

E-Service Quality in Digital Health Applications

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Abstract

The aim of this research is to investigate the factors affecting customer satisfaction and customer loyalty in digital health service. The independent variables are System Quality and Service Quality. The purposive samples are 102 respondents in Jakarta area. The study reveals that ease of use in system quality and assurance, and empathy from service quality influence the customer satisfaction. There is no mediation effect found on customer satisfaction. This study concludes the importance of ease of use, assurance, and empathy in gaining customer satisfaction. Moreover, this research confirmed the positive relationship between customer satisfaction and customer loyalty. From the management perspective, this research suggested several action plans that could be implemented by telemedicine services providers to improve their customer satisfaction and customer loyalty. From the management perspective, they can improve the response time, security, and responsiveness to better satisfy and increase customer loyalty.

Keywords

Mobile digital health service, System Quality, Service Quality, Customer Satisfaction, Customer Loyalty

1. Introduction

Covid 19 pandemic boost the usage of mobile digital health service. However, this research will focus on the evaluation of telemedicine services via mobile application. The mobile application is chosen since the recent data found that 96.4% of internet users in Indonesia prefer to access the internet via their smartphones. In Indonesia, Halodoc application is one of the most popular telemedicine service providers, reported that its telemedicine application has been used by 20 million users during Q2 2021.

Recent research on telemedicine services has focused on the barrier to telemedicine services adoption (Samarraie et al., 2020; Zobair, 2019) and technology development (Ahmad et al., 2021). Many of the works are carried out without considering the dimension of satisfaction and loyalty as critical aspects in telemedicine services.

In Indonesia, customer satisfaction and customer loyalty in telemedicine service is still under-researched. There are very few pieces of literature that provide the research related to customer satisfaction and customer loyalty in telemedicine services via mobile application. Therefore, which factors affecting customer satisfaction and customer loyalty in telemedicine services are still questionable. This research aims to examine the factors affecting customer satisfaction and customer loyalty in telemedicine services via mobile application in Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) areas.

The topic is highly relevant since there has been an increase in Indonesian telemedicine users during the COVID-19 pandemic. The study is also highly important since the outcome will help telemedicine service providers to understand the factors affecting customer satisfaction and its relationship with customer loyalty. Therefore, by increasing customer loyalty, the service provider could gain higher profitability and competitive advantage (Iqbal, 2021).

2. Literature Review

System Quality

Almaiah & Alismaiel, 2019 suggest the evaluation of mobile application based on DeLone and McLean's model, with system quality as one of the components to measure the success of the model. According to research conducted by Sharma & Sharma, 2019, system quality dimensions consist of response time, ease of use, reliability, and user interface. In addition, security is considered as critical success factor in system quality (Wuri et al., 2018). Ease of Use is defined as the effort needed to use information technology (Chi, 2018b). Response Time refers to the time difference between the data collection and the delivery of results to the customer (Shahhosseini et al., 2021). Security is defined as the protection customer data from security breaches (Balapour et al., 2020).

Service Quality

Service quality refers to the attitude or judgment that relates to the perfection of the service (Parasuraman et al., n.d). Five dimensions are used to measure the service quality (Tripathi, & Siddiqui, 2020). Tangible is defined as physical facilities, personnel, and equipment appearance. Reliability is the capability to provide precise service, punctually at an equal performance level. Responsiveness refers to the desire to deliver fast and valuable service to the customers. Assurance is defined as the capability to provide a feeling of customer trust and confidence. Empathy is defined as the capability to provide individual and customized care to all customers.

Customer Satisfaction

Satisfaction is the feeling that comes from the consequence of comparing performance from a service to expectations. Zablah et al, 2016 state that customer satisfaction is an individual's evaluation of an organization based on personal experiences over time. Customer satisfaction can be utilized as a way to assess a service, with value measurement obtained through experience and feelings that have been tested by the customers to the product (Ndubisi & Natarajan, 2018). Another study stated that customers' perspectives on the service can be evaluated using customer satisfaction (de Ofia., 2016).

Customer loyalty

Boateng, 2019 defines customer loyalty as customers' positive stance to an organization, which leads to repeat purchase action. Customer loyalty is one of the important elements that promote the companies to have a competitive advantage (Boateng, 2019). It is a valuable asset that helps the companies to secure future orders, and increase their profitability (Boateng, 2019). There are various psychological aspects that may be related to customer loyalty; however, it has been shown by various studies that customer satisfaction is the predecessor of customer loyalty (Carranza et al., 2018; El-Adly, 2019; Huang & Sudhir, 2021).

Hypotheses

This paper proposes the following hypothesis:

- H1: Ease of use has a positive relationship with customer satisfaction
- H2: Faster Response time has a positive relationship with customer satisfaction
- H3: Security has a positive relationship with customer satisfaction
- H4: Responsiveness has a positive impact on customer satisfaction
- H5: Assurance has a positive impact on customer satisfaction
- H6: Empathy has a positive impact on customer satisfaction
- H7: Customer Satisfaction has a positive impact on customer loyalty
- H8: The effect of ease of use on customer loyalty is mediated by customer satisfaction
- H9: The effect of response time on customer loyalty is mediated by customer satisfaction
- H10: The effect of security on customer loyalty is mediated by customer satisfaction
- H11: The effect of responsiveness on customer loyalty is mediated by customer satisfaction

H12: The effect of assurance on customer loyalty is mediated by customer satisfaction
 H13: The effect of empathy on customer loyalty is mediated by customer satisfaction

The figure of conceptual model can be seen in Figure 1.

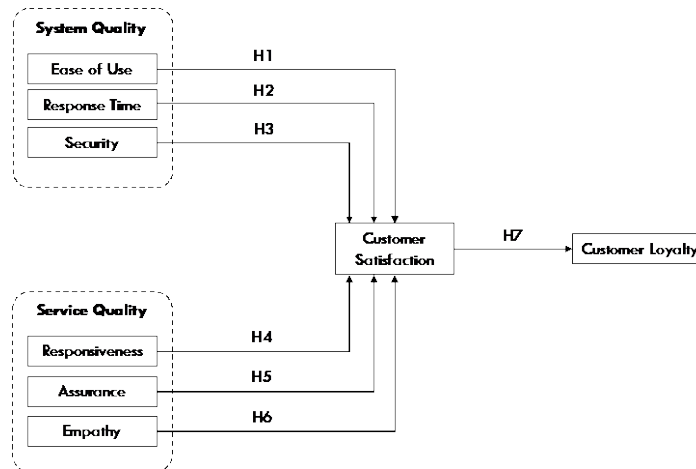


Figure 1. Conceptual Model

3. Methods

This study sent total of 150 questionnaires using convenience sampling technique. The survey returned is 136 with 102 are eligible for further analysis. The survey uses five-point Likert scale ranging from “1” meaning “strongly disagree” to “5” meaning “strongly agree”, with a 33-items indicator.

4. Data Collection

A total of 150 questionnaires were distributed through the convenience sampling technique, where the respondents were contacted via WhatsApp and Telegram application. (Table 1)

5. Result and Discussion

Table 2 summarizes demographic variables from the valid respondents. Of 102 respondents, 47.1% were males and 52.9% were females. The largest frequency is from the 26-40-year-old group (55%), followed by the 41-55-year-old group (37%). The majority of respondents were private employees (49%), with the majority of educational background is under-graduate (55.9%). The most preferred telemedicine service application used by respondents is Halodoc (86%). Additional sample attributes in this research are the domicile and telemedicine application usage.

Table 1 Statistic Description

Aspects	Category	Frequency	Percentage
Gender	Male	48	47.1
	Female	54	52.9
Age	17 - 25 yrs	4	3.9
	26 - 40 yrs	56	54.9
	41 - 55 yrs	38	37.3
	> 55 yrs	4	3.9
Domicile	DKI Jakarta	43	42.1
	Tangerang	16	15.7
	Bekasi, Bogor, Depok	39	38.3
	Others	4	3.9
Occupation	Private Employee	50	49.0
	Public Servant / SOE Employee	27	26.5
	Entrepreneur	4	3.9
	Student	3	2.9
	Others	18	17.7
Education	Undergraduate	57	55.9

	Postgraduate	30	29.4
	Others	15	14.7
Usage	Halodoc	65	63.7
	Halodoc+AloDokter	24	23.5
	Halodoc+GoodDoctor	3	2.9
	AloDokter	2	2.0
	Halodoc+KlikDokter	2	2.0
	Halodoc+KlikDokter+AloDokter	1	1.0
	Others	5	4.9
Preferred Application	Halodoc	88	86.3
	AloDokter	7	6.9
	GoodDoctor	4	3.9
	Others	3	2.9

The results using Fornell and Larcker calculation are shown in Table 4, which meets the requirement of discriminant validity. (Table 3)

Table 2 Measurement Items of the Construct's Analysis Results

Construct	Item	Loading Factor	Cronbach's Alpha	CRE	AVE
Ease of Use	EOU_1	0.832	0.833	8	0.665
	EOU_2	0.841			
	EOU_3	0.806			
	EOU_4	0.781			
Response Time	RT_1	0.847	0.816	1	0.731
	RT_2	0.911			
	RT_3	0.804			
Security	SEC_1	0.838	0.825	6	0.741
	SEC_2	0.891			
	SEC_3	0.854			
Responsiveness	RSP_1	0.837	0.897	8	0.764
	RSP_2	0.871			
	RSP_3	0.897			
	RSP_4	0.890			
Assurance	AS_1	0.911	0.906	1	0.841
	AS_2	0.941			
	AS_3	0.900			
Empathy	EM_1	0.741	0.862	6	0.708
	EM_2	0.891			
	EM_3	0.843			
	EM_4	0.882			
Customer Satisfaction	CS_1	0.932	0.852	1	0.871
	CS_2	0.934			
Customer Loyalty	CL_1	0.912	0.753	0	0.801
	CL_2	0.878			

Table 3 Discriminant Validity Result

Constructs	AS	CL	CS	EOU	EM	RT	RSP	SEC
Assurance (AS)	0.917							
Customer Loyalty (CL)	0.750	0.895						
Customer Satisfaction (CS)	0.780	0.777	0.930					
Ease of Use (EOU)	0.700	0.707	0.710	0.810				
Empathy (EM)	0.806	0.822	0.790	0.742	0.841			
Response Time (RT)	0.687	0.651	0.633	0.773	0.739	0.855		
Responsiveness (RSP)	0.763	0.727	0.690	0.721	0.777	0.698	0.874	
Security (SEC)	0.598	0.540	0.528	0.634	0.551	0.606	0.582	0.861

Hypotheses testing results are summarized in Table 4. The results showed that Ease of Use has a significant impact on Customer Satisfaction ($\beta = 0.256, t = 2.009, p < 0.05$), hence, H1 was supported. However, the results showed an insignificant impact of Response Time ($\beta = -0.091, t = 0.767, p = 0.443$), Security ($\beta = -0.003, t = 0.051, p = 0.959$), and Responsiveness ($\beta = 0.007, t = 0.059, p = 0.953$) on Customer Satisfaction, failing to support H2, H3 and H4 respectively.

The results revealed that Assurance has a significant positive impact on Customer Satisfaction ($\beta = 0.359, t = 2.597, p < 0.05$), hence, H5 was supported. This study also found that Empathy has a significant positive impact on Customer Satisfaction ($\beta = 0.375, t = 2.907, p < 0.01$). Therefore, H6 was substantiated. Lastly, the results revealed that Customer Satisfaction has a significant positive impact on Customer Loyalty ($\beta = 0.258, t = 2.017, p < 0.05$). Therefore, H7 was supported.

Table 4 Hypotheses testing results

Path	Path Coefficient	t value	p values	Decision
H1 Ease Of Use -> Customer Satisfaction	0.256	2.009	0.045	Supported
H2 Response Time -> Customer Satisfaction	-0.091	0.767	0.443	Rejected
H3 Security -> Customer Satisfaction	-0.003	0.051	0.959	Rejected
H4 Responsiveness -> Customer Satisfaction	0.007	0.059	0.953	Rejected
H5 Assurance -> Customer Satisfaction	0.359	2.597	0.010	Supported
H6 Empathy -> Customer Satisfaction	0.375	2.907	0.004	Supported
H7 Customer Satisfaction -> Customer Loyalty	0.258	2.017	0.044	Supported

Mediation Analysis

Mediation analysis (Table 5) was conducted to assess mediating role of Customer Satisfaction between Ease of Use, Response Time, Security, Responsiveness, Assurance, Empathy, and Customer Loyalty.

The results in Table 6 revealed that through Customer Satisfaction, the indirect effect of Ease of Use, Response Time, Security, Responsiveness, Assurance, and Empathy on Customer Loyalty was found insignificant. Therefore, H8, H9, H10, H11, H12, H13 were not supported respectively.

Table 5 Mediation Analysis – Total Effects and Direct Effect

Path	Direct Effect		Hypotheses	Indirect Effects		Decision	
	Coefficient	p Values		Coefficient	p values		
EOU -> CL	0.091	0.457	H8	EOU -> CS -> CL	0.066	0.234	Rejected
RT -> CL	-0.033	0.796	H9	RT -> CS -> CL	-0.024	0.538	Rejected
SEC -> CL	0.029	0.726	H10	SEC -> CS -> CL	-0.001	0.961	Rejected
RSP -> CL	0.112	0.366	H11	EOU -> CS -> CL	0.002	0.956	Rejected
AS -> CL	0.068	0.587	H12	RT -> CS -> CL	0.093	0.111	Rejected
EM -> CL	0.418	0.005	H13	SEC -> CS -> CL	0.097	0.079	Rejected

Our investigation on hypothesis 1 supports the theory offered in previous studies that found a positive relationship of Ease of Use with Customer Satisfaction (Masri et al., 2020; Ngubelanga & Duffett, 2021; Rahi & Abd.Ghani, 2019). This indicates that if the application is easy to use, the likelihood of customers executing the transaction will be faster, which eventually leads to their satisfaction (Khrais & Alghamdi, 2021).

On hypothesis 2, we find that response time does not have a significant impact on customer satisfaction. This finding is contradictory to previous studies that support the positive relationship of response time on customer satisfaction (Kourtesopoulou et al., 2019; Yu et al., 2020). However, research from (Chi, 2018a) stated that response time does not have any significant effect on customer satisfaction which supports the research results. This might be related to the demographic factor of most respondents who are 26 years and above (96.1%). Respondents with older age tend to have more mature personalities and emotional stability (von Soest, Wagner, Hansen, & Gerstorff, 2018), Hence, it might lead to more tolerance behavior to response time while using telemedicine mobile application.

Third, hypothesis 3 reveals that security does not influence customer satisfaction. This finding is contradictory to a previous study that supports the positive relationship of security with customer satisfaction (F. Li et al., 2021). The authors examine the Halodoc application which is preferred by 86% of respondents, and it shows that only a phone number is needed for the user registration. Therefore, there's an indication that respondents less care about the security aspect of telemedicine mobile application, since the data might be less sensitive and categorized as non-confidential information, according to respondents' perspective. In addition, the transaction in telemedicine services application is conducted via internet banking or digital payment with very secure access. Therefore, the security of transactions may not be an issue to the customers since it is done via a secure third-party application. Fourth, we reveal that responsiveness does not have a significant impact on customer satisfaction. This evidence contradicts the result of previous studies that support the positive effect of responsiveness on customer satisfaction (Janahi & al Mubarak, 2017; D. T. Nguyen et al., 2020).

Fifth, this study reveals that assurance has a significant relationship with customer satisfaction. Similar results from several studies (Naser Alolayyan et al., 2018; D. T. Nguyen et al., 2020) confirm this conclusion. This might be related to the trend of customers' demand who want the service application to provide more confidence and trust to them when using the application (Arcand, PromTep, Brun, & Rajaobelina, 2017).

Sixth, the result confirms that empathy has a significant relationship with Customer Satisfaction. Similar results from several studies (Naser Alolayyan et al., 2018; D. T. Nguyen et al., 2020) confirm this conclusion. From these results, we understand that the respondent's satisfaction is increased when more personalized attention is given by telemedicine providers. A study from (Moudatsou, Stavropoulou, Philalithis, & Koukouli, 2020) states that empathy has been proven to bring better patient health outcomes. This condition could lead to better customer satisfaction.

Seventh, this study also reveals that Customer Satisfaction has a significant impact on Customer Loyalty. These outcomes support the existing study literature that has shown the significant impact of customer satisfaction on customer loyalty (Carranza et al., 2018; El-Adly, 2019; Huang & Sudhir, 2021). Similarly, the study conducted by (Dam & Dam, 2021) also proved the same correlation. The respondents who are satisfied with telemedicine application, will tend to use the application again in the future. The evidence is supported by 75.5% of respondents that would like to use telemedicine application again in the future, based on a five-point Likert scale question related to customer loyalty (CL 1).

Furthermore, including a mediator in the analysis has further helped in determining under what conditions Service Quality and System Quality could advance Customer Loyalty. From the study results, customer satisfaction did not have any mediating role in the relationship between system quality dimensions (ease of use, response time, security) and customer loyalty. In addition, the relationship between service quality dimensions (responsiveness, assurance, empathy) and customer loyalty is not mediated by customer satisfaction. These finding outcomes contradict the result of previous studies that support mediating role of customer satisfaction between system quality and customer loyalty (Ngoc Duy Phuong & Thi Dai Trang, 2018; Wilson et al., 2020); and between service quality and customer loyalty (Hadi et al., 2019; Slack & Singh, 2020).

This research demonstrated the relationship between system quality dimensions (ease of use, response time, security), service quality dimensions (responsiveness, assurance, empathy), customer satisfaction, and customer loyalty.

6. Conclusion

This study concludes the importance of ease of use, assurance, and empathy in gaining customer satisfaction. Moreover, this research confirmed the positive relationship between customer satisfaction and customer loyalty. From the management perspective, this research suggested several action plans that could be implemented by telemedicine services providers to improve their customer satisfaction and customer loyalty.

Research Limitation and Suggestions for Future Research

First, there's a gap between initial target respondents (150 respondents) and the valid responses (102 respondents). There might be an issue with the representativeness of the sample since the valid responses are limited. Future research should provide more valid responses to represent the population. Second, the moderating effect of demographic factors and education in this study has not been considered, the results of the effect of demographic factors and education on telemedicine customer satisfaction and customer loyalty would provide better insights in future research. Lastly, customer loyalty and customer satisfaction have been measured in terms of system quality dimensions (ease of use, response time, security) and service quality dimensions (responsiveness, assurance, empathy). Future research might explore other important indicators i.e efficiency, fulfilment, perceived usefulness, customer trust, and brand perception for further investigation.

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