SERVICE QUALITY, PRODUCT QUALITY, CUSTOMER SATISFACTION AND BRAND LOYALTY IN E-COMMERCE: INTERPLAY AND MEDIATION ANALYSIS

KUALITAS LAYANAN, KUALITAS PRODUK, KEPUASAN PELANGGAN DAN LOYALITAS MEREK DALAM E-COMMERCE: ANALISIS INTERAKSI DAN MEDIASI

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ABSTRACT
This study examines the relationships between product quality, service quality, customer satisfaction, and brand loyalty within the context of e-commerce, with a specific focus on Shopee, a leading e-commerce platform in Southeast Asia. Using a cross-sectional survey design, the research examines the impact of two exogenous variables—product quality and service quality—on customer satisfaction, as well as the mediating role of customer satisfaction in influencing brand loyalty. The research was conducted with 220 respondents and analyzed through Structural Equation Modeling (SEM) using SmartPLS. The findings reveal that both product quality and service quality significantly influence customer satisfaction. However, service quality alone does not have a direct effect on brand loyalty. Importantly, customer satisfaction plays a critical mediating role, especially between service quality and brand loyalty. These results highlight the importance of enhancing customer satisfaction to foster brand loyalty, offering valuable insights for businesses seeking to improve their service offerings and strengthen customer loyalty. The study suggests that companies should prioritize customer satisfaction as a key mediator in their service and quality strategies.
Keywords: *Consumer Satisfaction, Brand Loyalty, Service Quality, Product Quality, E-Commerce.*

ABSTRAK
Penelitian ini menguji hubungan antara kualitas produk, kualitas layanan, kepuasan pelanggan, dan loyalitas merek dalam konteks e-commerce, dengan fokus khusus pada Shopee, platform e-commerce terkemuka di Asia Tenggara. Dengan menggunakan desain survei cross-sectional, penelitian ini menguji dampak dari dua variabel eksogen - kualitas produk dan kualitas layanan - terhadap kepuasan pelanggan, serta peran mediasi kepuasan pelanggan dalam mempengaruhi loyalitas merek. Penelitian ini dilakukan dengan 220 responden dan dianalisis melalui Structural Equation Modeling (SEM) dengan menggunakan SmartPLS. Temuannya mengungkapkan bahwa kualitas produk dan kualitas layanan secara signifikan mempengaruhi kepuasan pelanggan. Namun, kualitas layanan saja tidak memiliki pengaruh langsung terhadap loyalitas merek. Yang penting, kepuasan pelanggan memainkan peran mediasi yang penting, terutama antara kualitas layanan dan loyalitas merek. Hasil ini menyoroti pentingnya meningkatkan kepuasan pelanggan untuk menumbuhkan loyalitas merek, menawarkan wawasan berharga bagi bisnis yang ingin meningkatkan penawaran layanan mereka dan memperkuat loyalitas pelanggan. Studi ini menyarankan agar perusahaan memprioritaskan kepuasan pelanggan sebagai mediator utama dalam strategi layanan dan kualitas mereka.
Kata kunci: Kepuasan Konsumen, Loyalitas Merek, Kualitas Layanan, Kualitas Produk, E-Commerce.

INTRODUCTION

E-commerce has rapidly evolved into one of the dominant business models in the global marketplace, with a growing emphasis on understanding the critical factors that influence customer loyalty (Pasaribu et al., 2022; Akıl & Ungan, 2022). Among these factors, service quality, product quality, customer satisfaction, and brand loyalty are consistently identified as central to sustaining a competitive advantage (Mandagi et al., 2024; Walean et al., 2024; Inaray et al., 2024). In today's highly competitive and dynamic digital marketplace, customer loyalty is increasingly recognized as a key driver of long-term business success. Thus,

comprehending the underlying factors that impact customer satisfaction and brand loyalty is essential for e-commerce businesses seeking to maintain a competitive edge. This research delves into how product quality and service quality contribute to customer satisfaction, and how satisfaction, in turn, influences brand loyalty. By exploring these interrelationships, the study also emphasizes the mediating role of customer satisfaction in linking service quality, product quality, and brand loyalty, providing valuable insights for businesses aiming to enhance customer retention and foster long-term brand loyalty.

Recent studies emphasize the crucial role of service quality in driving customer satisfaction, trust, and loyalty in e-commerce. Pasaribu et al. (2022) highlight that high-quality service, marked by reliability, responsiveness, and empathy, directly influences satisfaction and loyalty. Kassim and Abdullah (2010) further show that various service quality dimensions, like tangibles and responsiveness, impact customer satisfaction across different cultural contexts. Product quality also plays a key role, with Tzavlopoulos et al. (2019) noting that higher product quality leads to greater satisfaction and reduced perceived risk, fostering loyalty. Additionally, customer satisfaction mediates the relationship between service/product quality and brand loyalty, as highlighted by Akıl and Ungan (2022), who stress that satisfaction from both service and product quality strengthens brand loyalty. These findings suggest that e-commerce businesses must ensure high standards in both service and product quality, with customer satisfaction acting as the key link to enhanced loyalty, offering actionable insights for improving e-commerce strategies

Despite the growing body of research in areas such as product and service quality, customer satisfaction, and brand loyalty, there remains a gap in understanding how these variables specifically interact within the e-commerce industry, particularly in the context of Southeast Asia. While previous studies (Utami, 2024; Susanto et al., 2022; Setyorini et al., 2023; Lebo & Mandagi, 2023) have explored the effects of product and service quality on brand loyalty mediated by customer satisfaction in other sectors, little attention has been paid to e-commerce platforms such as Shopee. This gap is particularly pressing given the rapid growth and increasing competition in the region's e-commerce market, which calls for a deeper understanding of the factors that drive customer loyalty in this space.

The purpose of this research is to fill the gap in the literature by developing a structural model that explores the influence of product quality, service quality, and customer satisfaction on brand loyalty in the e-commerce industry. The urgency of this research stems from the need for e-commerce businesses to better understand the variables that shape customer experiences and contribute to long-term brand loyalty. As customer expectations continue to evolve, e-commerce platforms like Shopee must continually adapt their strategies to improve customer satisfaction and maintain loyalty. The novelty of this research lies in its specific focus on e-commerce and its examination of customer satisfaction as a mediator between product quality, service quality, and brand loyalty. This approach provides a more nuanced understanding of how these factors interact, offering valuable insights for businesses aiming to enhance their customer retention strategies. By analyzing Shopee, the study contributes

to the growing body of knowledge on customer loyalty in digital marketplaces, offering practical implications for e-commerce businesses seeking to build stronger customer relationships.

LITERATURE REVIEW
Brand Loyalty

Brand loyalty is defined as the attitude and commitment consumers demonstrate toward a particular brand, which is built upon customer satisfaction and leads to repeat purchases and continued brand preference (Kotler & Keller, 2009). It represents the commitment consumers show to a brand or company, observable through their attitudes or behaviors (Mandagi et al., 2024) after purchasing and using the brand's products. Nurbaiti et al. (2021) highlight that brand loyalty is vital for businesses, as it helps companies remain competitive and boosts financial performance. It also reflects consumers' preference for purchasing a specific brand within a product category, especially when they perceive that the brand offers the right product features, image, or quality at the right price (Kotler & Keller, 2009). Therefore, brand loyalty is closely associated with consumer attachment and preference for a brand, making it a critical element in brand management.

Brand loyalty is not only a result of satisfaction with product quality but also stems from the trust and emotional connection customers develop with the brand (Diputra & Yasa, 2021) further explain that. Consistent delivery of high-quality products strengthens the brand image and fosters trust, both of which are essential for nurturing long-term brand loyalty (Mandagi & Aseng, 2021). When customers perceive a brand as reliable and capable of delivering on its promises, they form emotional attachments, which deepen brand loyalty. This emotional bond is critical for businesses looking to maintain a loyal customer base in a competitive marketplace.

Service Quality

Service quality is a critical factor that shapes consumer perceptions and emotions, influencing satisfaction, loyalty, and the overall success of organizations. Defined as the consumer's perception of the service experience, service quality results from a comparison between expectations and perceptions. The smaller the gap between customer expectations and actual service experience, the higher the level of satisfaction (Elizar et al., 2020). Moreover, service quality plays a vital role in fostering customer loyalty, as positive service experiences lead to behavioral changes and increased commitment toward the company (Utami, 2024).

Across various industries, service quality has emerged as a cornerstone for meeting customer needs and desires while ensuring convenience and appropriateness. In multi-level marketing (MLM) companies, high service quality builds trust and strengthens customer loyalty. Lebo and Mandagi (2023) emphasize that integrating service quality with brand gestalt helps create a cohesive brand image, ultimately enhancing customer satisfaction and fostering long-term relationships. Similarly, in postgraduate education, Kelejan et al. (2023) highlight how service quality factors such as responsive faculty, timely support, and adequate infrastructure significantly impact student satisfaction and loyalty, reinforcing the institution's reputation.

In the tourism industry, service quality is instrumental in shaping destination brand and influencing tourist attitudes and loyalty. Tumober et al.

(2023) argue that destinations offering high-quality services create memorable experiences, enhancing satisfaction and promoting repeat visits. Similarly, in healthcare, particularly faith-based hospitals, service quality encompasses not only technical care but also emotional and spiritual support. Inaray et al. (2023) demonstrate that superior service quality leads to higher patient satisfaction and stronger recommendations, aligning with the holistic care mission of such organizations.

Ultimately, service quality is built upon the long-term performance of service providers and is measured by customers themselves (Yani & Sugiyanto, 2022). It involves fulfilling customer needs and desires while ensuring that products or services meet expectations, thereby influencing customer perceptions and loyalty. High service quality not only ensures the success of a brand or company but also creates meaningful impacts on customers, solidifying its importance across all sectors. This leads to the formulation of the following hypothesis:
H1: Service quality has a significant and positive effect on customer satisfaction.
H3: Service quality has a significant and positive effect on customer loyalty.

Product Quality

Product quality refers to the ability of a product to perform its intended function, thereby meeting the needs and desires of consumers. It is a critical component for businesses aiming to improve their competitiveness. Products must satisfy customer needs and offer quality that is on par with or exceeds the quality of competing products (Anwar & Wardani, 2021). Naini et al. (2022) emphasize two key aspects of product quality: consistency in product development and ensuring that the

product's quality supports the intended market positioning. Additionally, product quality involves the product's ability to deliver the promised functions. As such, product quality plays a central role in influencing customer perceptions, satisfaction, and loyalty, which ultimately drive business success.

Alzoubi and Ahmed (2022) underscore the importance of specific product quality dimensions, such as reliability, performance, and conformance, in improving customer satisfaction. The study highlights that businesses focusing on high product quality can gain a competitive edge by consistently meeting or exceeding customer expectations, leading to higher customer satisfaction. This directly impacts customer loyalty, as customers are more likely to return to brands that deliver high-quality products consistently.

Moreover, the interplay between product quality and service quality is crucial in shaping overall customer satisfaction. Mahsyar and Surapati (2020) argue that both product and service quality are important contributors to customer satisfaction, although their influence may vary depending on the industry. Product quality affects tangible attributes like performance, design, and durability, while service quality influences intangible factors such as responsiveness, reliability, and customer support. When both elements align with customer expectations, they create a positive experience that enhances satisfaction and fosters loyalty.

The relationship between product quality, brand image, and customer loyalty is further emphasized by Diputra and Yasa (2021), who demonstrate how these factors collectively influence customer satisfaction. High product quality not only impacts satisfaction but

also shapes the brand image and trust, which are essential for building long-term loyalty. Customers who perceive a brand as consistently offering high-quality products are more likely to develop strong emotional connections and remain loyal to that brand. This reinforces the idea that product quality is not only a driver of immediate satisfaction but also a key factor in cultivating long-term customer relationships. Based on this theoretical and empirical backdrop, the following hypothesis were introduced:

H2: Product quality has a significant and positive effect on customer satisfaction.

H4: Product quality has a significant and positive effect on customer loyalty.

Customer Satisfaction

Customer satisfaction is a cornerstone of sustainable business success, playing a pivotal role in shaping customer behavior and business performance. Research highlights the multifaceted importance of satisfaction and its interaction with various factors, such as brand, service quality, and social media marketing, across diverse contexts (e.g., Abin et al., 2022; Rantung et al., 2023; Inaray et al., 2024; Tumober et al., 2024; Lebo et al., 2023) . Abin et al. (2023) emphasize that brand image significantly impacts customer satisfaction by influencing customer attitudes and purchase intentions. A positive brand image fosters trust and emotional connection, ultimately leading to greater satisfaction. This is especially crucial for start-up brands, as a strong image not only differentiates them in competitive markets but also enhances their appeal.

Customer satisfaction is inherently tied to customer loyalty, functioning as a feedback mechanism that reflects an individual's perception of either dissatisfaction or pleasure when comparing a product's actual performance or benefits against prior expectations (Mohammed et al., 2022). Azlan and Farid (2020) highlight that satisfaction reflects how well the product experience aligns with the buyer's expectations of value, establishing its role as a precursor to loyalty. The relationship between satisfaction and loyalty has been extensively studied, with findings consistently showing that satisfaction acts as a mediating variable, influencing whether consumers remain loyal to a brand or seek alternatives (Rondonuwu & Mandagi, 2023; Tumober et al., 2023; Walean et al., 2024). Consequently, the following hypothesis was introduced:

H5: Customer satisfaction has a significant and positive effect on customer loyalty.

H6: Customer satisfaction mediates the relationship between service quality and customer loyalty.

H7: Customer satisfaction mediates the relationship between product quality and customer loyalty.

The relationships among the variables in this study, along with their respective indicators and corresponding hypotheses, are summarized in Figure 1.
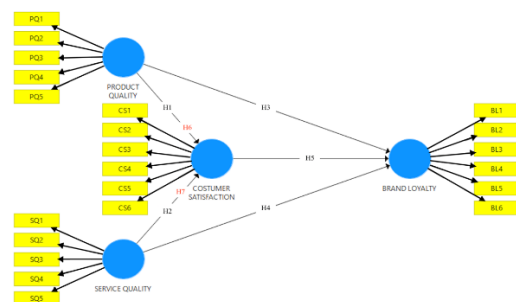

Figure 1. Conceptual Framework

METHODOLOGY
Research Design

In this study, a quantitative research approach was employed, focusing on examining the correlational relationships among the tested variables,

which are described in a descriptive manner. Descriptive research refers to studies that aim to depict or describe phenomena (Supriyanto et al., 2023). Specifically, a cross-sectional design was utilized to comprehensively observe and analyze all variables at a single point in time (Notoatmodjo, 2002). This research involved four latent variables: service quality, product quality, customer satisfaction dan brand loyalty. Data collection was conducted through an online survey using a self-administered questionnaire. The data were analyzed using the structural equation modeling (SEM) approach with the statistical software SmartPLS.

Sample and Sampling Technique

The population studied in this research consists of Shopee application users, both male and female, aged 18 years and older. Following the data analysis methodology employed in this study, which utilizes the structural equation modeling (SEM) approach, the sample size was determined using the N5 formula. This formula multiplies the number of indicators by 5 (Hair, 2018). Applying this formula, the minimum sample size required for the study was calculated to be 130, derived from multiplying 26 (the number of indicators) by 5. The sampling method used was simple random sampling, a type of probability sampling where individuals are randomly selected without considering strata within the target population, giving each member an equal chance of being included in the sample (Sugiyono, 2019).

Data collection was conducted over a two-month period, from November to December 2022, resulting in 220 respondents completing the questionnaire. Of these respondents, 127 were female, accounting for 58% of the total. The largest age group represented

was individuals aged 18 to 25 years, comprising 126 respondents or 57% of the total. In terms of geographical distribution, the majority of respondents, totaling 72 individuals (32% of the sample), resided in Manado City, as shown in Table 1.

Table 1. Respondents' Demographic Profile

Variable	Level	n	%
Gender	Female	127	58
	Male	93	42
Age	18 – 25	126	57
	26 – 35	59	27
	36 – 50	20	9
	>50	15	6
Domicile	Manado	72	32
	Minahasa Utara	42	19
	Tomohon	8	4
	Bitung	7	3
	Minahasa	53	24
	Minahasa Selatan	2	1
	Minahasa Tenggara	1	0,4
	Others	35	16

Data Collection Procedure

The data collection process in this study began with the preparation and development of the research instrument, specifically a questionnaire tailored to the research objectives. Initially, an in-depth literature review was conducted for each variable under investigation to formulate accurate and relevant questions. Once finalized, the indicators for each variable were articulated clearly and precisely in Indonesian. Subsequently, each indicator was transformed into a seven-point Likert scale, where 1 indicated strong disagreement ("strongly disagree") and 7 indicated strong agreement ("strongly agree"). The questionnaire was then distributed electronically to respondents using Google Forms. It was specifically targeted at users of the Shopee online shopping platform or individuals who had previously made purchases using Shopee, with the distribution facilitated through the WhatsApp application. The use of an online questionnaire in this study aimed to streamline the data processing for researchers by eliminating the need for manual

tabulation of completed responses, which would otherwise consume more time and increase the likelihood of data entry errors. After the online questionnaires were completed, the researchers verified that each response met the required completion and eligibility criteria. Only questionnaires that satisfied these criteria were included for further data analysis.

Data Analysis

For the data analysis process in this study, a two-step SEM approach was employed, consisting of the Measurement Model and the Structural Model. This approach was utilized to test the hypotheses and examine the relationships among the observed variables. The decision to use SEM was based on its superior analytical and predictive capabilities compared to other models. Additionally, SEM is recognized as a comprehensive method for explaining research methodologies (Haryono, 2017), as it facilitates in-depth analysis of each variable under investigation.

SEM itself is a multivariate statistical technique that enables simultaneous testing of a series of cause-and-effect relationships among variables, thereby offering statistical efficiency (Hair, 2018). This study used SmartPLS as the preferred tool due to its suitability for research involving relatively small datasets or samples (Sarstedt, 2017). Additionally, SmartPLS facilitates the application of PLS-SEM without requiring extensive mathematical expertise (Ringle, 2015), making it an integrated and user-friendly option.

During the data measurement process using SmartPLS, it was found that certain indicators, specifically CS2 and BL3, did not meet the required criteria and had to be excluded. These

indicators were identified as having the lowest outer loadings for the variables *Customer Satisfaction* and *Brand Loyalty*. After excluding these indicators, a second algorithm test was conducted, and the results were found to meet the necessary criteria.

RESULTS
Measurement Model Evaluation
Convergent Validity

Convergent validity refers to the extent to which an indicator accurately measures a construct that is expected to be similar or related to another construct (Campbell, 1959). According to Haryono (2017), a loading factor value of ≥ 0.7 is considered ideal, indicating that the indicator is valid in measuring the construct. However, a loading factor value greater than 0.5 is still deemed acceptable. As shown in Table 2, the AVE value is greater than 0.5, and the loading factor for each indicator is ≥ 0.7. Therefore, convergent validity is considered to be achieved.

Table 2. Convergent Validity

Variable	Indicator	Factor Loading	AVE
Brand loyalty	BL1	0,894	0,869
	BL2	0,952	
	BL4	0,947	
	BL5	0,921	
	BL6	0,946	
Customer satisfaction	CS1	0,882	0,864
	CS3	0,938	
	CS4	0,943	
	CS5	0,936	
	CS6	0,948	
Product quality	PQ1	0,937	0,888
	PQ2	0,907	
	PQ3	0,957	
	PQ4	0,960	
	PQ5	0,948	
Service quality	SQ1	0,963	0,829
	SQ2	0,968	
	SQ3	0,872	
	SQ4	0,926	

	SQ5	0,813

Discriminate Validity

In this study, the Fornell–Larcker criterion and cross-loading were used to assess discriminant validity. The Fornell–Larcker criterion is validated by comparing the square root of the Average Variance Extracted (AVE) for each variable with the correlations among the variables in the model. Discriminant validity is considered established when the square root of the AVE exceeds the correlations between different variables. The Fornell–Larcker criterion is considered satisfied if the correlation coefficient between an indicator and its construct is greater than the correlation coefficients between that indicator and the constructs in other blocks (below it). Additionally, cross-loading is evaluated by examining the correlation coefficients in the adjacent columns (Hair et al., 2017).

Table 3. Fornell–Larcker criterion

Variables	BL	CS	PQ	SQ
Brand Loyalty	0,932			
Customer Service	0,902	0,930		
Product Quality	0,813	0,679	0,942	
Service Quality	0,814	0,880	0,590	0,910

Notes: BL= *Brand Loyalty*; CS= *Customer Satisfaction*; PQ= *Product Quality*; SQ= *Service Quality*;

Cross-loading is another measure of discriminant validity, which means that each indicator block is expected to have higher loadings on its respective latent variable. According to Hair et al. (2017), a loading factor value greater than 0.7 is considered ideal, indicating that the indicator is valid in measuring the construct it is intended to represent. Based on the results in Table 4, it can be concluded that discriminant validity, as assessed through cross-loading, has been achived.

Table 4. Cross Loading

Indicator	BL	CS	PQ	SQ
BL1	0.894	0.779	0.758	0.696
BL2	0.952	0.848	0.762	0.776
BL4	0.947	0.866	0.773	0.786
BL5	0.921	0.853	0.727	0.765
BL6	0.946	0.856	0.770	0.770
CS1	0.911	0.882	0.815	0.746
CS3	0.790	0.938	0.546	0.872
CS4	0.811	0.943	0.522	0.823
CS5	0.859	0.936	0.711	0.818
CS6	0.820	0.948	0.559	0.830
PQ1	0.764	0.643	0.937	0.588
PQ2	0.712	0.579	0.907	0.500
PQ3	0.769	0.644	0.957	0.542
PQ4	0.791	0.667	0.960	0.575
PQ5	0.790	0.661	0.948	0.572
SQ1	0.786	0.865	0.562	0.963
SQ2	0.786	0.864	0.556	0.968
SQ3	0.760	0.773	0.568	0.872
SQ4	0.774	0.841	0.567	0.926
SQ5	0.573	0.632	0.414	0.813

Notes: BL= *Brand Loyalty*; CS= *Customer Satisfaction*; PQ= *Product Quality*; SQ= *Service Quality*

Reliability Test

Reliability testing is conducted to assess the stability and consistency of the results from the data being tested (Ghozali, 2006). This test examines whether the measurement tool produces consistent results, even when the measurement is repeated. The evaluation of construct reliability is measured using

Cronbach's Alpha and Composite Reliability values. According to Siwoyo (2016), all constructs should have a reliability value of ≥ 0.7. As shown in Table 5, the construct reliability for all variables, based on Cronbach's Alpha and Composite Reliability values, is greater than 0.7. This indicates that the indicators are consistent in measuring their respective constructs.

Table 5. Reliability Test

	Cronbach's Alpha	Composite Reliability
Brand Loyalty	0,962	0,971
Customer Satisfaction	0,961	0,970
Product Quality	0,968	0,975
Service Quality	0,947	0,960

Collinearity

Collinearity refers to a situation where variables in a model are highly correlated, making it difficult to distinguish the individual effects of each variable on the dependent variable. To test for collinearity, the researcher examines the Variance Inflation Factor (VIF) values. According to Haryono (2017), a VIF value greater than 10 indicates the presence of multicollinearity in the study. VIF is used because it measures the extent of multicollinearity in the model, with higher values indicating a significant level of multicollinearity. In this study, as shown in Table 6, the indicators with VIF values less than 10 suggest that there is no multicollinearity among the variables in the research.

Table 6. Collinearity

	Brand Loyalty	Customer Satisfaction
Product Quality	1,535	1,535
Service Quality	1,535	1,535

Structural Model Evaluaataion

Coefficient of Determination (R^2)

The analysis of R^2 and customized R^2 is presented in Table 7. The R^2 value for customer satisfaction is 0.814 (81.4%), indicating that customer satisfaction can be explained by the variables of product quality and service quality to the extent of 81.4%, while the remaining 18.6% is explained by factors outside the scope of this study. For brand loyalty, the R^2 value is 0.833 (83.3%), meaning that brand loyalty can be explained by the variables of product quality, service quality, and other factors included in this study, with the remaining 16.7% being attributed to variables not covered in this research.

Table 7. *Coefficient of Determination*

	R Square	R Square Adjusted
Brand Loyalty	0,833	0,831
Customer Satisfaction	0,814	0,812

Effect size (F^2)

Hair (2018) suggests that an F^2 value of 0.02 indicates a small effect, 0.15 indicates a medium effect, and values greater than 0.35 indicate a large effect (Cohen, 1988). In this study, the F^2 values is shown in table 8 with effects that tend to be large, ranging from 0.2 to 1.8, which significantly exceed the threshold of 0.35. This indicates that the effect of the endogenous variables on the exogenous variables is very strong.

Table 8. *Effect Size (F^2)*

	Brand Loyalty	Customer Satisfaction
Product Quality	1,013	0,210
Service Quality	1,026	1,893

Model Fit Test

The model fit test in this study was evaluated based on the Normed Fit Index (NFI) and RMS Theta. As suggest by Hair et al., (2017), a higher NFI value, closer to 1, indicates better model fit. As shown in Table 9, the NFI value is 0.851,

which suggests a good level of model fit. Additionally, the RMS Theta value is 0.204, which is close to 0, indicating a good model fit. The RMS Theta value is used to assess the correlation of the outer model. The closer the value is to 0, the better the model fit.

Table 9. *Model Fit*

Model Fit	Value
NFI	0.851
rms Theta	0.204

Predictive Relevance (Q²)

A Q² value greater than 0 indicates that the model has predictive relevance. In this study, as shown in the table, the endogenous variables have Q² values greater than 0, suggesting that the predictions made by the model are relevant (Hair et al., 2017). Specifically, the Q² values for Brand Loyalty (Q² = 0.769) and Customer Satisfaction (Q² = 0.699) indicate that the model demonstrates strong predictive relevance for the endogenous variables in the context of this research.

Table 10. Predictive Relevance (Q²)

	SSO	SSE	Q² (=1 – SSE/SSO)
Construct Cross validated Redundancy	1100.000	254.025	0.769
	1100.000	331.530	0.699
Brand Loyalty	1100.000	1100.000	
Customer Satisfaction	1100.000	1100.000	
Product Quality			
Service Quality			

Hypothesis Testing

Hypothesis testing was conducted to evaluate the structural model in this study. A hypothesis is considered accepted if it meets the criteria: a p-value less than 0.05 and a t-value greater than 1.96. Based on these conditions, it can be concluded that there is a significant effect or influence of the exogenous variables on the endogenous variables.

Table 11. Hypothesis Testing

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
CS –> BL	0.561	5.887	0.000
PQ –> BL	0.369	9.693	0.000
PQ –> CS	0.251	6.642	0.000
SQ –> BL	0.103	1.078	0.281
SQ –> CS	0.731	15.888	0.000
PQ –> CS –> BL	0.141	6.003	0.000
PQ –> CS –> BL	0.410	5.385	0.000

Notes: BL= *Brand Loyalty*; CS= *Customer Satisfaction*; PQ= *Product Quality*; SQ= *Service Quality*
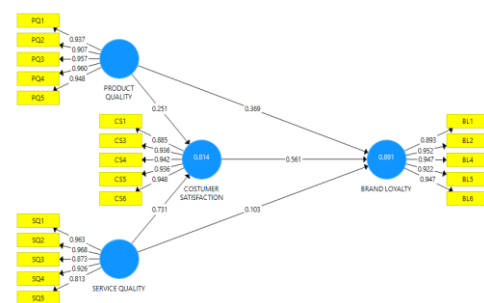

Figure 2. Structural Equation Model Estimation

The results of the hypothesis testing shown in table 11 and figure 2, provide valuable insights into the relationships between product quality, service quality, customer satisfaction, and brand loyalty, and how these factors interact to influence consumer behavior. Brand loyalty, which is the degree of commitment consumers demonstrate towards a particular brand, plays a pivotal role in the long-term success of a business (Sari et al., 2023). As Tjiptono et al. (2012) describe, it is an observable commitment through consumer attitudes or behaviors after purchasing and using the brand's products. For businesses, brand loyalty is essential, as it not only strengthens customer retention but also enhances financial performance (Nurbaiti et al., 2021). The findings in this study confirm that both product quality and customer satisfaction are integral to fostering brand loyalty.

Product quality is critical to ensuring that customers perceive a brand's products as meeting or exceeding their expectations, thereby contributing to their overall satisfaction and loyalty. Hypothesis 2 (H2), which asserts that product quality positively influences customer satisfaction, is supported by the results, with a t-value of 6.642 and a p-value of 0.000. This demonstrates that high-quality products significantly enhance customer satisfaction, reinforcing the view that product quality is a central factor in driving brand loyalty. As emphasized by Naini et al. (2022), product quality's consistency and ability to meet customer expectations are essential in gaining a competitive edge and ensuring long-term customer loyalty. Moreover, the relationship between product quality and customer loyalty (Hypothesis 4) was found to be significant, with a p-value of 0.000 and a t-value of 9.693, further solidifying the importance of maintaining high product standards to cultivate a loyal customer base.

Service quality, similarly, is a critical factor influencing customer satisfaction and brand loyalty. Defined as the consumer's perception of their service experience, it plays an essential role in shaping customer satisfaction and loyalty (Elizar et al., 2020). The results of Hypothesis 1 (H1) show that service quality significantly affects customer satisfaction, with a p-value of 0.000 and a t-value of 15.888. This indicates that customers who perceive high service quality are more likely to experience positive satisfaction, which in turn can lead to stronger brand loyalty. This aligns with research by Lebo and Mandagi (2023), who highlighted the role of service quality in reinforcing customer trust and satisfaction, thereby contributing to long-term loyalty. However, despite its importance in enhancing satisfaction, service quality was not found to have a direct effect on brand loyalty in this study, as seen in the rejection of Hypothesis 4, with a p-value of 0.281 and a t-value of 1.078. This finding aligns with Wijaya (2020), who argued that service quality may not directly foster brand loyalty, suggesting that product quality might be a more influential factor in cultivating customer loyalty.

Customer satisfaction emerged as a critical mediator between product quality, service quality, and brand loyalty. The results of Hypotheses 6 and 7 confirm that customer satisfaction plays a significant mediating role in both the product quality–brand loyalty relationship and the service quality–brand loyalty relationship. Hypothesis 6, which posits that customer satisfaction mediates the effect of product quality on brand loyalty, showed a p-value of 0.000 and a t-value of 6.003, indicating that satisfied customers are more likely to remain loyal to brands offering high-quality products. Similarly, Hypothesis 7, which asserts that customer satisfaction mediates the effect of service quality on brand loyalty, was also supported, with a p-value of 0.000 and a t-value of 5.385. This finding suggests that while service quality alone may not directly affect brand loyalty, it significantly impacts loyalty when mediated by customer satisfaction.

The interplay between product quality, service quality, and customer satisfaction reflects the importance of a holistic approach to customer experience management. As Diputra and Yasa (2021) note, brand loyalty is not merely the result of satisfaction with product quality but also stems from trust and emotional connections formed with the brand. These emotional attachments, built through consistent delivery of high-quality products and services, strengthen

brand loyalty and contribute to long-term customer retention. This aligns with the study's findings, where both product quality and service quality contribute to customer satisfaction, which in turn fosters brand loyalty.

CONCLUSION

This study investigates the relationships between product quality, service quality, customer satisfaction, and brand loyalty. The findings highlight several key insights that contribute to the understanding of how these factors interact to influence consumer behavior and brand performance. The results confirm that both product quality and service quality significantly influence customer satisfaction. High product quality positively impacts customer satisfaction and brand loyalty, emphasizing the critical role that consistent product performance plays in fostering long-term customer relationships. Similarly, service quality significantly affects customer satisfaction but does not directly influence brand loyalty. Instead, customer satisfaction mediates the relationship between service quality and brand loyalty. These findings underscore the importance of customer satisfaction as a critical factor in linking service quality and brand loyalty. Furthermore, the study reveals that brand loyalty is strongly influenced by customer satisfaction, which acts as a mediating variable in the relationship between both product and service quality and brand loyalty.

This study contributes to the body of literature on brand loyalty and customer satisfaction by validating the mediating role of customer satisfaction in the relationship between service quality, product quality, and brand loyalty. The findings align with existing theories that emphasize the importance

of satisfaction in driving loyalty, confirming that a positive customer experience, fueled by high-quality products and services, leads to stronger brand attachment and repeat purchase behaviors. Additionally, the study expands on the work of Tjiptono et al. (2012) and Nurbaiti et al. (2021) by demonstrating that service quality, while important, may not have a direct effect on brand loyalty unless mediated by customer satisfaction. This adds nuance to the understanding of how service quality influences consumer attitudes and behaviors in a competitive market.

From a practical standpoint, businesses should prioritize both product and service quality to enhance customer satisfaction, as this will ultimately lead to stronger brand loyalty. For managers, the study underscores the importance of consistently delivering high-quality products to meet or exceed customer expectations, as this builds trust and emotional connections with the brand. Additionally, investing in service quality, particularly in areas such as customer support, responsiveness, and reliability, is crucial to shaping positive customer experiences. However, since service quality alone may not drive brand loyalty, organizations should focus on integrating high-quality service with strong product offerings to create a comprehensive customer experience. Furthermore, the findings suggest that businesses should consider satisfaction surveys and customer feedback as essential tools to monitor and enhance their product and service quality, as satisfied customers are more likely to remain loyal.

While this study provides valuable insights into the relationships between product quality, service quality, customer satisfaction, and brand loyalty, there are several avenues for future research. First, future studies could

explore the impact of other factors, such as brand image, customer trust, and emotional connection, on customer satisfaction and loyalty in different industries. The role of digital technologies, such as artificial intelligence and personalized marketing, in shaping customer perceptions and loyalty could also be examined. Additionally, the study could be extended to include cross-cultural comparisons to determine whether the relationships between these factors vary across different regions and consumer segments. Finally, future research could investigate the long-term effects of service and product quality improvements on customer loyalty, providing deeper insights into the sustainability of brand loyalty over time.

References

Abin, D. G., Mandagi, D. W., & Pasuhuk, L. S. (2023). Influence of brand image on customer attitude, intention to purchase, and satisfaction: The case of start-up brand. *Enrichment: Journal of Management, 12*(5), 3907-3917.

Adamska, M., & Minárová, M. (2014). Role of learning organization in building consumer confidence. E+M Ekonomie a Management, 17(1). https://doi.org/10.15240/tul/001/2014-1-005

Akıl, S., & Ungan, M. C. (2022). E-commerce logistics service quality: Customer satisfaction and loyalty. *Journal of Electronic Commerce in Organizations, 20*(3), 1-18. https://doi.org/10.4018/JEC.20220701

Alzoubi, H. M., & Ahmed, G. (2022). An empirical investigation into the impact of product quality dimensions on improving the order-winners and customer satisfaction. *Productivity and Quality Journal, 2022*(1), 1-15.

Amine, A. (1998). Consumers' true brand loyalty: the central role of commitment. Journal of Strategic Marketing, 6(4), 305–319. https://doi.org/10.1080/096525498346577

Anwar, R. N., & Wardani, F. A. (2021). Pengaruh kualitas produk dan kualitas pelayanan terhadap minat beli ulang produk Scarlett di e-commerce Shopee. *Nusantara: Jurnal Ilmu Pengetahuan Sosial, 8*(5).

Campbell, D. T. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. Psychological bulletin, 56(2), 81.

Diputra, I., & Yasa, N. N. (2021). The influence of product quality, brand image, and brand trust on customer satisfaction and loyalty. *American International Journal of Business, 5*(2), 200-210.

Elizar, C., Indrawati, R., & Syah, T. Y. R. (2020). Service Quality, Customer Satisfaction, Customer Trust, and Customer Loyalty in Service of Paediatric Polyclinic Over Private H Hospital of East Jakarta, Indonesia. Journal of Multidisciplinary Academic, 4(2).

Ghozali, I. (2006). Aplikasi Analisis Multivariate dengan Program SPSS. Semarang: Badan Penerbit Universitas Diponegoro.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, *1*(2), 107-123.

Hair, J. S. (2018). Advanced Issues in Partial Least Squares Structural

Equation Modeling. Thousand Oaks, California: Sage.

Haryono, S. (2017). Metode SEM Untuk Penelitian Manajemen dengan AMOS LISREL PLS. Jawa Timur: Luxima Metro Media.

Inaray, A. C. P., Soewignyo, F., Sumanti, E. R., & Mandagi, D. W. (2021). Exploring the nexus between service quality, patient satisfaction, and recommendation intentions in faith-based hospital settings. *EKUITAS (Jurnal Ekonomi dan Keuangan), 8*(3), 398-417.

Kassim, N., & Abdullah, N. A. (2010). The effect of perceived service quality dimensions on customer satisfaction, trust, and loyalty in e-commerce settings: A cross-cultural analysis. *Asia Pacific Journal of Marketing and Logistics, 22*(3), 392-417. https://doi.org/10.1108/13555851 011069740

Kelejan, D. F., Walean, R. H., Soewignyo, T. I., & Mandagi, D. W. (2022). An exploratory analysis of determining factors influencing student satisfaction with postgraduate program services. *QALAMUNA: Jurnal Pendidikan, Sosial, Dan Agama, 14*(1), 369-384.

Kotler, P., & Keller, K. L. (2009). Marketing Management (13th Edition (Manajemen Pemasaran (Edisi ke 13) (13th ed.).

Lebo, T. C., & Mandagi, D. W. (2023). Integrating service quality, customer satisfaction, and brand gestalt in the context of multi-level marketing (MLM) companies. *Jurnal Mantik*, *7*(1), 100-111.

Mahsyar, S., & Surapati, U. (2020). Effect of service quality and product quality on customer

satisfaction and loyalty. *International Journal of Economics, 8*(2), 115-130.

Mandagi, D. W., Rampen, D. C., Soewignyo, T. I., & Walean, R. H. (2022). Empirical nexus of hospital brand gestalt, patient satisfaction, and revisit intention. *International Journal of Pharmaceutical and Healthcare Marketing, 18*(2), 215-236.

Mandagi, D. W., Soewignyo, T., Kelejan, D. F., & Walone, D. C. (2024). From a hidden gem to a tourist spot: Examining brand gestalt, tourist attitude, satisfaction and loyalty in Bitung city. *International Journal of Tourism Cities*.

Mohammed, Z. M., Serwan L. Haji, & Abdulkhaleq N. Qadar. (2022). The Mediation Effect of Customer Satisfaction on the Relationship Between Service Marketing Mix, Service Orientation, and the Service Quality and Customer Loyalty: A Case Study of the Customers of Mobile Phone Provider in Erbil/ Kurdistan. https://doi.org/10.25156/ptjhss.v3 n2y2022.pp

Naini, N. F., Sugeng Santoso, Andriani, T. S., Claudia, U. G., & Nurfadillah. (2022). The Effect of Product Quality, Service Quality, Customer Satisfaction on Customer Loyalty. Journal of Consumer Sciences, 7(1). https://doi.org/10.29244/jcs.7.1.34 -50

Notoatmodjo, S. (2002). Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta.

Nurbaiti, N., Rahma, F. I. T., Wulandari, A., & Maha, N. (2021). Pengaruh E-Commerce Shopee Pada Kualitas Layanan Shopee Terhadap Loyalitas Pengguna

Shopee (Studi Kasus Masyarakat Kota Medan). Jurnal Pendidikan Tambusai, Volume 5, 8600–8606.

Pasaribu, F., Sari, W., Bulan, T., & others. (2022). The effect of e-commerce service quality on customer satisfaction, trust, and loyalty. *International Journal of, m.growingscience.com*. https://doi.org/10.1108/IJEC.2022 07

Poluan, M. S., Pasuhuk, L. S., & Mandagi, D. W. (2021). The role of social media marketing in local government institution to enhance public attitude and satisfaction. *Jurnal Ekonomi, 11*(03), 1268-1279.

Rantung, D. I., Mandagi, D. W., Wuryaningrat, N. F., & Lelengboto, A. L. P. (2020). Small medium enterprises brand gestalt: A key driver of customer satisfaction and repurchase intention. *International Journal of Professional Business Review, 8*(6), e01463-e01463.

Rondonuwu, B. F., & Mandagi, D. W. (2021). Brand gestalt as a key determinant of tourist satisfaction and loyalty: Empirical study of super-priority destination Likupang. *Jurnal Ekonomi, 12*(02), 452-464.

Setyorini, D., Tirtayasa, S., & Khair, H. (2023). The Effect Of Brand Image And Customer Relationship On Customer Loyalty Mediated By Customer Satisfaction At Primary School Al-Ulum Under A Creative Commons Attribution-Noncommercial 4.0 International License (CC BY-NC 4.0). Jurnal Ekonomi, 12(01), 2023. http://ejournal.seaninstitute.or.id/index.php/Ekonomi

Siwoyo, H. (2016). Metode AWM untuk Penelitian Manajemen dengan Amos Lisrel PLS. Jakarta: PT. Intermedia Personali Utama.

Supriyanto, A., Chikmah, I. F., Salma, K., & Tamara, A. W. (2023). Penjualan Melalui Tiktok Shop dan Shopee: Menguntungkan yang Mana? BUSINESS: Scientific Journal of Business and Entrepreneurship, 1, 1–16. https://journal.csspublishing/index.php/business

Susanto, S. E., Daeng Toto, H., Krisnanto, B., & Singkeruang, A. W. T. F. (2022). The influence of brand loyalty and brand image on customer satisfaction. *Point of View Research Management, 3*(1), 70–80. https://journal.accountingpointofview.id/index.php/povrema

Tumober, N. C. G., Langelo, C. G. E., Rantung, D. I., & Mandagi, D. W. (2022). Brand harmony: Exploring how destination brand gestalt influences tourist attitudes, satisfaction, and loyalty. *Jurnal Ekonomi, 13*(02), 404-421.

Tzavlopoulos, I., Gotzamani, K., & Andronikidis, A. (2019). Determining the impact of e-commerce quality on customers' perceived risk, satisfaction, value, and loyalty. *Journal of Quality and Service, 13*(4), 112-130. https://doi.org/10.1108/JQS.2019 09

Utami, R. P. (2024). Analisis kualitas produk, pelayanan dan citra merek terhadap loyalitas yang di mediasi oleh kepuasan pelanggan pada Klinik Erha Jakarta Selatan. *Journal of Social and Economics Research, 5*(2), 1886–1899. https://doi.org/10.54783/jser.v5i2.305

Walean, R. H., Pongoh, H., & Mandagi, D. W. (2021). Integrating brand gestalt and customer loyalty in

telecommunication sector: The mediating role of customer satisfaction. *International Review of Management and Marketing, 14*(6), 409-423.

Yani, M. I., & Sugiyanto, S. (2022). Pengaruh kualitas layanan, kepercayaan, citra merek dan kepuasan pelanggan terhadap loyalitas pelanggan Edwin Jeans Indonesia pada e-commerce Shopee. *Sinomika Journal: Publikasi Ilmiah Bidang Ekonomi dan Akuntansi, 1*(3), 443–472. https://doi.org/10.54443/sinomika.v1i3.285