The Service Quality Effect of McDonald's Self-Service Technology towards Customer Loyalty: A Cognition Affective Behavior Theory Approach

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ABSTRACT
Self-service technology (SST) is a technological interface that allows customers to obtain services independently. SST includes self-checkout machines, food or ticket ordering kiosks, internet services, automated gas stations, and others. The adoption of SST has been an endeavor for firms to improve service quality, enhance operational efficiency, and increase the likelihood of achieving competitive advantage gains. However, empirical evidence is needed to better understand customer expectations of SST service quality and how SST service quality impacts customer loyalty. Therefore, the purpose of this study is to examine SST service quality and its impact on customer satisfaction and customer loyalty. This study adopts the quantitative method and the self-service technology service quality (SSTQUAL) framework and cognition affective behavior theory. Data collection in this study was carried out by distributing questionnaires via google form with a purposive sampling technique, namely the target respondents were SST users at McDonald's aged 18 to 55 years. The results of the questionnaire collection obtained 285 data analyzed by partial least squares-structural equation model (PLS-SEM) with the help of SmartPLS 4 tools. Based on the results of the analysis conducted, 4 hypotheses were accepted. Self-service technology service quality variables are influenced by 5 quality dimensions such as functionality, enjoyment, assurance, design, and convenience. In addition, the self-service technology service quality variable has a positive influence on the customer satisfaction variable, which in turn positively affects customer loyalty. In other words, the service quality of self-service technology has a positive effect on customer loyalty through customer satisfaction.

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1. INTRODUCTION

Technological developments have led to the emergence of self-service technologies (SST) in various industries, such as banking and travel, resulting in reduced costs for businesses and outsourcing of services to customers (Otekhile & Zeleny, 2016). SST is a technological interface that allows customers to generate services independently, without the direct involvement of service employees. (Shim et al., 2020). SST has a certain appeal, attracting a large number of service organizations and allowing them to standardize service delivery, reduce labor costs, expand service delivery options, and improve the efficiency and quality of customer-facing operations. SST has replaced direct contact between buyers and businesses, making it possible for buyers to obtain services without direct interaction with business employees.

The use of SST or food ordering kiosks in restaurants is increasingly common, with more convenient and user-friendly technology (Yoon, 2023). In addition, ATMs, online bill payments, flight reservations, and online shopping are also growing in popularity. In Indonesia, the use of SST has penetrated various aspects of life, such as fast food restaurants with automated kiosks, the banking sector with ATMs and digital banking services, and transportation facilities such as airports and train stations for check-in and ticket purchases. For example, McDonald's as a fast food restaurant has adopted SST including in Indonesia.

Adopting SST has become a strategy to improve service quality (Winanda & Sriyanto, 2016). With SST, customers can perform various transactions independently, such as ordering, payment, and order pickup, which provides a faster and more efficient experience. This not only fulfills operational needs, but is also a strategic move to provide a competitive advantage, while maintaining the expected service quality standards. Restaurants that successfully integrate SST can offer a more modern and convenient customer experience that is in line with current technology trends, thus improving service quality and competitiveness in an increasingly competitive market.

According to Girsang et al. (2021), SST has a direct influence on customer satisfaction and loyalty by creating an efficient and satisfying transaction experience, so that customers can access products or services quickly and smoothly. In addition to efficiency, SST also provides convenience for employees and customers in terms of time and place (Yang & Klassen, 2008). Previous research has shown the importance of service quality on customer satisfaction and loyalty (Fernandes & Pedroso, 2017), using measurement scales such as SERVQUAL (Kadir et al., 2023) and SSTQUAL (Lin & Hsieh, 2011). SSTQUAL, which measures the dimensions of functionality, enjoyment, security/privacy, assurance, design, comfort, and customization, has proven effective

across a wide range of industries and a variety of consumer characteristics (Orel & Kara, 2014).

Research by Zhang et al. (2023) examines customer satisfaction and loyalty using the cognition affective behavior (CAB) theory model. This theory explains the consumer decision-making process from the cognitive to the affective phase and finally to behavior (Bagozzi, 1992). According to Oliver (1999), customer loyalty starts from experience-based knowledge of brand attributes (cognitive loyalty), then develops into affective loyalty, and finally into behavior loyalty which involves a commitment to repurchase. This research develops previous studies by using SSTQUAL and CAB theories to measure SST service quality on customer satisfaction and loyalty.

This study explores the effect of existing SST service quality at McDonald's on customer loyalty with customer satisfaction as a mediating variable. three research questions are outlined below:
RQ1. What factors influence McDonald's customer loyalty in Indonesia?
RQ2. How much influence does the variable between SST service quality have on McDonald's customer loyalty in Indonesia?
RQ3. How much influence does the mediating variable customer satisfaction have on McDonald's customer loyalty in Indonesia?

2. RESEARCH FRAMEWORK

Customer loyalty is defined as the willingness to recommend a brand to others, make repeat purchases, and remain loyal to the brand (Latif et al., 2020). The literature shows that service quality is an important factor in building customer loyalty (Iqbal et al., 2018; Radnan & Christin, 2023; Setyadi et al., 2023). Al-Wishah et al. (2022) found that improving service quality has a positive effect on customer loyalty and firm value. Yum and Yoo (2023) also found that service quality and brand equity have a positive impact on customer satisfaction and loyalty.

H1: Self-service technology service quality (SSTQUAL) has a positive and significant effect on customer loyalty (CL).

According to Oliver (1998), customer satisfaction is a positive reaction to service quality that meets or exceeds expectations. Adequate customer satisfaction is achieved when customers feel a positive company image due to good service quality, so they feel satisfied and encouraged to continue interacting with the company (Hariyanto & Anandya, 2021). Research shows that SST can increase productivity and customer satisfaction (Demoulin & Djelassi, 2016; Girsang et al., 2021; Orel & Kara, 2014). Chandra (2023) found that service quality has a significant effect on customer satisfaction in the private banking sector in Bangladesh. In addition, Andriyani (2023)

stated that there is a significant relationship between service quality and customer satisfaction in the context of e-commerce.

H2: Self-service technology service quality (SSTQUAL) has a positive and significant effect on customer satisfaction (CS).

Research conducted by Damanik and Situmorang (2023) states that customer satisfaction has a positive and significant effect on customer loyalty. This research is supported by the findings of Marcos and Coelho (2022), which show that customer satisfaction encourages positive behavior such as word of mouth recommendations and loyalty. Kasiri et al. (2017) customer satisfaction has a significant positive effect on customer loyalty and the relationship between customer satisfaction and customer loyalty is statistically significant.

H3: Customer satisfaction (CS) has a positive and significant effect on customer loyalty (CL).

Customer satisfaction plays an important mediating role in the relationship between service quality, corporate image, and customer loyalty (Iqbal et al., 2018). Orel and Kara (2014) also showed that self-checkout service quality has a positive impact on loyalty through customer satisfaction. Setyadi et al. (2023) and Taufik et al. (2022) reinforce these findings by stating that the effect of service quality on customer loyalty occurs through customer satisfaction as a mediating variable. Thus, customer satisfaction serves as a bridge that connects SST service quality with customer loyalty.

H4: Customer satisfaction (CS) mediates the relationship between self-service technology service quality (SSTQUAL) and customer loyalty (CL).

3. RESEARCH METHODS

3.1 Sampling

This study used purposive sampling, a non-probability sampling technique, based on specific criteria to collect relevant information that is not easily accessible by other means (Andrade, 2021). Data collection was conducted over four weeks, from March 11, 2023 to April 8, 2024. During this time, the aim was to collect a minimum of 250 respondents (Hair Jr et al., 2021), who met the predetermined criteria, i.e., McDonald's SST users aged at least 18 years and a maximum of 55 years. Ultimately, 285 respondents completed the online questionnaire, with subsequent data screening resulting in 266 data sets deemed suitable for further analysis.

3.2 Research Instrument

The research instrument consisted of two sections written in Indonesian. The former focused on collecting respondents' demographic information, which included aspects

such as gender, age, education level, and occupation, as well as questions regarding the frequency of using McDonald's SST in a month. The last section consisted of statements relating to self-service technology service quality (SSTQUAL) indicators, including functionality (FUN), enjoyment (ENJ), assurance (ASC), security (SEC), design (DES), convenience (CON), and customization (CUS). In addition, this study also addresses variables such as customer satisfaction (CS) and customer loyalty (CL). Furthermore, this study utilizes a 5-point Likert scale, which offers respondents five options for each question, ranging from strongly disagree (rated 1) to strongly agree (rated 5).

3.3 Data Analysis

This study used partial least squares–structural equation modeling (PLS-SEM) for data analysis. PLS-SEM was chosen due to its wide acceptance in the quantitative research community to evaluate the relationship between independent and dependent variables in the research model (Abumalloh et al., 2020). This method uses a regression-based approach, focusing on reducing the residual variance in the dependent variable. PLS-SEM analysis in this study includes two assessments, namely the outer model and inner model. This research is organized to employ a high-order model, with the evaluation of cloud service quality dimensions forming the initial model (Sarstedt et al., 2021). The latent variables obtained from this evaluation will then be integrated into the subsequent analysis as components of the second-order model.

4. RESULTS AND DISCUSSION

4.1 Demographic Analysis

Out of the 266 respondents who completed the questionnaire, 213 people, which constituted 80% of the total, were identified as female, while 53 respondents, which constituted 20% of the total, were identified as male. Thus, the study comprised mainly of female respondents. Regarding the age distribution, the majority of the research respondents were in the younger age group, while the representation of the older age group was limited. most of the respondents were in the age group of 18 to 25 years, totaling 163 people out of 266. This age range consists mainly of students and recent graduates.

Most respondents in this study had a high school education, totaling 182 out of 266 respondents. Furthermore, 57 respondents stated that their education level was undergraduate. In addition, 27 respondents stated that they had a bachelor's degree. This breakdown highlights the educational profile of the study participants. This breakdown highlights the educational profile of the study participants. The demographic profile of respondents is shown in Table 1.

Table 1 Demographic Profile of Respondents

Respondent profile	Total	Percentage
Gender		
Male	53	20%
Female	213	80%
Age		
18-25 years	163	61%
26-35 years	74	28%
36-45 years	29	11%
Educational stage		
Secondary School	182	68%
Associate's Degree	27	11%
Bachelor's Degree	57	21%

4.2 Measurement Model Test Results (Outer Model)

The measurement model, also known as the outer model test, initiates the evaluation of convergent validity. As per Hair Jr et al. (2021), an indicator is considered valid if its external load exceeds a minimum threshold of 0.7. Table 2 and Table 3 display the results of the convergent validity analysis of all indicators/items in the first-order models and second-order models. This shows that all 33 indicators examined in this study show validity, because the outer loading value exceeds 0.7.

Table 2 Convergent Validity Outputs of the First-Order Construct

Indicator	Outer Loading	Information
ASC1	0.797	Valid
ASC2	0.805	Valid
ASC3	0.812	Valid
ASC4	0.703	Valid
CON1	0.795	Valid
CON2	0.857	Valid
CON3	0.880	Valid
CON4	0.808	Valid
DES1	0.777	Valid
DES2	0.825	Valid
DES3	0.808	Valid
DES4	0.873	Valid

ENJ1	0.827	Valid
ENJ2	0.867	Valid
ENJ3	0.844	Valid
ENJ4	0.818	Valid
FUN1	0.863	Valid
FUN2	0.881	Valid
FUN4	0.875	Valid
CUS2	0.741	Valid
CUS3	0.881	Valid
SEC2	0.842	Valid
SEC5	0.724	Valid
CS1	0.866	Valid
CS2	0.858	Valid
CS3	0.903	Valid
CS4	0.911	Valid
CS5	0.761	Valid
CL1	0.753	Valid
CL2	0.820	Valid
CL3	0.815	Valid
CL4	0.866	Valid
CL5	0.864	Valid

Table 3 presents the convergent validity results for the second-order construct, showing that all indicators have outer loadings above the recommended threshold of 0.70, indicating that each item is valid and contributes significantly to its respective construct.

Table 3 Convergent Validity Outputs of the Second-Order Construct

Indicator	Outer Loading	Information
CS1	0.865	Valid
CS2	0.857	Valid
CS3	0.904	Valid
CS4	0.911	Valid
CS5	0.761	Valid
CL1	0.752	Valid
CL2	0.820	Valid
CL3	0.815	Valid
CL4	0.866	Valid
CL5	0.864	Valid
ASC	0.848	Valid
CON	0.888	Valid
DES	0.886	Valid
ENJ	0.906	Valid
FUN	0.822	Valid

The next convergent validity test for each of these variables will use the AVE criteria, where each variable has a minimum value of 0.5 so that each variable can be said to be valid (Hair Jr et al., 2021). The results of the convergent validity test show that the AVE value of the nine variables is more than 0.5. The next test test includes a discriminant validity test using the Fornell-Larcker criterion which states that the square of each AVE variable must be greater than its highest correlation with other variables. The results displayed in Table 4 and Table 5 show that all variables meet this criterion, with their square root AVE values exceeding the correlation with other variables, thus confirming their validity.

Table 4 Discriminant Validity (Fornell and Larcker Criterion) of the First-Order Construct

	ASC	**CL**	**CON**	**CS**	**CUS**	**DES**	**ENJ**	**FUN**	**SEC**
ASC	**0.780**								
CL	0.648	**0.825**							
CON	0.676	0.689	**0.836**						
CS	0.680	0.771	0.748	**0.861**					
CUS	-0.137	-0.031	-0.094	-0.131	**0.814**				
DES	0.714	0.661	0.723	0.704	-0.060	**0.821**			
ENJ	0.693	0.688	0.769	0.738	-0.048	0.779	**0.839**		
FUN	0.611	0.596	0.679	0.636	-0.100	0.633	0.688	**0.873**	
SEC	-0.111	-0.125	-0.122	-0.115	-0.067	-0.069	-0.131	-0.024	**0.785**

Table 5 shows the discriminant validity results using the Fornell and Larcker criterion, indicating that each construct's square root of AVE (diagonal values) is greater than its correlations with other constructs, thus confirming adequate discriminant validity.

Table 5 Discriminant Validity (Fornell and Larcker Criterion) of the Second-Order Construct

	CS	**CL**	**SSTQUAL**
CS	**0.861**		
CL	0.771	**0.825**	
SSTQUAL	0.807	0.755	**0.871**

The reliability is also assessed through two criteria: Cronbach's alpha and composite reliability, which must be greater than 0.7 (Hair Jr et al., 2021). The reliability test show demonstrates that all variables utilized in this study are reliable as indicated in Table 6 and Table 7.

Table 6 Reliability of the First-Order Construct

Variable	Cronbach's Alpha	Composite Reliability	Information
Assurance (ASC)	0.785	0.788	Reliable
Convenience (CON)	0.855	0.857	Reliable
Design (DES)	0.839	0.843	Reliable
Enjoyment (ENJ)	0.860	0.861	Reliable
Functionality (FUN)	0.844	0.844	Reliable
Customer Satisfaction (CS)	0.912	0.917	Reliable
Customer Loyalty (CL)	0.882	0.888	Reliable

Table 7 presents the reliability results of the second-order constructs, showing that all variables have Cronbach's Alpha and Composite Reliability values above 0.70, indicating strong internal consistency and reliability.

Table 7 Reliability of the Second-Order Construct

Variable	Cronbach's Alpha	Composite Reliability	Information
Customer Satisfaction (CS)	0.912	0.917	Reliable
Customer Loyalty (CL)	0.882	0.888	Reliable
Self-service technology service quality (SSTQUAL)	0.920	0.923	Reliable

4.3 Structural Model Test Result (Inner Model)

The inner model testing includes model fit testing, path coefficient analysis, coefficient of determination (R2), effect size (f2), and predictive relevance (Q2). The model fit test is carried out to evaluate the suitability of the research model and to reduce or prevent specification errors, ensuring compatibility with sample data. Model fit testing criteria in this study include standardized root mean square residual (SRMR), exact fit test (Euclidean and Geodesic values), and normed fit index (NFI). The result of the model fit test indicates that the research model is deemed satisfactory as it satisfies the specified criteria, as depicted in Table 8.

Table 8 Model Fit Outputs

Criterion	Limit Value	Model Value	Information
SRMR	Should be < 0.08	0.048	Good fit
d_ULS	Should be < 95	0.272	Good fit
d_G	Should be < 95	0.183	Good fit
Chi-square/df	Should be < 3	1.269	Good fit
NFI	Between 0 and 1	0.913	Good fit

The coefficient of determination test evaluates the accuracy of predicting the impact of independent variables on dependent variables. R2 values range from 0 to 1, with higher values indicating better measurement accuracy. According to (Hair Jr et

al., 2021), R2 values fall into three categories: < 0.25 indicates weak, 0.25 - 0.75 indicates moderate, and > 0.75 indicates strong. Given that this research is related to consumer behavior, the R2 value of 0.20 is considered quite high (Hair Jr et al., 2021). The results of the coefficient of determination (R2) test are presented in Table 9.

Table 9 Coefficient of Determination Outputs

Variabel	R Square	Information
Customer Satisfaction (CS)	0.645	High
Customer Loyalty (CL)	0.651	High

The effect size test (f2) tests the predictive impact of specific variables on others within the model. According to Hair Jr et al. (2021), if the value of f2 falls between 0.02-0.15, it indicates a small impact; between 0.15-0.35 suggests a moderate impact; and if it exceeds 0.35, it signifies a large impact. Conversely, if the f2 value is less than 0.02, it suggests no impact on the model structure. The results of the effect size test show that: a) one hypothesis or correlation shows a small impact, namely SSTQUAL-CL; b) one hypothesis shows a moderate impact, namely CS-CL; c) one hypothesis shows a large impact, namely SSTQUAL-CL.

The predictive relevance test (Q2) evaluates the extent to which the independent variable (predictor) can predict the dependent variable. According to Hair Jr et al. (2021), a model shows predictive relevance if the Q2 value exceeds 0. This test calculates the Q2 value using the blindfolding method. The results of the predictive relevance test show that all dependent variables have a Q2 value greater than 0, thus confirming that the model in this study has predictive relevance to estimate the independent variables in the model.

Path coefficient analysis, which involves hypothesis testing, aims to assess the significance and strength of relationships between variables and to test hypotheses. Path coefficients typically range from -1 to +1. The bootstrapping procedure is used to determine the significance of the coefficient (t-value) and the strength of the relationship (p-value), as well as to test hypotheses. Bootstrapping is done using a two-sided test with a critical value of 1.96 (at 5% significance level). If the t value exceeds the critical value, the coefficient is considered significant, and if the p value is less than 0.05, the hypothesis can be accepted (Hair Jr et al., 2021). The results of the path coefficient test are detailed in Table 11.

Table 11 Results of Path Coefficients, t statistics, and p values

Hypothesis	Relationship	Original Sample (O)	t Statistics	p Values	Information
Direct effect					
H1	SSTQUAL → CL	0.382	4.578	0.000	Accepted
H2	SSTQUAL → CS	0.807	24.665	0.000	Accepted
H3	CS → CL	0.462	5.943	0.000	Accepted
Mediation effect					
H4	SSTQUAL → CS → CL	0.373	5.361	0.000	Accepted

Based on the test results, it is concluded and shows that SST service quality has a significant influence on customer loyalty **(H1 is accepted)**. This finding is in accordance with previous research which states that SST service quality affects customer loyalty and has a positive and significant relationship (Iqbal et al., 2018). This may occur because SST service quality as a cognition factor was very crucial for their business so it can have a direct effect on loyalty (behavior).

Furthermore, it is known that SST service quality has a positive and significant effect on customer satisfaction **(H2 accepted)**. This finding is in line with previous research which shows that SST service quality has a positive and significant effect on satisfaction (Orel & Kara, 2014). This indicated how important SST service quality as a cognition factor for its customers is related to their satisfaction (affective). SST service quality needs to be more understood by a company whether it needs to be improved or how to deliver it to customers.

In addition, the relationship between two variables, customer satisfaction and customer loyalty are positive and significant **(H3 accepted)**. This finding aligns with previous research, which also suggests that customer satisfaction has a positive and significant effect on customer loyalty (Kasiri et al., 2017). The connectivity of customers to SST is important for companies. Loyal customers are not only likely to use SST but also reuse it for other reasons. Therefore, customer satisfaction as an affective factor must be tightened and improved over time to maintain their market in the real world.

Based on the test results, the p values for this relationship are less than 0.05, which means that SST service quality indirectly affects customer loyalty positively through customer satisfaction **(H4 accepted)**. Customer satisfaction strengthens the already significant relationship between SST service quality and customer loyalty. This shows that customer satisfaction is important in the relationship between SST service quality and customer loyalty.

5. CONCLUSION

In conclusion, this study provides valuable insights into the factors that influence customer loyalty in SST service quality, using a quantitative approach, and employing a partial least squares-structural equation model (PLS-SEM) for analysis. Acceptance of all hypotheses underscores the importance of various factors, including SST service quality (SSTQUAL) and customer satisfaction (CS), that shape customer loyalty. Factors

such as functionality, enjoyment, assurance, design, and convenience were identified as significant dimensions of SSTQUAL that play an important role. However, the factors of security and customization are not included in the factors that affect the dimensions of SST service quality. In this regard, McDonald's as an SST service provider is advised to develop better security features and improve service personalization.

The analysis results show that SSTQUAL has an effect on customer loyalty. In addition, customer satisfaction acts as a partial mediator in strengthening the relationship between SSTQUAL and customer loyalty. Overall, the PLS-SEM model showed high predictive power, demonstrating its reliability in predicting customer loyalty-related variables on SST service quality. These findings contribute to a better understanding of the dynamics of customer loyalty in the SST provider industry, emphasizing the importance of factors such as SSTQUAL and CS, in fostering customer loyalty.

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