
Product Quality and Service Quality as Determinants of Customer Loyalty: The Mediating Role of Customer Satisfaction in MSMEs in Tambaksari District, Surabaya

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Abstract

This study aims to examine the influence of product quality and service quality on customer loyalty, with customer satisfaction as an intervening variable among Micro, Small, and Medium Enterprises (MSMEs) in Tambaksari District, Surabaya. This study employed a quantitative approach using a survey method through questionnaires distributed to MSME customers. The data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). The measurement model was evaluated through outer loading, Average Variance Extracted (AVE), discriminant validity, and reliability tests, while the structural model was assessed using R-square, f-square, Q-square, model fit, path coefficients, and specific indirect effects. The results indicate that product quality has a positive and significant effect on customer satisfaction and customer loyalty. Service quality also has a positive and significant effect on customer satisfaction and customer loyalty. Furthermore, customer satisfaction has a positive and significant effect on customer loyalty. The mediation analysis shows that customer satisfaction significantly mediates the effects of both product quality and service quality on customer loyalty. These findings highlight the importance of maintaining product and service quality while strengthening customer satisfaction as a strategic mechanism for building sustainable customer loyalty among MSMEs.

Keywords: Product Quality, Service Quality, Customer Satisfaction, Customer Loyalty, MSMEs, SEM-PLS

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Introduction

Micro, Small, and Medium Enterprises (MSMEs) play an important role in supporting economic development, creating employment opportunities, generating income, and strengthening local economic activity. In developing economies, MSMEs are not only business entities that provide goods and services but also constitute an important part of community-based economic development (Evinita et al., 2025). Their relatively flexible business structures enable them to respond to changes in market conditions and consumer preferences. However, this flexibility also places MSMEs in an increasingly competitive business environment. MSMEs have to compete with businesses operating in similar sectors, larger enterprises, modern retail businesses, and digital-based businesses that provide consumers with a wider range of choices (Faiz et al., 2024). These conditions make the ability to retain customers increasingly important for the sustainability of MSMEs.

The increasing availability of business alternatives has changed the way customers make purchasing decisions. Customers can compare products, prices, service experiences, and reviews before deciding whether to purchase from a particular business (Paramita & Yuniarto, 2025). Changes in consumer preferences also require MSMEs to continuously adapt their products and services to customer expectations. Attracting new customers is therefore not sufficient to ensure business continuity because customers may easily switch to competing businesses when their expectations are not fulfilled. Customer loyalty becomes particularly important in this situation because loyal customers are more likely to make repeat purchases, recommend products or services to others, and maintain their relationship with a business (Haseeb et al., 2024). The ability to establish customer loyalty can consequently provide MSMEs with a more sustainable customer base in the midst of intense competition.

Customer loyalty is closely related to the experiences customers obtain during the purchasing process. Customers evaluate whether the products they receive provide the expected benefits and whether the services they experience meet their expectations. Product quality becomes an important component of this evaluation because customers generally expect products to perform consistently and meet their needs (Hossain et al., 2024). Product performance, reliability, durability, conformity to specifications, and aesthetic characteristics can influence how customers perceive the value of a product. When customers consistently receive products that meet their expectations, they are more likely to develop positive evaluations and trust toward the business. Poor or inconsistent product quality, on the other hand, may result in negative experiences and encourage customers to consider alternative products offered by competitors (Xuehui et al., 2025).

The purchasing experience is also influenced by the quality of services provided by the business. Service quality concerns the extent to which a business is able to provide reliable, responsive, reassuring, empathetic, and physically supportive services (Sakyi, 2020). These aspects are particularly relevant to MSMEs because interactions between business owners or employees and customers are often direct and personal. Customers may evaluate not only the products they purchase but also the manner in which they are served. Friendly communication, responsiveness, reliability, attention to customer needs, and appropriate handling of complaints can create a positive experience. When these service aspects are not adequately maintained, customers may perceive that the overall value of their

purchasing experience is low, even when the products offered are of satisfactory quality (Salamah et al., 2022).

The experiences generated by product and service quality can influence customer satisfaction. Customer satisfaction reflects customers' evaluation after comparing their expectations with the performance of the products and services they receive (Yum & Kim, 2024). When the quality of products and services meets or exceeds expectations, customers are more likely to experience satisfaction. Satisfied customers may subsequently develop stronger intentions to repurchase, recommend the business to others, and maintain their relationship with the business. Customer satisfaction therefore represents an important mechanism that can connect product quality and service quality with customer loyalty. The relationship is not limited to the direct effect of quality on loyalty because customers may first evaluate the quality of their experience, develop satisfaction, and then demonstrate loyal behavior (Rashid & Nurunnabi, 2020).

This relationship is particularly important for MSMEs because their competitive advantage often depends on their ability to maintain close relationships with customers. Unlike large corporations that generally rely on standardized systems and extensive organizational resources, MSMEs frequently operate through direct interactions between owners, employees, and customers (Mammadov & Wald, 2025). Product consistency, personal attention, responsiveness, and communication can consequently become important elements of the customer experience. Maintaining these aspects can help MSMEs create satisfaction and strengthen customer relationships. When customers consistently perceive positive experiences, the possibility of developing long-term loyalty becomes greater.

The issue becomes increasingly relevant in Tambaksari District, Surabaya, where MSMEs operate across various business sectors and serve customers with different needs and expectations. The diversity of businesses creates opportunities for local economic activity while simultaneously increasing competition among business actors (Surya et al., 2021). Customers in this environment have alternatives when the products or services provided by one MSME do not meet their expectations. MSMEs therefore need to understand the factors that determine whether customers remain with a particular business or decide to switch to competitors. The challenge is not simply providing products and services, but maintaining a level of quality that can generate satisfaction and encourage customers to remain loyal.

Empirical studies have provided evidence concerning the relationships among product quality, service quality, customer satisfaction, and customer loyalty. Yustina et al., (2025) found that product quality has a positive and significant effect on customer satisfaction in culinary MSMEs. Zulviani & Roza, (2025) also found that product quality and service quality positively influence customer satisfaction among SMEs. Juliana et al., (2025) examined product quality and service quality in the MSME context and found relationships involving customer satisfaction and customer loyalty. Rita et al., (2019) further demonstrated the relevance of customer satisfaction as a mediating variable in the relationship between product quality, service quality, and customer loyalty. These findings indicate that quality-related factors and customer satisfaction are important components in explaining customer loyalty.

Although previous studies provide substantial evidence regarding these relationships, differences in research contexts indicate that the findings cannot automatically be generalized to all MSMEs (Basar et al., 2025). Existing studies have been conducted in various business sectors, including restaurants, cafés, bakeries, tourism businesses, retail stores, and individual MSMEs. Differences in products, customer characteristics, business models, and service interactions may influence how customers evaluate quality and develop satisfaction. Research that examines these relationships within a particular local geographical environment can therefore provide a more specific understanding of customer behavior (Ge et al., 2026).

The existing literature also leaves a contextual gap concerning MSMEs at the sub-district level in an urban Indonesian setting. Several studies have examined individual businesses or particular MSME sectors, while research that simultaneously examines product quality, service quality, customer satisfaction, and customer loyalty across diverse MSMEs within a defined sub-district remains limited. This limitation is important because MSMEs operating within the same geographical area may face similar competitive conditions while having different products, service characteristics, and customer interactions. The extent to which product quality and service quality contribute to loyalty through customer satisfaction therefore requires further empirical examination within a specific local context (Hui et al., 2025).

Tambaksari District provides a relevant setting for examining this relationship because its MSMEs operate within a competitive local market in which customers have various choices of products and services. The diversity of MSMEs also creates different forms of customer interaction and purchasing experience. These conditions raise an important question concerning whether product quality and service quality are sufficient to directly encourage customer loyalty or whether their influence is strengthened through customer satisfaction. Understanding this mechanism is important because improvements in product and service quality may not automatically result in loyalty unless they are perceived positively by customers and generate satisfaction (Haress & Akhlaghimofrad, 2026).

The central issue addressed in this study is therefore the formation of customer loyalty among MSMEs in Tambaksari District through product quality and service quality and the role of customer satisfaction in this process. Customer satisfaction is positioned as an intervening variable to examine whether the influence of product quality and service quality on customer loyalty occurs not only directly but also through customers' satisfaction with the products and services they receive. This approach enables the study to examine the mechanism underlying customer loyalty rather than focusing only on the direct relationships between the variables (Reitenberger & Marx, 2026).

This study therefore examines the influence of product quality and service quality on customer loyalty with customer satisfaction as an intervening variable among MSMEs in Tambaksari District, Surabaya. The study examines the effects of product quality and service quality on customer satisfaction, the direct effects of product quality, service quality, and customer satisfaction on customer loyalty, and the indirect effects of product quality and service quality on customer loyalty through customer satisfaction. The findings are expected to contribute to the understanding of customer loyalty within the MSME context and provide practical

insights for MSME owners in improving product quality, service quality, and customer satisfaction as part of efforts to maintain customer loyalty in a competitive local market.

Methodology

Research Design

This study employed a quantitative research approach to examine the relationships among product quality, service quality, customer satisfaction, and customer loyalty among MSMEs in Tambaksari District, Surabaya. A quantitative approach was selected because the study aims to test the proposed hypotheses and measure the magnitude and significance of relationships among the research constructs.

The research model consists of two exogenous variables, namely product quality (X1) and service quality (X2), customer satisfaction (Z) as an intervening variable, and customer loyalty (Y) as the endogenous variable. Customer satisfaction is positioned as an intervening construct to examine whether product quality and service quality influence customer loyalty both directly and indirectly through customer satisfaction.

Population and Sample

The population of this study consisted of customers who had experience purchasing products or using services provided by MSMEs operating in Tambaksari District, Surabaya. The respondents were selected based on their direct experience with the products and services of the MSMEs under study.

Data were collected using a structured questionnaire. The questionnaire employed a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The use of a Likert scale enabled respondents to express their level of agreement with each statement representing the indicators of the research constructs.

Research Variables and Measurement

The study involved four constructs: product quality, service quality, customer satisfaction, and customer loyalty. Each construct was operationalized into several indicators.

Product quality (X1) was measured using five indicators covering product performance, reliability, durability, conformity to specifications, and aesthetics. Service quality (X2) was measured using five dimensions based on the SERVQUAL perspective: reliability, responsiveness, assurance, empathy, and tangibles.

Customer satisfaction (Z) was measured using five indicators reflecting customers' satisfaction with product quality and service, the fulfillment of expectations, positive purchasing experiences, and the handling of customer complaints. Customer loyalty (Y) was measured using indicators reflecting repurchase intention, preference for the MSME over competitors, willingness to recommend the business to others, resistance to switching to competitors, and emotional commitment to maintaining the customer relationship.

Data Collection

Primary data were obtained directly from respondents through questionnaires. The questionnaire items were developed based on the operational definitions and

indicators of each research construct. Respondents were asked to evaluate each statement according to their actual experience with MSMEs in Tambaksari District.

The collected responses were subsequently tabulated and prepared for analysis. Each questionnaire response was converted into a numerical score according to the five-point Likert scale, allowing the data to be analyzed statistically using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach.

Data Analysis

The data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). PLS-SEM was employed because the research model includes multiple relationships between latent constructs and examines both direct and indirect effects, with customer satisfaction functioning as an intervening variable. The analysis consisted of two main stages: evaluation of the measurement model (outer model) and evaluation of the structural model (inner model).

1. Descriptive Statistical Analysis

Descriptive statistics were used to describe the respondents' responses to each measurement indicator. The analysis included the mean, median, minimum value, maximum value, and standard deviation. These statistics were used to identify the general tendency and distribution of respondents' perceptions toward product quality, service quality, customer satisfaction, and customer loyalty.

2. Measurement Model Evaluation

The measurement model was evaluated to determine whether the indicators adequately measured their respective latent constructs. The evaluation included convergent validity, discriminant validity, reliability, and collinearity assessment.

- a. Convergent validity** was assessed through outer loading and Average Variance Extracted (AVE). Indicators with outer loading values above 0.70 were considered to have adequate reliability in representing their respective constructs. AVE values above 0.50 indicated that the construct explained more than half of the variance of its indicators.
- b. Discriminant validity** was evaluated using the Heterotrait-Monotrait Ratio (HTMT), Fornell-Larcker criterion, and cross-loading analysis. HTMT values below 0.90 indicate adequate discriminant validity. The Fornell-Larcker criterion was assessed by comparing the square root of AVE for each construct with its correlations with other constructs. Cross-loading analysis was conducted by ensuring that each indicator had a higher loading on its associated construct than on other constructs.
- c. Reliability** was evaluated using Cronbach's alpha and composite reliability (rho_a and rho_c). A value above 0.70 indicates acceptable internal consistency, indicating that the indicators consistently measure the same construct.

- d. **Collinearity** was assessed using the Variance Inflation Factor (VIF). VIF values below 5.00 were considered to indicate the absence of problematic multicollinearity among the indicators.

3. Structural Model Evaluation

After the measurement model satisfied the required criteria, the structural model was evaluated to assess the relationships among the latent constructs. The coefficient of determination (R^2) was used to determine the extent to which the exogenous constructs explain the variance in the endogenous constructs. In this study, R^2 was evaluated for customer satisfaction and customer loyalty.

The effect size (f^2) was examined to determine the contribution of each exogenous construct to the endogenous construct. The predictive relevance of the model was evaluated using $Q^2_{predict}$, with values greater than zero indicating that the model has predictive relevance.

Model fit was assessed using the Standardized Root Mean Square Residual (SRMR). An SRMR value below 0.08 indicates an acceptable model fit.

4. Hypothesis Testing

Hypothesis testing was conducted using bootstrapping in the PLS-SEM procedure. The significance of the direct effects was assessed using path coefficients, t-statistics, and p-values. A relationship was considered statistically significant when the t-statistic exceeded 1.96 and the p-value was below 0.05.

The direct relationships examined were:

- a. Product quality → Customer satisfaction.
- b. Service quality → Customer satisfaction.
- c. Product quality → Customer loyalty.
- d. Service quality → Customer loyalty.
- e. Customer satisfaction → Customer loyalty.

The mediation hypotheses were examined using specific indirect effects to determine whether customer satisfaction mediates the relationship between product quality and customer loyalty and between service quality and customer loyalty.

The indirect effect was considered significant when the t-statistic exceeded 1.96 and the p-value was below 0.05. The mediation mechanism was interpreted by considering the significance of both the direct and indirect effects. When both effects were significant, customer satisfaction was interpreted as providing partial mediation.

5. Research Model

The structural relationships tested in this study can be represented as follows:

- a. **H1:** Product quality → Customer satisfaction.
- b. **H2:** Service quality → Customer satisfaction.
- c. **H3:** Product quality → Customer loyalty.
- d. **H4:** Service quality → Customer loyalty.
- e. **H5:** Customer satisfaction → Customer loyalty.

- f. **H6:** Product quality → Customer satisfaction → Customer loyalty.
- g. **H7:** Service quality → Customer satisfaction → Customer loyalty.

Through this analytical procedure, the study evaluates not only the direct contribution of product and service quality to customer loyalty but also the role of customer satisfaction as a mechanism that connects quality perceptions with customer loyalty among MSMEs in Tambaksari District, Surabaya.

Result and Discussion

Descriptive Statistics

Table 1. Descriptive Statistics

Name	Mean	Median	Scale min	Scale max	Standard deviation
X1.1	4.320	4.000	3.000	5.000	0.569
X1.2	4.327	4.000	3.000	5.000	0.583
X1.3	4.373	4.000	3.000	5.000	0.536
X1.4	4.347	4.000	3.000	5.000	0.554
X1.5	4.347	4.000	3.000	5.000	0.554
X2.1	4.320	4.000	3.000	5.000	0.546
X2.2	4.327	4.000	3.000	5.000	0.523
X2.3	4.300	4.000	3.000	5.000	0.539
X2.4	4.293	4.000	3.000	5.000	0.572
X2.5	4.300	4.000	3.000	5.000	0.539
Y.1	4.267	4.000	3.000	5.000	0.573
Y.2	4.300	4.000	3.000	5.000	0.563
Y.3	4.333	4.000	3.000	5.000	0.596
Y.4	4.307	4.000	3.000	5.000	0.599
Z.1	4.267	4.000	3.000	5.000	0.512
Z.2	4.273	4.000	3.000	5.000	0.540
Z.3	4.293	4.000	3.000	5.000	0.523
Z.4	4.273	4.000	3.000	5.000	0.599
Z.5	4.260	4.000	3.000	5.000	0.594

The descriptive analysis was conducted to provide an overview of the respondents' perceptions of the variables examined in this study, namely product quality, service quality, customer satisfaction, and customer loyalty. The descriptive analysis includes the mean, standard deviation, minimum value, and maximum value of the observed indicators. This analysis provides an initial representation of how customers perceive the products and services offered by MSMEs in Tambaksari District.

The descriptive results indicate that the indicators of product quality, service quality, customer satisfaction, and customer loyalty generally received positive responses from respondents. This indicates that customers tend to perceive the products and services provided by MSMEs in Tambaksari District as capable of meeting their expectations. Positive perceptions of product and service quality are

important because they represent the initial customer experience that can subsequently contribute to satisfaction and loyalty.

From a product quality perspective, customers evaluate the products based on their performance, reliability, durability, conformity to specifications, and aesthetic characteristics. A positive perception of these aspects indicates that MSMEs are able to provide products that are considered appropriate to customer needs. Consistency in product quality is particularly important because customers who repeatedly receive products that meet their expectations are more likely to develop confidence in the business.

Service quality is reflected through reliability, responsiveness, assurance, empathy, and tangible aspects of service. Positive customer perceptions of these dimensions indicate that MSMEs are able to provide services that support a satisfactory purchasing experience. Direct interactions between MSME owners or employees and customers can strengthen this perception because customers may feel more personally attended to and valued.

Customer satisfaction reflects the extent to which customers perceive that their expectations have been fulfilled after purchasing or using the products and services. Positive perceptions of satisfaction indicate that customers generally consider their experiences with MSMEs to be satisfactory. Such satisfaction provides an important basis for the formation of customer loyalty, particularly through repeat purchasing and recommendations to others.

Customer loyalty is reflected in customers' willingness to repurchase, maintain their relationship with the business, recommend the business to others, and resist switching to competitors. Positive perceptions of loyalty indicate that MSMEs in Tambaksari District have the potential to maintain long-term customer relationships. However, maintaining this loyalty requires consistent product and service quality because customer expectations may change over time.

Measurement Model Assessment

The measurement model was evaluated through convergent validity, discriminant validity, and reliability testing. The assessment was conducted using outer loading, Average Variance Extracted (AVE), Heterotrait-Monotrait Ratio (HTMT), Fornell-Larcker Criterion, cross loading, and reliability indicators. The results demonstrate that the measurement instruments meet the required criteria and can therefore be used for structural model analysis.

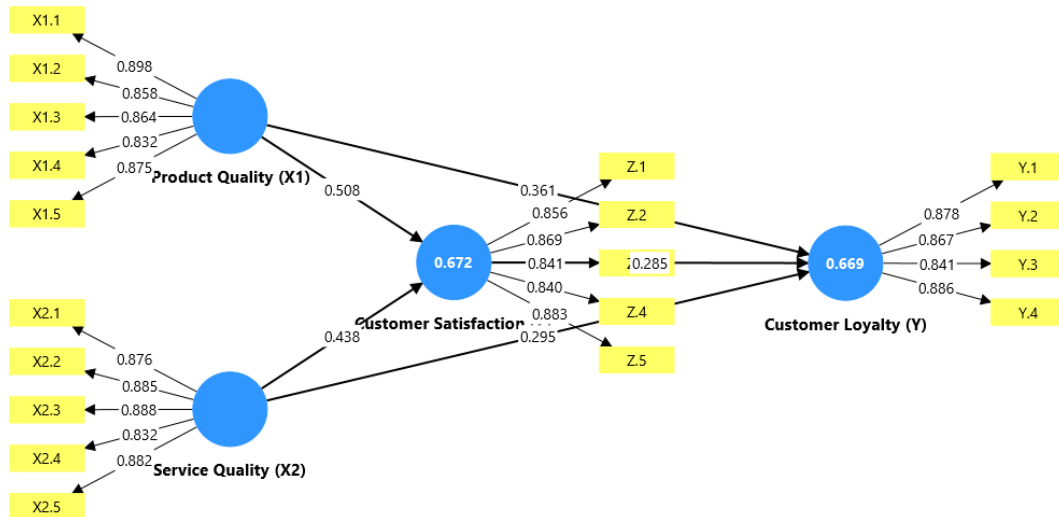


Figure 1. Outer Model

1. Convergent Validity

Table 2. Convergent Validity Outer Loading

	Customer Satisfaction (Z)	Service Quality (X2)	Product Quality (X1)	Customer Loyalty (Y)
X1.1			0.898	
X1.2			0.858	
X1.3			0.864	
X1.4			0.832	
X1.5			0.875	
X2.1		0.876		
X2.2		0.885		
X2.3		0.888		
X2.4		0.832		
X2.5		0.882		
Y.1				0.878
Y.2				0.867
Y.3				0.841
Y.4				0.886
Z.1	0.856			
Z.2	0.869			
Z.3	0.841			
Z.4	0.840			
Z.5	0.883			

The outer loading results demonstrate that all indicators have loading values above 0.70. The product quality indicators range from 0.832 to 0.898, while the service quality indicators range from 0.832 to 0.888. The customer loyalty indicators range from 0.841 to 0.886, and the customer satisfaction indicators range from 0.840 to 0.883. These values indicate that each indicator has a strong contribution to its respective latent construct.

Table 3. Convergent Validity AVE

	Average Variance Extracted (AVE)
Customer Loyalty (Y)	0.754
Customer Satisfaction (Z)	0.736
Product Quality (X1)	0.750
Service Quality (X2)	0.762

The AVE results further support convergent validity. Customer loyalty has an AVE of 0.754, customer satisfaction 0.736, product quality 0.750, and service quality 0.762. All values exceed the minimum criterion of 0.50, indicating that each construct explains more than half of the variance of its indicators. Therefore, the constructs demonstrate adequate convergent validity.

2. Discriminant Validity

Table 4. Discriminant Validity HTMT

	Customer Loyalty (Y)	Customer Satisfaction (Z)	Product Quality (X1)	Service Quality (X2)
Customer Loyalty (Y)				
Customer Satisfaction (Z)	0.831			
Product Quality (X1)	0.788	0.793		
Service Quality (X2)	0.737	0.751	0.537	

Discriminant validity was assessed using HTMT, Fornell-Larcker Criterion, and cross loading. The HTMT values range from 0.537 to 0.831 and remain below the 0.90 threshold. This indicates that the constructs are sufficiently distinct from one another.

Table 5. Discriminant Validity Fornel Larcker Criterion

	Customer Loyalty (Y)	Customer Satisfaction (Z)	Product Quality (X1)	Service Quality (X2)
Customer Loyalty (Y)	0.868			
Customer Satisfaction (Z)	0.750	0.858		
Product Quality (X1)	0.714	0.726	0.866	
Service Quality (X2)	0.671	0.691	0.496	0.873

The Fornell-Larcker results also demonstrate that the square root of AVE for each construct is higher than its correlations with the other constructs.

The values are 0.868 for customer loyalty, 0.858 for customer satisfaction, 0.866 for product quality, and 0.873 for service quality. This confirms that each construct shares greater variance with its own indicators than with other constructs.

Table 6. Discriminant Validity Cross Loading

	Customer Loyalty (Y)	Customer Satisfaction (Z)	Product Quality (X1)	Service Quality (X2)
X1.1	0.619	0.652	0.898	0.446
X1.2	0.571	0.617	0.858	0.394
X1.3	0.648	0.641	0.864	0.488
X1.4	0.640	0.608	0.832	0.418
X1.5	0.609	0.622	0.875	0.398
X2.1	0.569	0.604	0.505	0.876
X2.2	0.574	0.591	0.403	0.885
X2.3	0.627	0.643	0.442	0.888
X2.4	0.518	0.529	0.365	0.832
X2.5	0.628	0.638	0.446	0.882
Y.1	0.878	0.682	0.661	0.589
Y.2	0.867	0.646	0.588	0.613
Y.3	0.841	0.615	0.580	0.578
Y.4	0.886	0.660	0.647	0.549
Z.1	0.636	0.856	0.605	0.599
Z.2	0.662	0.869	0.646	0.557
Z.3	0.592	0.841	0.556	0.585
Z.4	0.669	0.840	0.662	0.632
Z.5	0.665	0.883	0.637	0.589

The cross loading results provide further support. Each indicator has its highest loading on the construct it is intended to measure. For example, X1.1 has a loading of 0.898 on product quality, X2.3 has a loading of 0.888 on service quality, Y.4 has a loading of 0.886 on customer loyalty, and Z.5 has a loading of 0.883 on customer satisfaction. Thus, the indicators demonstrate adequate discriminant validity.

3. Reliability

Table 7. Reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Customer Loyalty (Y)	0.891	0.892	0.924
Customer Satisfaction (Z)	0.910	0.911	0.933
Product Quality (X1)	0.916	0.917	0.937
Service Quality (X2)	0.922	0.925	0.941

The reliability assessment indicates strong internal consistency across all constructs. Cronbach's alpha values range from 0.891 to 0.922, while composite reliability rho_a values range from 0.892 to 0.925 and composite reliability rho_c values range from 0.924 to 0.941. All values exceed the minimum criterion of 0.70.

These results demonstrate that the indicators consistently measure their respective constructs. Consequently, product quality, service quality, customer satisfaction, and customer loyalty can be considered reliable constructs for subsequent structural model analysis.

Structural Model Assessment

The structural model was assessed using R-square, f-square, Q²predict, SRMR, path coefficients, and specific indirect effects. These analyses were conducted to determine the explanatory power, predictive relevance, model fit, direct effects, and mediation effects within the proposed research model.

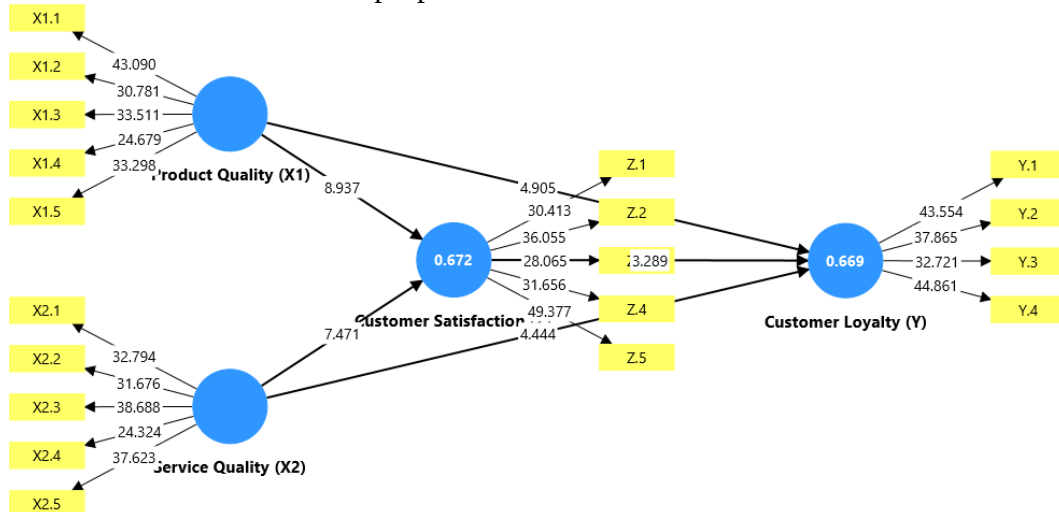


Figure 2. Inner Model

1. Coefficient of Determination (R²)

Table 8. R Square

	R-square	R-square adjusted
Customer Satisfaction (Z)	0.669	0.662
Customer Loyalty (Y)	0.673	0.667

The R-square value for customer satisfaction is 0.669, with an adjusted R-square of 0.662. This indicates that 66.9% of the variation in customer satisfaction can be explained by product quality and service quality, while the remaining 33.1% is explained by factors outside the model.

Customer loyalty has an R-square value of 0.673 and an adjusted R-square of 0.667. This means that 67.3% of the variation in customer loyalty can be explained by product quality, service quality, and customer satisfaction, while 32.7% is explained by other factors outside the research model.

These results indicate that the proposed model has substantial explanatory capability in explaining both endogenous constructs. The relatively high R-

square values also indicate that product quality and service quality are important factors in explaining customer satisfaction, while product quality, service quality, and customer satisfaction collectively provide meaningful explanatory power for customer loyalty.

2. Effect Size (f^2)

Table 9. F Square

	Customer Loyalty (Y)	Customer Satisfaction (Z)	Product Quality (X1)	Service Quality (X2)
Customer Loyalty (Y)				
Customer Satisfaction (Z)	0.080			
Product Quality (X1)	0.186	0.593		
Service Quality (X2)	0.137	0.441		

The effect size analysis shows that product quality has a large effect on customer satisfaction, with an f-square value of 0.593. Service quality also has a large effect on customer satisfaction, with an f-square value of 0.441. For customer loyalty, product quality has an f-square value of 0.186, indicating a medium effect. Service quality has an f-square value of 0.137, indicating a small-to-moderate effect, while customer satisfaction has an f-square value of 0.080, indicating a small effect.

These findings indicate that product quality has the strongest contribution to explaining customer satisfaction among the predictors examined. The relatively large effect of product quality suggests that customers' evaluation of the products themselves is an important determinant of their satisfaction with MSMEs in Tambaksari District.

3. Predictive Relevance (Q^2_{predict})

Table 10. Q Square

	Q^2_{predict}	RMSE	MAE
Customer Satisfaction (Z)	0.658	0.593	0.429
Customer Loyalty (Y)	0.641	0.608	0.461

The Q^2_{predict} value for customer satisfaction is 0.658, while the value for customer loyalty is 0.641. Both values are greater than zero, indicating that the model demonstrates predictive relevance for the endogenous constructs. The results suggest that the model has the ability to generate predictions that are relevant to customer satisfaction and customer loyalty. The RMSE values of 0.593 for customer satisfaction and 0.608 for customer loyalty, together with MAE values of 0.429 and 0.461, respectively, provide additional information regarding prediction errors. Overall, the results indicate that the structural model possesses adequate predictive relevance.

4. Model Fit

Table 11. Model Fit

	Saturated model	Estimated model
SRMR	0.048	0.048

The SRMR value for both the saturated model and estimated model is 0.048. This value is below the commonly used threshold of 0.08, indicating that the discrepancy between the observed and model-implied correlations is relatively low.

The SRMR result therefore supports the adequacy of the proposed structural model. The model can be considered to have an acceptable level of fit and is appropriate for evaluating the proposed hypotheses.

Hypothesis Testing

The hypothesis testing results demonstrate that all direct relationships proposed in the research model are positive and statistically significant.

1. The effect of product quality on customer satisfaction has a path coefficient of **0.508**, with a t-statistic of **8.937** and a p-value of **0.000**. The result indicates that higher product quality is associated with higher customer satisfaction. Therefore, **H1 is supported**.
2. The effect of service quality on customer satisfaction has a path coefficient of **0.438**, with a t-statistic of **7.471** and a p-value of **0.000**. This demonstrates that better service quality contributes significantly to customer satisfaction. Therefore, **H2 is supported**.
3. Product quality also has a positive and significant effect on customer loyalty, with a path coefficient of **0.361**, a t-statistic of **4.905**, and a p-value of **0.000**. Thus, customers who perceive higher product quality tend to demonstrate stronger loyalty toward MSMEs. Therefore, **H3 is supported**.
4. Service quality has a positive and significant effect on customer loyalty, with a path coefficient of **0.295**, a t-statistic of **4.444**, and a p-value of **0.000**. The result indicates that positive service experiences contribute to the development of customer loyalty. Therefore, **H4 is supported**.
5. Customer satisfaction has a positive and significant effect on customer loyalty, with a path coefficient of **0.285**, a t-statistic of **3.289**, and a p-value of **0.001**. This indicates that higher levels of customer satisfaction are associated with stronger customer loyalty. Therefore, **H5 is supported**.
6. The specific indirect effect analysis shows that product quality has a positive and significant indirect effect on customer loyalty through customer satisfaction. The indirect path coefficient is **0.145**, with a t-statistic of **2.857** and a p-value of **0.004**. Therefore, **H6 is supported**, indicating that customer satisfaction mediates the relationship between product quality and customer loyalty.
7. Service quality also has a positive and significant indirect effect on customer loyalty through customer satisfaction. The indirect coefficient is **0.125**, with a t-statistic of **3.065** and a p-value of **0.002**. Therefore, **H7 is supported**,

demonstrating that customer satisfaction mediates the relationship between service quality and customer loyalty.

Discussion

1. Product Quality and Customer Satisfaction

The findings demonstrate that product quality has a positive and significant effect on customer satisfaction. The path coefficient of 0.508 represents the strongest direct relationship in the model, indicating that product quality is an important determinant of customer satisfaction among MSMEs in Tambaksari District.

This finding suggests that customers tend to experience higher satisfaction when the products they receive perform well, are reliable, durable, conform to their expectations, and have an attractive appearance. In the MSME context, product quality is particularly important because customers directly evaluate the products they purchase. Consistent quality can create positive experiences and strengthen customers' confidence in the business.

The finding is consistent with previous studies that demonstrate a positive relationship between product quality and customer satisfaction. The result also supports the theoretical perspective that customer satisfaction develops when the performance of a product meets or exceeds customer expectations. The relatively large f-square value of 0.593 further indicates the substantial contribution of product quality to customer satisfaction.

2. Service Quality and Customer Satisfaction

Service quality has a positive and significant effect on customer satisfaction, with a path coefficient of 0.438. This indicates that customers who receive reliable, responsive, reassuring, empathetic, and satisfactory services tend to report higher levels of satisfaction.

The result highlights the importance of interpersonal interaction within MSMEs. Customers may value not only the products they purchase but also how they are treated during the transaction. Friendly communication, responsiveness, and attention to customer needs can create positive experiences that contribute to satisfaction.

The finding is consistent with the SERVQUAL perspective, which emphasizes the importance of reliability, responsiveness, assurance, empathy, and tangible aspects in evaluating service quality. The f-square value of 0.441 also indicates a large effect of service quality on customer satisfaction, demonstrating that service-related factors represent an important component of the overall customer experience.

3. Product Quality and Customer Loyalty

Product quality has a positive and significant effect on customer loyalty, with a path coefficient of 0.361. This result indicates that customers who perceive higher product quality tend to have stronger intentions to repurchase, recommend the business, and maintain their relationship with the MSME.

Consistent product quality can create trust because customers develop confidence that the business will continue to provide products that meet their expectations. This confidence can reduce customers' willingness to switch to competitors. The f-square value of 0.186 indicates a medium effect,

demonstrating that product quality makes a meaningful contribution to customer loyalty.

The finding reinforces the importance of maintaining product consistency as part of MSME customer retention strategies. Product quality should therefore not be considered only as a means of generating initial customer satisfaction but also as an important factor in maintaining long-term customer relationships.

4. Service Quality and Customer Loyalty

Service quality has a positive and significant effect on customer loyalty, with a path coefficient of 0.295. This result indicates that positive service experiences can encourage customers to maintain their relationship with MSMEs.

The direct interaction characteristic of MSMEs provides an opportunity for business owners to establish closer relationships with customers. Customers who receive friendly, responsive, and attentive services may feel valued and more comfortable returning to the same business. Service quality can therefore function as a differentiating factor, particularly when competing businesses offer similar products.

Although the effect size of service quality on customer loyalty is smaller than the effect of product quality, its significant path coefficient demonstrates that service quality remains an important determinant of loyalty. MSMEs should consequently maintain both product and service quality rather than focusing exclusively on the physical quality of their products.

5. Customer Satisfaction and Customer Loyalty

Customer satisfaction has a positive and significant effect on customer loyalty, with a path coefficient of 0.285. This finding indicates that satisfied customers tend to develop stronger loyalty toward MSMEs.

Satisfaction represents customers' overall evaluation after experiencing the products and services provided by the business. When customers perceive that their expectations have been fulfilled, they are more likely to repurchase, recommend the business, and continue their relationship with it. Satisfaction therefore represents an important psychological foundation for loyalty formation.

Although the f-square value of customer satisfaction on loyalty is 0.080, categorized as a small effect, its statistically significant relationship demonstrates that satisfaction remains relevant in explaining customer loyalty. This finding suggests that customer satisfaction works together with product quality and service quality in establishing longer-term customer relationships.

6. Product Quality, Customer Satisfaction, and Customer Loyalty

The indirect effect analysis demonstrates that product quality significantly influences customer loyalty through customer satisfaction. The indirect coefficient of 0.145 indicates that part of the influence of product quality on loyalty occurs through customers' satisfaction with the products they receive.

The mechanism can be understood through the sequence in which customers evaluate product quality, develop satisfaction based on that evaluation, and

subsequently demonstrate loyal behavior. High-quality products can fulfill customer expectations and create positive experiences. These positive experiences increase satisfaction, which then encourages customers to continue purchasing and maintaining their relationship with the business.

The direct effect of product quality on customer loyalty is also significant, while the indirect effect through satisfaction is significant. This pattern indicates that customer satisfaction functions as a **partial mediator** in the relationship between product quality and customer loyalty. Product quality therefore contributes to loyalty both directly and through the satisfaction generated by the customer's product experience.

7. Service Quality, Customer Satisfaction, and Customer Loyalty

Service quality also demonstrates a positive and significant indirect effect on customer loyalty through customer satisfaction. The indirect coefficient of 0.125 indicates that service quality contributes to loyalty partly by creating customer satisfaction.

The result suggests that customers who receive fast, friendly, responsive, and reliable services are more likely to experience satisfaction. This satisfaction subsequently increases their tendency to repurchase and recommend the business. In MSMEs, where customer and business-owner interactions are often personal, the quality of these interactions can become an important foundation for maintaining customer relationships.

Because the direct effect of service quality on customer loyalty is also significant, while its indirect effect through customer satisfaction is significant, customer satisfaction can be interpreted as a **partial mediator** of this relationship. Service quality therefore influences loyalty through two pathways: directly through the customer's service experience and indirectly through the satisfaction generated by that experience.

Summary of Hypothesis Testing

Table 12. Hypothesis Testing

Hypothesis	Relationship	Path Coefficient	T-statistic	P-value	Result
H1	Product Quality → Customer Satisfaction	0.508	8.937	0.000	Supported
H2	Service Quality → Customer Satisfaction	0.438	7.471	0.000	Supported
H3	Product Quality → Customer Loyalty	0.361	4.905	0.000	Supported
H4	Service Quality → Customer Loyalty	0.295	4.444	0.000	Supported
H5	Customer Satisfaction → Customer Loyalty	0.285	3.289	0.001	Supported
H6	Product Quality → Customer Satisfaction → Customer Loyalty	0.145	2.857	0.004	Supported
H7	Service Quality → Customer Satisfaction → Customer Loyalty	0.125	3.065	0.002	Supported

Conclusion

This study concludes that product quality and service quality play important roles in strengthening customer loyalty among MSMEs in Tambaksari District, Surabaya. The findings demonstrate that both product quality and service quality have positive and significant effects on customer satisfaction, indicating that customers tend to experience higher satisfaction when MSMEs are able to provide products that meet their expectations and services that are reliable, responsive, and customer-oriented.

The results also confirm that product quality and service quality have positive and significant direct effects on customer loyalty. This indicates that customers are more likely to repurchase, maintain their relationship with the business, and recommend the products or services to others when they perceive consistent product quality and satisfactory service. In addition, customer satisfaction has a positive and significant effect on customer loyalty, demonstrating that satisfaction represents an important factor in maintaining long-term customer relationships.

Furthermore, customer satisfaction significantly mediates the relationships between product quality and customer loyalty as well as between service quality and customer loyalty. These findings indicate that the influence of product quality and service quality on loyalty occurs through two mechanisms: directly and indirectly by first creating customer satisfaction. Therefore, improving product and service quality is not only important for generating immediate positive customer responses but also for creating satisfaction that subsequently strengthens customer loyalty.

Overall, the findings provide empirical evidence that customer loyalty among MSMEs is shaped by an integrated relationship between product quality, service quality, and customer satisfaction. For MSMEs in Tambaksari District, maintaining consistent product quality, improving service performance, and ensuring customer satisfaction are therefore essential strategies for building sustainable customer loyalty in an increasingly competitive business environment.

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