can be determined. According to (Ghozali, 2021), multiple linear regression analysis is used to test the effects of two or more independent variables on a single dependent variable. In this study, multiple linear regression analysis was used to test the effects of Digital Customer Engagement (X1), Product Adaptation (X2), and Brand Trust (X3) on Business Sustainability (Y). The results of the multiple linear regression analysis are presented in the following table.

Table 10. Results of the multiple linear regression test

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,877	1,081		6,362	,000
	X1	-,010	,075	-,015	-,139	,890
	X2	,080	,109	,101	,734	,464
	X3	,623	,100	,739	6,246	,000

a. Dependent Variable: Y

Source: SPSS-Processed Data (2026)

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e \quad [1]$$

$$Y = 6{,}877 - 0{,}10X^1 + 0{,}080X^2 + 0{,}623X^3 + e \quad [2]$$

The results of the multiple linear regression equation can be interpreted as follows: a) Constant (a) = 6.877, a constant value of 6.877 indicates that if the variables Digital Customer Engagement (X_1), Product Adaptation (X_2), and Brand Trust (X_3) are held constant or set to zero, then Business Sustainability (Y) is estimated to be 6.877; b) Coefficient for Digital Customer Engagement (X_1) = -0.010, the regression coefficient for Digital Customer Engagement (X_1) of -0.010 indicates that a one-unit increase in Digital Customer Engagement will decrease Business

Sustainability by 0.010 units, assuming all other variables remain constant. A negative coefficient value indicates an inverse relationship between Digital Customer Engagement and Business Sustainability; c) Product Adaptation Coefficient (X_2) = 0.080, the regression coefficient for Product Adaptation (X_2) of 0.080 indicates that a one-unit increase in Product Adaptation will increase Business Sustainability by 0.080 units, assuming all other variables remain constant. A positive coefficient value indicates a positive relationship between Product Adaptation and Business Sustainability; d) Koefisien Brand Trust (X_3) = 0,623, the regression coefficient for Brand Trust (X_3) of 0.623 indicates that a one-unit increase in Brand Trust will increase Business Sustainability by 0.623 units, assuming all other independent variables remain constant. The positive coefficient value indicates that the higher the level of consumer trust in a brand, the higher the level of Business Sustainability; e) Error (e)Error, is a disturbance variable that reflects other factors outside the research model that may influence Business Sustainability but are not included in the regression equation.

Partial Test (t-Test)

The t-test is conducted to determine the partial effect of each independent variable on the dependent variable. According to (Hair et al., 2022), this test is used to evaluate the significance of each independent variable's regression coefficient in explaining changes in the dependent variable. Decision-making is based on comparing the significance value with the 5% significance level (α = 0.05). If the significance value is < 0.05, the hypothesis is accepted; if the significance value is > 0.05, the hypothesis is rejected. The results of the t-test in this study are presented in the following table.

Table 11. Results of the partial test (t-test)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,877	1,081		6,362	,000
	X1	-,010	,075	-,015	-,139	,890
	X2	,080	,109	,101	,734	,464
	X3	,623	,100	,739	6,246	,000

a. Dependent Variable: Y

Source: SPSS-Processed Data (2026)

Based on the results of the t-test in Table 11, the degrees of freedom (df) were calculated using the formula df = n − k − 1, where n is the sample size and k is the number of independent variables; thus, df = 100 − 3 − 1 = 96. Consequently, the critical t-value was determined to be 1.987 at a 5% significance level. The results of the partial hypothesis testing can be explained as follows: H1: Digital Customer Engagement (X_1) has an effect on Business Sustainability (Y).

Based on the test results, the calculated t-value is -0.139 with a significance value of 0.890. This calculated t-value is smaller than the critical t-value (1.987), and the significance level is greater than 0.05. Thus, Digital Customer Engagement does not have a significant effect on Business Sustainability. Therefore, H1 is rejected. H2: Product Adaptation (X_2) has an effect on Business Sustainability (Y). The test results show a calculated t-value of 0.734 with a significance value of 0.464. The calculated t-value is smaller than the critical t-value (1.987), and the significance value is greater than 0.05. This indicates that Product Adaptation does not have a significant effect on Business Sustainability. Therefore, H2 is rejected. H3: Brand Trust (X_3) influences Business Sustainability (Y). The test results show a calculated t-value of 6.246 with a significance level of 0.000. The calculated t-value is greater than the critical t-value (1.987), and the significance level is less than 0.05. These results indicate that Brand Trust has a positive and significant effect on Business Sustainability. Thus, H3 is accepted.

Simultaneous Test (F-Test)

The F-test aims to determine whether the independent variables collectively influence the dependent variable. According to (Sugiyono, 2022) the F-test is used to assess the validity of the

regression model and to determine the simultaneous influence of all independent variables on the dependent variable. The test was conducted by comparing the significance value with a significance level of 0.05. If the significance value is less than 0.05, then the independent variables collectively influence the dependent variable. The results of the simultaneous test can be seen in the following table.

Table 12. Results of the simultaneous test (f-test)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	395,215	3	131,738	63,688	,000[b]
	Residual	198,575	96	2,068		
	Total	593,790	99			

a. Dependent Variable: Y
b. Predictors: (Constant), X3, X1, X2
Source: SPSS-Processed Data (2026)

Based on the results of the simultaneous test (F-test) in Table 12, the calculated F-value was 63.688 with a significance level of 0.000. This value indicates that the calculated F-value is greater than the critical F-value (63.688 > 2.70) and the significance level is less than 0.05 (0.000 < 0.05). Thus, it can be concluded that Digital Customer Engagement (X_1), Product Adaptation (X_2), and Brand Trust (X_3) collectively have a significant effect on Business Sustainability (Y). These results indicate that the regression model used is effective in explaining the variation in Business Sustainability; therefore, the simultaneous hypothesis (H4) is accepted.

Analysis of the Coefficient of Determination (Adjusted R^2)

The coefficient of determination (Adjusted R^2) is used to determine the extent to which the independent variables explain the variation in the dependent variable in a regression model. The Adjusted R^2 value ranges from 0 to 1. The higher the Adjusted R^2 value, the greater the ability of the independent variables to explain changes in the dependent variable. In multiple linear regression, the Adjusted R^2 value is more appropriate because it has been adjusted for the number of independent variables in the model, resulting in a more accurate value (Ghozali, 2021).

Table 13. Results of the coefficient of determination test (adjusted r^2)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,816[a]	,666	,655	1,43823

a. Predictors: (Constant), X3, X1, X2
Source: SPSS-Processed Data (2026)

The regression model in this study shows a very strong relationship between the independent and dependent variables, as indicated by an R value of 0.816. The R-squared value of 0.666 indicates that 66.6% of the variation in the business sustainability of culinary MSMEs in Medan can be explained by the variables Digital Customer Engagement, Product Adaptation, and Brand Trust, while the remaining 33.4% is influenced by other factors outside the research model. Meanwhile, the Adjusted R-Square value of 0.655 indicates that, after adjusting for the number of independent variables and sample size, the model is still capable of explaining 65.5% of the variation in the business sustainability of culinary MSMEs in Medan. This suggests that the regression model used is effective in explaining the relationship between the independent and dependent variables.

The Impact of Digital Customer Engagement on the Business Sustainability of Culinary MSMEs in Medan

Based on the results of the partial test (t-test), a calculated t-value of -0.139 was obtained with a significance level of 0.890. This significance value is greater than 0.05, indicating that digital customer engagement does not have a significant effect on the business sustainability of culinary

MSMEs in Medan. Thus, the first hypothesis (H1) is rejected. This finding suggests that customer engagement through digital media has not yet become a factor capable of enhancing the business sustainability of culinary MSMEs in Medan. Although some MSME operators have utilized social media and digital platforms as tools for promotion and communication with customers, such interactions do not necessarily foster strong relationships that contribute to business sustainability. In other words, high levels of digital activity do not always lead to increased customer loyalty or business sustainability.

This situation can arise because Digital Customer Engagement places greater emphasis on the intensity of interactions between businesses and customers on digital media. However, these interactions do not necessarily generate economic value if they are not accompanied by product quality, satisfactory service, and customer trust in the brand. For culinary SMEs, customers generally prioritize taste, product quality, price, and the transaction experience over simply observing a business's social media activity. Therefore, digital customer engagement has not yet become a primary factor influencing business sustainability.

The results of this study do not align with the research by (Kim, 2023), which states that the effective use of social media can increase customer engagement. Additionally, the study by Nurmilah and (Djakasaputra, 2024) shows that customer engagement has a positive impact on SME performance, while (Lestari, 2025) found that customer engagement through social media can increase consumer loyalty. These differing results are likely influenced by respondent characteristics, the level of digital media usage, and the ability of individual business owners to manage interactions with customers. In this study, digital customer engagement may not yet have been optimally utilized as a strategy for building long-term relationships with customers.

These findings can be explained by the Commitment-Trust Theory proposed by Morgan and Hunt (1994). This theory explains that long-term relationships between companies and customers are built through two main elements: trust and commitment. Digital interactions serve only as a means to build these relationships. If these interactions fail to enhance customer trust and commitment, then Digital Customer Engagement will not have a significant impact on business sustainability. Thus, the results of this study indicate that customer engagement through digital media alone is insufficient to support the sustainability of culinary MSMEs without the presence of other supporting factors.

The Effect of Product Adaptation on the Business Sustainability of Culinary MSMEs in Medan

Based on the results of the partial test (t-test), a calculated t-value of 0.734 was obtained with a significance level of 0.464. This significance level is greater than 0.05, indicating that Product Adaptation does not have a significant effect on the business sustainability of culinary MSMEs in Medan. Consequently, the second hypothesis (H2) is rejected. These findings suggest that the ability of MSME operators to adapt their products to changing market needs has not yet become a factor that directly determines business sustainability. Although some business operators have made various adjustments such as expanding menu variety, improving packaging, or following emerging culinary trends these changes do not necessarily have an impact on business sustainability. This suggests that the success of product adaptation is determined not only by the presence of innovation but also by the extent to which such innovation can provide added value that aligns with customer needs and expectations. Several factors may explain this insignificant effect, including inconsistent product innovation, limited understanding of changing consumer needs, and product adjustments that do not provide clear added value. Changes such as menu variations, packaging improvements, and following culinary trends may not directly improve business sustainability if they are not aligned with customer expectations and supported by effective business strategies.

The results of this study do not align with the research by (Sahrul & Nuringsih, 2023), which states that adaptability is a crucial component of business transformation to ensure a business remains competitive. Research by (Cahyadi et al., 2023) also found that product innovation plays a role in enhancing the competitiveness of MSMEs, while (Suarna et al., 2025) demonstrated that

product adaptation has a positive impact on business sustainability. The differences in these research findings are likely influenced by the characteristics of the respondents as well as the level of product adaptation implementation among the respective study subjects. In this study, the product adaptation carried out by MSME operators may not yet have been implemented consistently or may not have been fully based on changes in consumer needs.

These findings can be explained through Dynamic Capability Theory, which states that the ability to adapt is one of the key capabilities in responding to changes in the business environment. However, this ability must be supported by entrepreneurs' capacity to identify market opportunities, manage resources, and implement innovation on an ongoing basis. Thus, the results of this study indicate that product adaptation alone is not sufficient to drive business sustainability if it is not accompanied by a business strategy capable of creating value for customers.

Based on these findings, culinary MSME entrepreneurs in Medan must not only adapt their products to market needs but also leverage digital technology to support decision-making and business management. In line with this, (Nasution & Azizah, 2025) state that the implementation of digital-based information systems can improve the effectiveness of MSME management so that business owners are more responsive to changes in the business environment. Thus, product adaptation supported by the use of digital technology is expected to provide added value to customers while supporting business sustainability.

The Effect of Brand Trust on the Business Sustainability of Culinary MSMEs in Medan

Based on the results of the partial test (t-test), a calculated t-value of 6.246 was obtained with a significance level of 0.000. This significance value is less than 0.05, indicating that brand trust has a positive and significant effect on the business sustainability of culinary MSMEs in Medan. Thus, the third hypothesis (H3) is accepted. This finding indicates that customer trust in a brand is one of the factors that plays a role in maintaining the sustainability of culinary SMEs. When customers are confident that the products offered are of good quality, safe to consume, and capable of delivering an experience that meets their expectations, they tend to make repeat purchases and continue to choose that brand over competing products. This situation provides greater opportunities for SME operators to maintain sales and ensure the sustainability of their businesses.

The results of this study are consistent with the research by (Wardati et al., 2024), which states that effective communication via social media and the implementation of customer relationship management can increase customer trust in SMEs. The study by (Rajiman et al., 2025) also found that brand trust has a significant impact on improving business performance through customer loyalty. Furthermore, (Santoso, 2025) explains that the higher a customer's trust in a brand, the higher their loyalty which ultimately supports business sustainability. These consistent findings demonstrate that customer trust is a vital asset for MSMEs in maintaining their competitiveness amid increasingly intense business competition. These findings are further supported by (Nurbaiti et al., 2023), who state that brand trust is a key factor influencing customers' decisions to choose and continue using a particular brand. Therefore, the higher the level of customer trust, the greater the opportunity for SMEs to retain customers and ensure the sustainability of their businesses.

When viewed in the context of the Relationship Marketing Theory proposed by (Morgan & Hunt, 1994), the results of this study reinforce the concept that trust is the cornerstone of building long-term relationships between companies and customers. Relationships based on trust will encourage customers to maintain their relationship with a brand make repeat purchases, and even recommend products to others. Therefore, the higher the level of customer trust in a brand, the greater the opportunity for MSMEs to ensure the sustainability of their businesses.

Based on the results of this study, culinary SME operators in Medan need to continue building and maintaining customer trust by providing high-quality products, consistent service, and open and honest communication. These efforts not only influence customers' purchasing decisions but also serve as a key strategy in fostering customer loyalty, which ultimately supports the long-term sustainability of SME businesses.

The Influence of Digital Customer Engagement, Product Adaptation, and Brand Trust on the Business Sustainability of Culinary MSMEs in Medan

Based on the results of the simultaneous test (F-test), the calculated F-value was 63.688 with a significance level of 0.000. This value is less than the significance level of 0.05, indicating that Digital Customer Engagement, Product Adaptation, and Brand Trust simultaneously have a significant effect on the Business Sustainability of Culinary MSMEs in Medan. Thus, the fourth hypothesis (H4) is accepted. Additionally, the analysis of the coefficient of determination revealed an Adjusted R-Square value of 0.655, meaning that the three independent variables account for 65.5% of the variation in the business sustainability of culinary MSMEs in Medan, while the remaining 34.5% is influenced by other factors outside the research model. [Reviewer 1] The Adjusted R-Square value of 65.5% indicates that Digital Customer Engagement, Product Adaptation, and Brand Trust explain 65.5% of the variation in culinary MSME business sustainability. Meanwhile, the remaining 34.5% is influenced by other factors not examined in this study. These factors may include financial management, access to capital, innovation, and market competition, which could be considered in future research.

The results of this study show that the business sustainability of MSMEs is not influenced by a single factor but rather by a combination of several complementary factors. Although Digital Customer Engagement and Product Adaptation did not show a significant influence when analyzed individually, the inclusion of these two variables remains an integral part of the model, which, together with Brand Trust, is capable of explaining business sustainability as a whole. This indicates that efforts to maintain business sustainability must be undertaken through a comprehensive approach, rather than focusing solely on a single aspect.

The findings of this study align with the Relationship Marketing Theory proposed by (Morgan & Hunt, 1994). This theory explains that long-term relationships between companies and customers are built through trust and sustained commitment. In the context of this study, Digital Customer Engagement serves as a means to create interactions with customers; Product Adaptation reflects a business's ability to respond to changing market needs; and Brand Trust strengthens existing relationships. When these three aspects are managed collectively, MSMEs will have a greater chance of retaining customers and ensuring business sustainability.

The findings of this study are also supported by several previous studies. (Asakdiyah et al., 2023) state that the implementation of digital-based relationship marketing can increase customer loyalty and support the sustainability of MSME businesses. Furthermore, (Sari & Nugroho, 2024) explain that a good relationship between business owners and customers can increase consumer trust and help retain customers in the long term. Furthermore, (Rahmat et al., 2024) found that well-managed digital interactions can strengthen relationships with customers and have a positive impact on loyalty and business sustainability. These findings reinforce the view that the sustainability of MSME businesses is not influenced by a single strategy but is the result of the continuous management of customer relationships.

Based on these findings, food-related MSMEs in Medan need to manage digital marketing, product innovation, and customer trust-building in an integrated manner. These three aspects are inseparable if the goal is to ensure business sustainability. With mutually supportive strategies, MSMEs are expected to be better equipped to navigate market changes, retain customers, and enhance their long-term competitiveness.

4. CONCLUSION

This study concludes that the business sustainability of culinary MSMEs in Medan is more strongly influenced by business owners' ability to build customer trust than by their use of digital media or their ability to adapt products. In this research model, Brand Trust was found to have a positive and significant effect on business sustainability, while Digital Customer Engagement and Product Adaptation did not show a significant partial effect. These findings indicate that digital activities and product innovation are not yet capable of having a direct impact on business sustainability unless

they are accompanied by the development of customer trust in the brand. Nevertheless, Digital Customer Engagement, Product Adaptation, and Brand Trust collectively have a significant impact on the business sustainability of culinary MSMEs in Medan. This suggests that business sustainability is the result of managing various complementary strategies. Therefore, SME operators not only need to increase digital marketing activities and make product adjustments but also need to prioritize building Brand Trust as the foundation for creating long-term relationships with customers and supporting business sustainability. [Reviewer 2] The main contribution of this study is the development of an integrated perspective on MSME business sustainability by highlighting the complementary roles of Digital Customer Engagement, Product Adaptation, and Brand Trust. The findings emphasize that building customer trust, supported by digital interaction and continuous product adaptation, is essential for strengthening the long-term sustainability of culinary MSMEs.

Although this study contributes to explaining the influence of Digital Customer Engagement, Product Adaptation, and Brand Trust on the Business Sustainability of Culinary MSMEs in Medan, it still has several limitations. The study was conducted only on culinary MSMEs in Medan; therefore, the findings cannot yet be generalized to the broader MSME sector or to other regions with different characteristics. Furthermore, this study used only three independent variables; consequently, there are other factors that could potentially influence business sustainability but were not analyzed in the research model. Additionally, this study employed a quantitative approach through the distribution of questionnaires; thus, the results primarily reflect respondents' perceptions and do not delve deeply into the actual conditions or experiences of MSME operators.

Further research is recommended to develop the research model by adding other variables that may influence the sustainability of MSME businesses, such as entrepreneurial orientation, business innovation, service quality, managerial competence, or the adoption of digital technology, thereby making the research model more comprehensive. Additionally, research can be conducted in different MSME sectors or regions to ensure that the findings have a broader scope of generalizability. The use of a mixed-methods approach or longitudinal research is also recommended to gain a deeper understanding of the factors that influence the business sustainability of MSMEs. [Reviewer 1] Future research should use actual business performance data, such as sales growth, revenue, and business survival rates, combined with long-term observations. This approach would provide more objective evidence of MSME business sustainability beyond respondents' perceptions.

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