The Effect of System Quality, Information Quality and Service Quality Towards Customer Loyalty Using Mobile Banking Application

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Authors’ contributions

This work was carried out in collaboration among all authors. Author MAM designed the research concept, conducted a survey and conducted hypothesis testing. Author WAW is looking for literature studies, hypothesis testing, and writing discussions. Author ASK seeks literature studies, conducts surveys and writes discussions. All authors read and approved the final manuscript.

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Abstract

**Aims/ Objectives:** This study aims to examine the effect of system quality, information quality and service quality on customer loyalty with satisfaction as a moderating variable for users of the mobile banking application of Bank BRI Jember Branch.

**Study Design:** Quantitative Research

**Place and Duration of Study:** This research was conducted between March 2021 to May 2021. The research location is Bank BRI Jember Branch.

**Methodology:** The data in this study used a questionnaire distributed to customers of Bank BRI Jember Branch in the use of mobile banking applications. In this study, quota sampling technique was used to determine the number of samples taken, namely 390 customers of Bank BRI Jember Branch.

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Results: The system quality variable (X1) has a p value of 0.005 on customer loyalty through customer satisfaction, quality information (X2) has a p value of 0.003 on customer loyalty through customer satisfaction and the service quality variable (X3) has a p value of 0.405. Meanwhile, customer satisfaction (Y) has a p value of 0.127 on customer loyalty.

Conclusion: This study rejects H1, H2 and H3 namely system quality (X1), information quality (X2) and service quality (X3) which directly have no effect on customer loyalty (Z) and accept H4 directly, customer satisfaction has a significant effect. significant to customer loyalty. While indirectly the quality of the system (X1) and the quality of information (X2) have a significant effect on customer loyalty (Z) through variables that affect customer satisfaction (Y) which means that it supports hypotheses H5 and H6. In contrast to service quality (X3) which has no significant effect on customer loyalty (Z) through customer satisfaction (Y).

Keywords: Customer loyalty; customer satisfaction; system quality; information quality; service quality; mobile banking.

1 INTRODUCTION

Countries in the world, including Indonesia, are countries that are competing in creating and following the development of information technology, especially in the very fast and massive economic and business sectors. This will directly affect the mindset of individuals and the company’s business performance to develop business innovation. In addition, currently many countries in the world are starting to compete with each other to create some inventions, especially in the field of information technology that will be able to compete with other companies. One example in Indonesia is Bank BRI. Bank BRI is currently active in developing their services for the information technology sector. In 2015, Bank BRI was the only bank that launched a private satellite for the first time in Indonesia. This shows that BRI is very concerned about the developments needed in this modern era. By developing information technology, BRI is expected to have better service facilities and systems than other banks and can also improve their reputation in the community. One of the products for customers produced by Bank BRI in technology development is the mobile banking application. With the mobile banking application, the transaction process will be easier such as making money transfers, checking balances, checking or paying credit cards, mutating savings accounts and also creating new accounts. The mobile banking application allows customers to make transaction anywhere or no longer required to come to the bank office in order to avoid queues, and then the transaction activities will be more efficient.

According to [1], there are several advantages of mobile banking for customers, such as providing convenience and efficiency in conducting transactions. As for banking, mobile banking can replace some manual service facilities such as opening an account that does not need to spend a lot of paper in filling in the identity. In addition, there are also several weaknesses in the use of mobile banking, including fraud by hackers, unwanted transactions occur if the customer experiences the loss or theft of a cellphone, data misuse can occur, the internet connection must be stable, and there is the potential for transaction errors to occur to other customers. Bank BRI as a company implementing mobile banking applications must prioritize security and quality in the use of information systems with the aim that customers get satisfaction from the services and products provided by Bank BRI.

In providing services and products to customers, Bank BRI also competes with other domestic banks. They have confidence that by developing the quality of information system services, companies will be able to increase their income or profits and can also improve the reputation of the company or institution. So that Bank BRI must pay attention to and develop any services or products that are needed and desired by customers. In addition, Bank BRI also has to
be able to pay attention and analyze how the development of technology in the economic and business sectors. This is expected so that Bank BRI can take policies and make strategic steps in order to provide the best services and products to customers. Unfortunately, companies or banks cannot dictate what the wishes and preferences of customers are to use their services and products. One way is that Bank BRI must find solutions and breakthroughs on how their products and services can be the better and superior to other banks. The quality of services and products that are better than other banks will affect customer satisfaction and loyalty, so that customers will not switch to use the services and products from other companies.

Customer loyalty is a measure of qualities to a product or service. The benchmark of how likely customers are to switch to other banks in using these products or services if it is known that there are changes, both in terms of service quality or other attributes [2]. Customer loyalty occurs as a result of several factors, one of which is customer satisfaction. Customer satisfaction must be considered by the bank, with the aim of increasing the reputation of the bank to get and be able to compete with other banks. Customers who are satisfied with the services of a bank will create a high loyalty attitude.

Based on the description above, the author are interested in developing this problem with the information system success model created by DeLone and McLean [3], namely system quality, information quality and service quality. The success model of DeLone and McLean is related to user interest and user satisfaction as well as net benefits.

Based on the description that has been explained, the formulation of the problem in this study is:

1. Do system quality, information quality and service quality simultaneously affect customer satisfaction?
2. Does the quality of the system affect customer satisfaction?
3. Does the quality of information affect customer satisfaction?
4. Does the service quality affect customer satisfaction?
5. Does customer satisfaction affect customer loyalty?

1.1 Customer Satisfaction

Customer satisfaction is a measure of the perceived performance of employees in accordance with the wishes of a customer. If the employee’s performance is worse than expectations, the customer will feel dissatisfied with the employee’s performance [4]. Meanwhile, according to [5], satisfaction is a remedial action after a transaction where there are several options from the chosen solution and provide results (outcomes) equal to or exceeding customer expectations, while dissatisfaction is obtained if the results and desires obtained are not in line with expectations. In order to create satisfaction from customers, company management must know the things that cause customer satisfaction. With the creation of customer satisfaction, it can create and improve cooperative relationships between financial institutions and customers which will also create a sense of loyalty to customers so as to improve the reputation of the institution or company [6].

According to [7], there are several indicators of satisfaction, namely 1) studying customer wants and needs for the services offered; 2) determine customer needs, wants, requirements and expectations; 3) eliminate all existing problems; 4) evaluate whether service improvement and customer satisfaction are in line with company expectations; 5) analyze whether the increase in performance has an effect on increasing profits; 6) make the next plan to be done; 7) implement thenext improvement process continuously.

Customer satisfaction is generally described in two forms of service as follow. 1) Materials, such as suitable buildings or offices, neat room decorations, comfortable and clean waiting rooms, clean and fragrant toilets, clean and comfortable places of worship, ATM machines which is always active, clean and never in trouble, as well as complete facilities and infrastructure; 2) Inmaterial, such as friendly, ethical, agile and communicative employees; good service;
customers feel well served; customers feel happy and satisfied.

### 1.2 System Quality

System quality is a characteristic of the information contained in the system where the quality of the system is based on how the quality of the hardware, software, and governance policies of the information system can produce the required information [8]. According to [8], there are several indicators used to illustrate the quality of the system as follow. 1) easy to use; 2) easily accessible; 3) access speed; 4) resistance from damage. With the development of an information system in the form of a mobile banking application for banking, it can provide convenience to customers in conducting transactions that are more efficient and more effective.

Research conducted by Risdiyanto [9] found that the quality of the system has a positive and significant effect on user satisfaction. Meanwhile, in the study by Zai and Anastasya [10], it was found that the quality of the system had no effect on the satisfaction of information system users. When a direct test was conducted on customer loyalty, Wijayanti [11] found that the quality of the system had no effect on customer loyalty.

### 1.3 Information Quality

Information quality is the quality of the results in the form of information generated by the system used [12]. According to [13] information quality is the degree to which information has characteristics of content, form and time that can provide benefits to certain users or customers. So that in the use of mobile banking the information produced must provide benefits in making company or organizational decisions. DeLone and McLean [3] describe four characteristics of information quality including information accuracy (accuracy), timeliness (timeliness), completeness of information (completeness), and presentation of information (format).

Research conducted by Asnawi [14] found that the quality of information has a significant effect on system user satisfaction. The results of this study are not in accordance with research conducted by Radityo and Zulaikha [15] which states that the quality of information does not affect the satisfaction of information system users. Wijayanti [11] who also tested the effect of information quality on customer loyalty, found that there was no effect of information quality on customer loyalty.

### 1.4 Service Quality

Service quality is an activity given to customers with the aim of customer satisfaction. One of the parameters to assess how the quality of service provided by employees is from customer satisfaction [16]. DeLone and McLean [3] describe five indicators that can be used as benchmarks for service quality, including tangibles, reliability, responsiveness, assurance and empathy. If customers who use mobile banking get good service quality from company or bank employees, then customers will feel satisfaction in using mobile banking.

Research conducted by Hsu et. al. [17] shows that service quality has a significant and positive effect on user satisfaction of information systems. This research is not consistent with the research conducted by Mardiana et al. [18] which shows that service quality has no significant effect on customer satisfaction. In addition, in a study conducted by Wijayanti [11], it was found that service quality had no effect on customer loyalty.

### 1.5 Customer Loyalty

Customer loyalty is defined as the willingness and desire of customers to reuse the required services and their willingness to become partners to cooperate with institutions or companies. Being a partner means the willingness to use the services provided on an ongoing basis, provide recommendations and suggestions to others and be willing to provide information to institutions or companies if an error occurs in service operations [19]. Meanwhile, according to [20], customer loyalty means the company’s ability to place its products or services in the hearts of customers, by making customers as partners by convincing customers, and communicating to
develop for the good of all parties. There are four stages of customer service loyalty, including:

1. Cognitive loyalty. Feeling that one product is preferred over another based on information about the product received.
2. Affective loyalty. Consumer interest in a product must be higher than product interest from other companies, both in attitude and product quality.
3. Conative loyalty. The desire to reuse or be loyal is an act that can be anticipated but not realized.
4. Action loyalty. This stage begins with a desire and motivation, then followed by anyone to act and want to overcome all obstacles to take action.

There are several indicators that can describe loyalty as follow. 1) Purchase of products or use of services on an ongoing basis; 2) Make a lot of purchases of products or use of services offered by the company; 3) Recommend against others; 4) Do not use the services or products of other companies [21]. Research conducted by Maharani [22] shows that customer satisfaction has a significant and positive effect on customer loyalty.

2 RESEARCH METHODOLOGY

This study aims to analyze and examine the effect of independent variables, namely system quality (X1), information quality (X2), service quality (X3), customer satisfaction (Y) and customer loyalty (Z). The test used in this study is a path analysis test. Path analysis test is a test to find out how the causal relationship is with the aim of explaining the direct effect of the independent variable on the moderating variable and the effect of the moderating variable on the dependent variable. The type used of this research is explanatory research, i.e., research explains the influence relationship between variables through testing the formulated hypothesis. The data was obtained from a questionnaire based on the views, assessments, responses or perceptions of the customers of Bank BRI Jember Branch in the use of mobile banking applications. The sampling technique in this study used quota sampling. The quota sampling method is used to determine the number of samples taken, namely 390 Bank BRI customers in the Jember Branch. This research was conducted between March 2021 to May 2021. The research location is Bank BRI customers who use mobile banking spread across all branches in Jember.

2.1 Research Conceptual Framework

The research conceptual framework can be described in Figure 1 as follows:

![Figure 1. Research Conceptual Framework]

KS = System Quality
KI = Information System
KL = System Service
KN = Customer Satisfaction
LN = Loyalty Customer

2.2 Research Hypothesis

Based on several theories, the hypotheses in this study are:
H1: System quality affects customer loyalty
H2: Information quality affects customer loyalty
H3: Service quality affects customer loyalty
H4: Customer satisfaction affects customer loyalty
H5: System quality affects customer loyalty through customer satisfaction
H6: Information quality affects customer loyalty through customer satisfaction
H7: Service quality affects customer loyalty through customer satisfaction.
2.3 Past Research

Billah [23] in his service research found that security and education to customers are important priorities in the development of mobile banking. Bank BRI also makes efforts to protect customers when conducting online transactions. Meanwhile, Sari [24] conducted a study to examine the effect of information system quality, information quality and service quality on Uber user satisfaction. The results show that the system quality variable has a positive effect on Uber user satisfaction, information quality has a positive effect on Uber user satisfaction, and service quality has a positive effect on Uber user satisfaction. Rachman [25] conducted a study to determine and test the effect of system quality, information quality and service quality on customer satisfaction of Taxi Online Go-Car in Banyuwangi Region. The results of this study indicate that the variables of system quality, information quality and service quality have a positive effect on customer satisfaction of Taxi Online Go-Car Banyuwangi region.

3 RESULTS AND DISCUSSION

This research was conducted by reviewing an object including observations, observations, interviews, literature studies and filling out questionnaires. The research data was carried out by distributing questionnaires to customers of Bank BRI Jember Branch who used mobile banking applications. The number of BRI Bank customers who use mobile banking is 15,000 people. In determining the research sample, the researcher used the Slovin formula in Eq. 3.1 as follow.

\[
\frac{N}{N - (d)^2 + 1} = n
\]  

(3.1)

Description: \( n \) = sample, \( N \) = population, \( d \) = precision value (95%) or significance (0.05).

So, the number of samples obtained is

\[
\frac{15000}{15000 - (0.05)^2 + 1} = 389.61 \approx 390
\]

There were 390 questionnaires distributed. Furthermore, the questionnaire will be processed using the SMART PLS version 3 application.

3.1 Reliability and Validity

The reliability test is used to determine the consistency of the measuring instrument, whether the measuring instrument is reliable and remains consistent if the measurement is repeated. A study is said to be reliable if the Cronbach's Alpha value is greater than 0.7. Validity test is the accuracy of an instrument in measurement. A data is said to be valid if the average variance extracted (AVE) value is greater than 0.5.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>0.80</td>
<td>0.50</td>
</tr>
<tr>
<td>X2</td>
<td>0.82</td>
<td>0.64</td>
</tr>
<tr>
<td>X3</td>
<td>0.77</td>
<td>0.52</td>
</tr>
<tr>
<td>Y</td>
<td>0.79</td>
<td>0.55</td>
</tr>
<tr>
<td>Z</td>
<td>0.70</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Based on Table 1, Cronbach's Alpha value is obtained for all variables above 0.7 (X1 = 0.80; X2 = 0.82; X3 = 0.77; Y = 0.79; Z = 0.70), so it can be said that all variables are reliability. In addition, the average variance extracted (AVE) is obtained for all variables above 0.5 (X1 = 0.50; X2 = 0.54; X3 = 0.52; Y = 0.55; Z = 0.63), thus all variables meet the validity test.

3.2 Multicollinearity Test

Multicollinearity test is a test carried out to ascertain whether in a regression model there is intercorrelation or collinearity between independent variables. It is said that multicollinearity occurs if the value of the variance inflating factor (VIF) is greater than 5.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>2.05</td>
<td>3.00</td>
</tr>
<tr>
<td>X2</td>
<td>2.33</td>
<td>2.35</td>
</tr>
<tr>
<td>X3</td>
<td>2.36</td>
<td>2.85</td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td>3.74</td>
</tr>
</tbody>
</table>

Based on Table 2, all VIF values are less than 5. So it can be said that there is no multicollinearity in the regression model.
3.3 Effect of System Quality, Information Quality, Service Quality on Customer Satisfaction

Table 3 shows that the value of R² is 0.73, which means system quality (X1), information quality (X2) and service quality (X3) have an effect of 73% on customer loyalty. When viewed from each system quality variable (X1), information quality (X2) and service quality (X3) each have an influence of 46%, 1.1% and 20% on customer satisfaction. The quality of the system has a significance probability value of 0.00, which means that the quality of information has a significant effect on customer satisfaction. While the quality of information has a significance probability value of 0.02 which can be said that the quality of information affects customer satisfaction. Likewise with service quality which has a significance probability value of 0.00 which means that service quality has a significant effect on customer satisfaction.

3.4 Influence of System Quality, Information Quality, Service Quality and Customer Satisfaction on Customer Loyalty

Table 4 shows that the magnitude of the influence of system quality (X1), information quality (X2), service quality (X3) and customer satisfaction (Y) directly on customer loyalty (Z). From the table, it can be seen that $f^2$ system quality and service quality are worth 0.00 or 0% for customer loyalty of 0%. The quality of information has a value of $f^2$ is 0.02 or 2% of customer loyalty. Meanwhile, customer satisfaction has a value of $f^2$ of 0.12 or 12% of customer loyalty. From Table 4 it can be seen that only customer satisfaction (Y) has a significant effect on customer loyalty (Z) with a significance probability value of 0.00, which means H4 is accepted. While the system quality (X1), information quality (X2) and service quality (X3) have no direct effect on customer loyalty (Z) with each significance probability value, respectively, 0.81; 0.09; 0.93. These results mean that H1, H2 and H3 are rejected.

3.5 Effect of System Quality, Information Quality, Service Quality on Customer Loyalty through Intervening Variables of Customer Satisfaction

Table 5 shows how the influence of system quality (X1), information quality (X2) and service quality (X3) indirectly on customer loyalty (Z) through customer satisfaction (Y). It can be seen that the value of R² is 0.454, which means that the influence of system quality (X1), information quality (X2) and service quality (X3) on customer loyalty (Z) through customer satisfaction (Y) is 45.4%. Based on the probability of significance, system quality and information quality have p values of 0.005 and 0.003, respectively, which mean that system quality and information quality have a significant effect on customer loyalty through customer satisfaction. Thus, H5 and H6 are accepted. While the significance probability of service quality is 0.405 (p value > 0.05), which means that service quality has no effect on customer loyalty through customer satisfaction. So H7 is rejected.
4 CONCLUSIONS AND SUGGESTIONS

Based on the research that has been done, it is found that directly only the intervening variable customer satisfaction (Y) has a significant effect on customer loyalty (Z), while the independent variables are system quality (X1), information quality (X2) and service quality (X3) indirectly affect customer loyalty. Indirectly, system quality and information quality have a significant effect on customer loyalty through the intervening variable of customer satisfaction, while service quality has no effect on customer loyalty through the intervening variable of customer satisfaction.

Future researchers are expected to be able to take objects from several banks, so that they can find out how the comparison of Bank BRI, Bank BNI, Bank Mandiri, Bank BCA and others in the DeLone and McLean models on customer loyalty.

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COMPETING INTERESTS

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