

## The Effect Of System Quality, Information Quality, And Service Quality On Loyalty With Customer Satisfaction Mediation

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**Abstract.** *Realizing loyal customers is the strategy of every online store manager in the midst of high competition. Therefore, the overall quality-based customer loyalty enhancement model is urgent. This study aims to analyze the effect of the quality of online stores as a whole which consists of system quality, information quality, and service quality on customer satisfaction and customer loyalty. This study used an explanatory survey approach with the population being the people of Semarang City. The sample of this research is focused on customers of online shops or market places in the city of Semarang. Samples were taken using a quota sampling approach with a total of 100 people. The analysis technique is Structural Equation Modeling (SEM) with IBM Amos 22 software. The results showed that system quality and information quality had a positive effect on customer satisfaction and customer loyalty. Service quality has a positive effect on customer satisfaction but does not have a direct effect on customer loyalty. Other results indicate the important role of customer satisfaction as a mediation of the overall quality relationship with customer loyalty.*

**Keywords:** *Customer; Information; Satisfaction; System; Quality.*

### 1. Introduction

The Internet is becoming an increasingly popular medium for facilitating information search, choice, and purchase. Increasing sales and purchases of products using e-commerce is one type of technology implementation for business.

Online trading has gained momentum since the outbreak of Covid-19 in early March 2020, in line with the closure of conventional business activities by the government. The online market is actually intended to market or buy various services or products, both in digital or physical form.(Luciana, 2015). The online market is one of the markets with the most promising growth.(Azizi et al., 2020). Online shopping provides customers with more information and alternatives about products and price comparisons, as well as providing convenience and simplicity in searching for something online.(2019).

Online shopping has played a vital role in the last two decades, with over 1.6 billion people worldwide using this method to purchase goods. In 2016, the value of online commerce

transactions was US\$1.90 trillion. This condition is expected to increase online consumers by more than 2 billion in 2019, and by the end of 2020 retail sales will increase by more than 100%(Bhatti & Rehman, 2020;Rehman et al., 2019).

Indonesia is a potential market for online shopping, because online shopping has become a lifestyle today.(2019). The widespread use of the internet has also changed the retail landscape in Indonesia, where there has been rapid growth in e-commerce that will significantly change shopping habits. The overall value of Indonesian internet retail has shifted from IDR 8.2 trillion in 2012 to IDR 46.5 trillion in 2017, with media products, consumer electronics, and apparel and footwear being the top three categories with the highest sales value.(Wiranata & Hananto, 2020).

There are many companies providing online shopping, and the competition among them is very tight. Therefore, an effective and market-based business strategy to attract potential buyers becomes very important.(2019). Data collected by iPrice shows many changes for the top five positions of e-commerce sites with the most monthly visitors. From within the country, names such as Tokopedia, Bukalapak, and Blibli are still consistently in the top five (<https://iprice.co.id/insights/mapofecommerce>).

However, competition between online stores is very competitive, so customer loyalty is a priority. Some factors that influence online store consumer loyalty are the quality of the visitor interface, the quality of information, the perception of security and the perception of privacy.(Dhiranty et al., 2017), e-trust, e-service quality, and e-satisfaction(2020). Consumer repurchase intention as an impact of loyalty is an individual's plan to purchase services or products in the future. Consumer purchase intention is influenced by many factors, namely profitable factors such as e-security and e-service.(Abid & Purbawati, 2020), convenience, product variety, product risks, and privacy risks.(Bhatti & Rehman, 2020).

The concept of online customer loyalty has attracted many researchers to study and explore its antecedents. However, there are still inconsistent research results.Jiradilok et al. (2014)AndHafni et al. (2020) conclude that information quality has a positive impact on loyalty with an indication of repurchase intentions. On the other hand, the results of the studyShahnaz and Wahyono (2016)shows that website quality actually has a negative and insignificant effect on purchasing interest. The studyAstuti and Deep (2019)stated that system quality has no effect on user satisfaction. The results of the studyRizan et al. (2020)concludes that service quality and perceived value directly affect customer loyalty positively but not significantly. Likewise, the results of the studyAburayya et al. (2020)shows that perceived service quality does not have a positive and significant effect on customer loyalty.

Based on the gaps in previous research, it is necessary to conduct further research on the determinants of customer loyalty. This study focuses on the mediating role of customer satisfaction in the relationship between overall service quality and online store customer

loyalty.Griffin (2005)argues that loyalty refers to a consumer's voluntary actions towards an e-business that result in repeat use.

Study resultsGoh et al. (2016)explains that satisfaction is an antecedent to repeat purchases, and customer satisfaction has been shown to have a direct positive effect on repeat purchase intentions. Also, the results of the studyKhurana and Jain (2017)states that consumer satisfaction is the most important variable that measures online loyalty. Likewise, researchGultom et al. (2020)explains that consumer trust can mediate the effect of customer satisfaction on loyalty.

## 2. Research Methods

This research uses a quantitative research method based on the philosophy of positivism.(2017), aims to analyze the relation between research constructs through hypothesis testing.(English: 2012). The research location was chosen as Semarang City considering that its people are already familiar with online shopping. This study involves two types of constructs: exogenous and endogenous. Exogenous constructs are antecedents that become factors in changing endogenous constructs, while endogenous constructs are consequences that are the focus of research to try to increase them.(2017). The exogenous constructs in this study are the quality of the website system or online store application, the quality of e-commerce information, and the quality of online store services. The endogenous constructs used in this study are online store consumer satisfaction and loyalty.

## 3. Results and Discussion

Chapter IV presents the results of data analysis and its discussion. The study data were obtained from the distribution of questionnaires to respondents, namely online store customers (e-commerce) in Semarang City, with a total of 100 respondents. This analysis includes a description of the demographics of the research object, a description of the respondents' answers (research variables), confirmatory factor analysis (measurement), and structural equation model (SEM).

The analysis of the demographic description of respondents in this study uses descriptive frequency and descriptive statistics. Descriptive frequency research for respondent data in the form of categories while descriptive statistical research for data in the form of ratios. Based on data from 100 respondents' answers to the research questionnaire, the demographic characteristics of respondents are as in Table.

**Table Description of Research Respondents**

Demographics	Frequency
Gender	
Man	35
Woman	65
Age	
Less than 20 years	5
Between 21 to 30 years	37
Between 31 to 40 years old	43

More than 40 years	15
Education	
SENIOR HIGH SCHOOL	14
Diploma	16
Bachelor	54
Post Graduate	6

Table explains that the respondents who participated in this study were 100 people, with a composition of 35% male and 65% female. This finding is in accordance with the theory of hedonic motivation in shopping.(Arnold & Reynolds, 2003;Kusuma et al., 2013;Widagdo & Roz, 2021), that women shop more often than men, women pay more attention to their appearance. The types of products most often purchased by women are fashion products in the form of clothes, skirts, pants, shoes, bags, and accessories.(Mahani, 2019).

The findings of the last respondent description stated that based on the last education, it is known that the majority of respondents have a Bachelor's degree (54%), Diploma (16%), High School (14%), and Postgraduate / Masters (6%). This result can be explained that the people of Semarang City have a high level of education so that many have completed undergraduate or diploma IV education. Based on BPS data from Semarang City, it is known that the gross participation rate for higher education in 2018 was high at 56.22 percent.

Descriptive statistical analysis of empirical data of research variables used for analysis of respondents' answers in the form of tabulation of respondents' answers. Measurement of research variables used five scores, starting with score 1 for the STS option, 2 for TS, 3 for N, 4 for S, up to number 5 for the SS answer option. Based on this, the index number is calculated using the following formula:

$$\text{Index value} = ((\%F1 \times 1) + (\%F2 \times 2) + (\%F3 \times 3) + (\%F4 \times 4) + (\%F5 \times 5)) / 5$$

F1 is the frequency of strongly disagree answers, F2 is the frequency of disagree answers, and so on F5 for strongly agree answers. Because the score starts from 1 to 5, the index numbers obtained range from (1x100): 5 = 20, to (5x100): 5 = 100 with a range of 100-20=80. This study uses a three-box category, so the distance of 80: 3 produces a distance of 26.67. This number is used for the following interpretation:

20.00 – 46.67 = Low Category

46.68 – 73.35 = Medium Category

73.36 – 100 = High Category

System quality operationalized with 4 (four) indicators, namely (1) accessibility, (2) ease of use, (3) reliability, and (4) response time.. Respondents' responses to system quality variable statements are described in Table 4.2.

Table Descriptive Statistics of System Quality									
INDICATOR	% ANSWER					INDE X	CRITERI A		
	1	2	3	4	5				

1	Accessibility	(	(	3	4	1	75.40	Tall
			7	9	4			
2	Ease of use	(	7	3	4	1	72.20	Currentl
			7	4	2			y
3	Reliability	(	2	3	4	1	74.20	Tall
			8	7	3			
4	Response time	(	(	4	4	1	73.80	Tall
			1	9	0			
Average index							73.90	Tall

Source: Study Data, 2021

The average value of the system quality construct index in the table above has a value of 73.90, which based on the range that has been made previously is in the high criteria. The data contains an interpretation that online store customers in Semarang City consider the online store website to have met consumer needs in making transactions to purchase goods.

Information quality operationalized with 4 (four) indicators, namely (1) current, (2) accurate, (3) timely, (4) relevant. Respondents' responses to the statements of information quality variables are summarized in Table. The average value of the service quality variable index is 74.68, which based on the range that has been made previously is in the high criteria. The data contains an interpretation that online shop customers in Semarang City assess the quality of service of sellers in online shops have provided the best service such as handling complaints, replacing damaged goods, replying to messages and so on.

Online consumer satisfaction is stated through indicators namely consumers are satisfied with online store services, customers feel happy when making purchases through the website, and (3) consumers are comfortable with online purchasing decisions. Respondents' responses to variable statements online customer satisfaction can be displayed in Table.

Table Customer Satisfaction Description

INDICATOR	% ANSWER					INDEX	CRITERIA
	1	2	3	4	5		
1 Happy with the service	0	3	41	47	9	72.40	Currently
2 Happy to buy goods	0	2	37	49	12	74.20	Tall
3 Comfortable shopping	0	0	43	46	11	73.60	Tall
Average index						73.40	Tall

Source: Study Data, 2021

The average value of the consumer satisfaction construct index is 73.40. Based on the range that has been made previously, it is in the high criteria. The data contains an interpretation that online store customers in Semarang City have felt that they have obtained what they expected from doing business with e-commerce so that they feel happy and comfortable shopping.

Online customer loyalty is measured with 4 (four) indicators, namely (1) do more business with the website in the future, (2) recommend the website to someone who searches for it, (3) say positive things about the website to others, (4) consider the website to be their first



choice for purchasing a type of product. Respondents' responses to construct statements consumer loyalty can be explained in Table.

**Table Descriptive Statistics of Customer Loyalty**

INDICATOR	% ANSWER					INDE	CRITERI
	1	2	3	4	5		
1 Doing more business in the future	6	2	4	5	7	72.40	Currentl y
2 Recommend to others	6	3	4	4	8	71.20	Currentl y
3 Saying positive things	6	5	4	4	6	71.20	Currentl y
4 Be the first choice for other types of products	7	1	2	3	1	72.00	Currentl y
Average index						71.70	Currentl y

Source: Study Data, 2021

The average customer loyalty variable index has a value of 71.70, which based on the range that has been made previously is in the medium criteria. The data contains an interpretation that online store customers in Semarang City are not fully loyal to one e-commerce so that they easily switch online stores if there are more attractive promotions such as discounts, free shipping, cheaper prices, and others.

The inferential statistics chosen in this study is Structural Equation Modeling. This statistic is a combination of separate methods, namely confirmatory factor analysis and path analysis. SEM assessment is carried out by analyzing the fit index. First, SEM assumptions are tested, then continued with research hypothesis testing.

The latent construct measurement model testing is intended to test the unidimensionality of the indicators forming each research construct. The validity of the indicator is evaluated based on the magnitude of the factor weight value obtained. The minimum factor weight value is 0.5, but a loading factor of 0.7 is recommended to meet the reliability criteria. The suitability of the model for measurement analysis is tested using the AMOS program. The suitability of the model is seen from the results of the model suitability criteria obtained from the AMOS program output.

Based on the table above, it can be seen that the loading factor of each indicator in the exogenous variable is none below 0.5 and has met the recommended criteria for a factor weight of 0.7. This indicates that all exogenous variable indicators are valid so that none are removed from the model.

The next SEM analysis is a structural model, aimed at testing the overall model and research hypothesis. SEM full model testing through model suitability criteria, and hypothesis testing is done by looking at the significance of path coefficient causality. The results of data calculations for the Full Model analysis can be explained in Figure

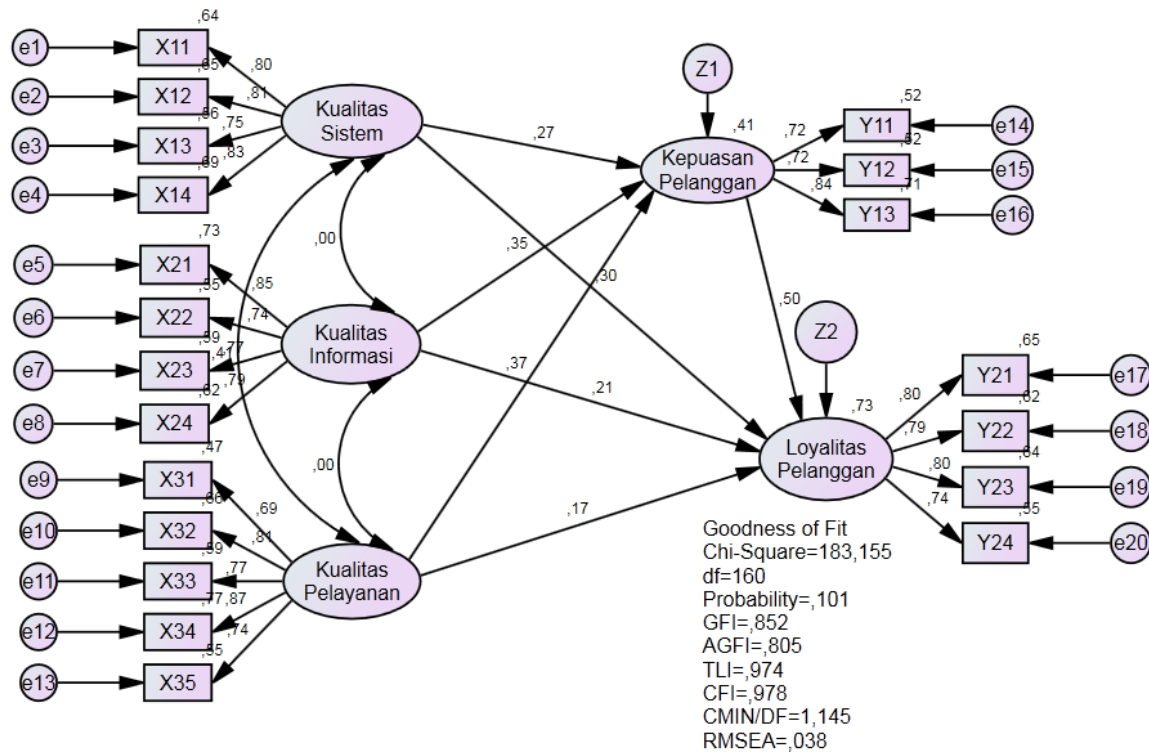


Figure Test Results *Structural Equation Model*(SEM)

The SEM full model fit test was conducted using the Chi-square, probability, GFI, AGFI, TLI, CFI, CMIN/DF and RMSEA criteria, as shown in Table .

Table Full Model SEM Feasibility Value

No	Criteria	Limit	Results Analysis	Model Evaluation
1	X2 - Chi-Square	<190,518	183,155	Fit
2	Significance Probability	$\geq 0.05$	0.101	Fit
3	GFI	$\geq 0.90$	0.852	Moderate
4	AGFI	$\geq 0.90$	0.805	Moderate
5	TLI	$\geq 0.95$	0.974	Fit
6	CFI	$\geq 0.95$	0.978	Fit
7	CMIN/DF	$\leq 2.00$	1,145	Fit
8	RMSEA	$\leq 0.08$	0.038	Fit

Source: Study Data, 2021.

The feasibility test of the model above explains that several indices have met the specified cut off. The Chi-square value = 183.155, and probability = 0.101 < 0.05 have met the required limit value. The GFI value = 0.852 and AGFI = 0.805 are close to the standard cut of value 0.90 so they are declared moderate. Other results show that the TLI value is 0.974 > 0.95, CFI is 0.978 > 0.95, CMIN / DF is 1.145 < 2.0 and RMSEA is 0.038 < 0.08. These findings state that the full model is acceptable.

Testing of SEM assumptions includes: evaluation of outliers, data normality, multicollinearity, and reliability testing. Outlier data testing is carried out with Mahalanobis Distance at a probability level of 0.001 at degrees of freedom of the number of research indicators. This study has 20 indicators so that all data with Mahalanobis Distance  $X^2(20, 0.001) = 45.315$  is an outlier.

The results of the multivariate outlier test calculations using the Amos version 21 program can be seen below:

**Table Multivariate Outlier Testing**

Observation number	Mahalanobis d-squared	p1	p2
34	34,125	0.025	0.923
4	33,246	0.032	0.829
42	32,860	0.035	0.683
83	32,165	0.042	0.601
1	31,925	0.044	0.453
...	...	...	...
58	7,407	0.995	0.987
97	5,765	0.999	0.997
47	0.954	1,000	1,000

Source: Primary Data, 2021.

Table shows the highest Mahalanobis distance value is 34.125 not exceeding 45.313. This shows that there is no multivariate outlier data in the model.

Multicollinearity testing is done by observing the correlation between exogenous variables. The assumption is that there is no high correlation between exogenous constructs, namely  $\geq 0.90$  (Ghozali, 2017). Test results can be summarized in Table.

**Table Exogenous Construct Correlation**

Correlation			Mark
System Quality	<-->	Information Quality	0.001
Information Quality	<-->	Quality of Service	-0.004
Quality of Service	<-->	Quality of Service	0.415

Source: Primary Data, 2021.

From Table it is known that the correlation between exogenous variables is still below 0.9. This indicates that there is no high correlation between exogenous variables. This result shows that there is no indication of multicollinearity.

Reliability testing is used to see whether the questionnaire provides consistent results. The results of the construct reliability (CR) and variance extracted (VE) calculations using the Microsoft Office Excel program can be displayed in Table.

**Table Reliability Testing**



Variables	Construct Reliability	Variance Extraction
System Quality	0.875	0.636
Information Quality	0.868	0.623
Quality of Service	0.884	0.606
Customer satisfaction	0.808	0.586
Customer Loyalty	0.865	0.616

Source: Primary Data, 2021.

Based on the calculation results with Microsoft Excel as in Table 4.12, it is known that the CR value is  $> 0.70$  and  $VE > 0.50$ . These results indicate that it has met the reliability test of the research instrument.

Hypothesis testing in research is comparing the Critical Ratio value - identical to the t-count and the probability value of the significance of the calculation results against the statistical limit or t-table. The limits are the CR value above the t-table 1.96 and the significant probability value is less than 0.05. The results of the standardized regression coefficient calculations on the causal relationship, the Critical Ratio which is identical to the t-count, and the probability of significance can be summarized in Table.

The results of statistical testing of seven hypotheses as shown in the table above show that 6 hypotheses can be accepted and 1 hypothesis is rejected. The first hypothesis produces an estimate of the influence of the system quality construct on customer satisfaction showing a result of 0.244, CR value =  $2.295 \geq 1.96$  and a probability of  $0.022 < 0.05$ . Based on these findings, the first hypothesis can be accepted.

The second hypothesis test confirms that there is a positive impact of information quality on online store customer satisfaction, obtained an estimated influence parameter of 0.290, CR =  $3.240 \geq 1.96$ , and a probability of  $0.001 < 0.05$ . Based on these findings, the second hypothesis can be accepted. The third hypothesis produces an estimated coefficient of the effect of service quality on customer satisfaction known to be 0.121, CR value =  $3.024 \geq 1.96$  with a probability of  $0.002 < 0.05$ . Based on these findings, the third hypothesis can be accepted. The fourth hypothesis test states that there is a positive influence of system quality on online store customer loyalty, obtained an estimated value of 0.283 which is significant with a CR value =  $3.056 \geq 1.96$  and a probability of  $0.002 < 0.05$ . Based on these findings, the fourth hypothesis is supported by empirical data so it is accepted.

The fifth hypothesis proposed about the positive influence of information quality on online store customer loyalty obtained a significant estimate of 0.182 with a CR value =  $2.339 \geq 1.96$ , a significance probability of  $0.019 < 0.05$ . From these findings, the fifth hypothesis can be accepted. The sixth hypothesis, namely the positive influence of service quality on online store consumer loyalty, obtained an estimated coefficient of 0.172, CR =  $1.101 < 1.96$  and a probability of  $0.089 > 0.05$ . Based on these findings, the sixth hypothesis is not supported by empirical data so it is rejected. Testing the seventh hypothesis that there is a positive influence of customer satisfaction on online store consumer loyalty, obtained an estimate of

0.522,  $CR = 3.936 \geq 1.96$ , and a probability of  $0.000 < 0.05$ . Based on these results, the seventh hypothesis can be accepted.

#### 4. Conclusion

This study was conducted with the aim of analyzing the influence of online store quality as a whole on satisfaction and its effect on consumer loyalty. Based on the data analysis process carried out previously, the first model can be produced that system quality has a positive and significant effect on customer satisfaction and loyalty. This means that if the accessibility of ease of use, reliability and system response time are improved, customer satisfaction will increase and have a positive impact on their loyalty.

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