Determination of User Satisfaction in Mobile Banking Services Using the Information Systems Success Model (ISSM) Perspective

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ABSTRACT
This study aims to determine the effect of Systems Quality, Information Quality, and Service Quality on User Satisfaction in Mobile Banking (M-Banking) users. The research method used was a quantitative approach by distributing questionnaires to 117 respondents of Mobile Banking users. Data analysis used was Partial Least Squares (PLS) where the results showed that System Quality and Information Quality affected the User Satisfaction of Mobile Banking. Increasing User Satisfaction through Information Quality and System Quality has become very important for banks. The effect of Service Quality did not directly affect User Satisfaction but was mediated by User Experience in using Mobile Banking for a long time, which can be a determining factor if the user has a positive image of the quality of Mobile Banking services.

Keywords: *systems quality, information quality, service quality, mobile banking, use, user satisfaction.*

1. INTRODUCTION

In Indonesia, Internet users are experiencing rapid growth from year to year [1]. The majority of Internet users use cell phones as their access tools [2]. This condition has been successfully exploited by most banks by launching IS-based e-channel innovations that can be directly accessed by mobile phones, smartphones, and Personal Digital Assistants (PDAs). This service is also called Mobile Banking or abbreviated as M-Banking [3, 4]. The trend in the number of banking transaction frequencies using M-Banking is increasing [5]. The success achieved by the implementation of M-Banking as a digital-based service is very interesting to study.

The technology acceptance model most widely used to measure M-Banking receipts [3, 6] is the Technology Acceptance Model (TAM) proposed by [7] The User Satisfaction perspective looks at the department or company that manufactures and provides M-Banking services which state that the success rate of implementing M-Banking is measured by System Quality, Information Quality, Service Quality, and Use [7].

Previous empirical studies have used the ISSM model to measure User Satisfaction [8-11]. This study aims to analyze the mediating effect of Use in M-Banking. Where the results of this research are expected to provide input for managers in the banking sector regarding the factors that influence the successful implementation of M-Banking and add to the existing literature, particularly studies empirical about the successful implementation of M-Banking.

1.1. Mobile Banking (MB)

MB or M-Banking can be described as a channel where customers communicate with banks through mobile devices, such as cellphones, smartphones, or Personal Digital Assistants (PDAs) [3, 4]. The MB application with the SMS model requires the user's mobile device to be connected to the Global System for Mobile (GSM) network while the user API model is quite connected to the data network, using a data package or Wireless Fidelity (WiFi) connected to the Internet.

1.2. Information System Success Model (ISSM)

This study adapted the ISSM model [8]. This model has six (6) constructs that are interconnected. The construct consists of quality dimensions which consist of system, information, and service. These dimensions affect Use and User Satisfaction both directly and indirectly. Figure 1 shows the measurement model of this research.

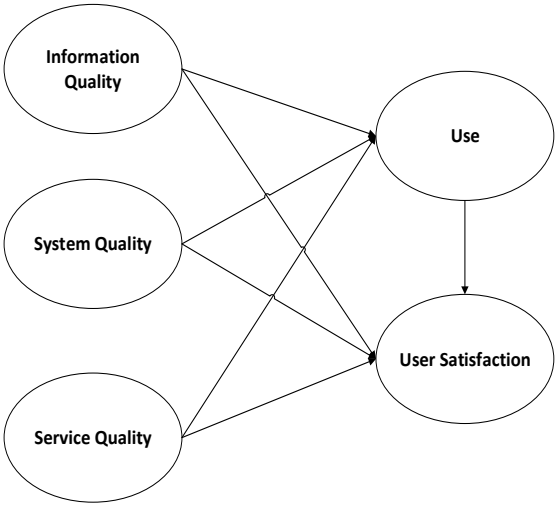

Figure 1. Measurement Model [8]

1.3. Information Quality (IQ)

IQ measures the quality of the output of information systems. The experience of using services during the post-implementation phases can be affected by the MB data format, such as general product and requirements for use. Where the information is irrelevant, unreliable, or obsolete, consumers may doubt the credibility of service providers and the ability to provide quality services [12-14]. Low quality of information would frustrate user experience, as making a great deal of effort to find information will impact user satisfaction level. Hence this analysis indicates the following hypothesis:

H1. IQ has a positive effect on MB use.

H2. IQ has a positive effect on MB user satisfaction.

1.4. Systems Quality (SQ)

As part of the consistency aspect of the system, [15] examined system reliability, system precision, accessibility, online response time, and ease of use. In particular, they include Bailey and Pearson's four measures in system efficiency, namely: ease of access, system versatility, system integration, and response time [16]. MB systems have several negative effects, including small displays, crowded keypads, limited bandwidth capacity, and other restrictions [13, 17, 18]. Poor SQ will intensify user experience because MB increases their difficulties and cannot satisfy users. A study using the meta-analysis method [19] about ISSM produced a strong conclusion that SQ was very influential on User Satisfaction and Use. SQ on MB had a positive effect on User Satisfaction [9]. Within this analysis, two hypotheses were tested:

H3. The SQ has a positive effect on MB use.

H4. The SQ has a positive effect on MB user satisfaction.

1.5. Service Quality (SRVQ)

A decade after the successful D&M IS model, in the "Ten Year Update" article the SRVQ dimension was added to the [7] models. According to them, the standard of service is the total support rendered by the service providers, whereas according to Petter et al [20], it is the level of service received by system users from the Information Systems (IS) department and its support staff, such as responsiveness, reliability, conciseness, technical competence and employee empathy. In an empirical analysis of the banking sector [21, 22] SRVQ has been found to have a significant effect on user satisfaction and user emotional responses. Low SRVQ can frustrate users and low user satisfaction with MB. Therefore, the hypothesis proposed is:

H5. The SRVQ has a positive effect on MB use.

H6. SRVQ has a positive effect on MB user satisfaction.

1.6. Use (U) dan User Satisfaction (US)

US is the user's view of the particular computer program they use [23]. A positive experience because of the use will result in increased US. These studies used real usage by measuring the number of requests for information from users or the amount of connection time from users. Upon assessing the overall system efficiency, use and US were focused on in this study. While, as noted by [3], some MB studies concentrating on the adoption of MB does not provide a conclusion about the implications of usage. A positive experience because of the use will result in increased US. Therefore, this study suspects:

H7. Use has a positive effect on US in MB.

2. METHODS

Sampling in this study used the Purposive Sampling method, namely sampling with a specific purpose [24]. Because the exact number of MB users in Indonesia is unknown, the minimum sample withdrawal is 10 times the highest number of items in the model constructions used in this study [25, 26]. The highest number of items is 6 items from the SQ construct. Then the minimum sample that must be obtained is 60 respondents. The manifest variables used for the constructs SQ, IQ, and

SRVQ in this study were adapted from research conducted by [27]. Whereas the U and US construct was adapted from a research by [27, 13]. All of these variables were translated into Indonesian and adjusted to the research object of Mobile Banking [6]. A Likert scale of 1 to 5 was used in the answers to the questions given. Data was collected electronically using Google Forms. Data were collected for four (4 days, from 19 to 23 November 2019). This study used Smart PLS 3.2.8 to evaluate items from the measurement and testing of hypotheses.

3. RESULTS AND DISCUSSION

3.1. Result

was obtained. Only 117 samples of data were declared eligible for analysis. In more detail, the profile of respondents can be seen in Table 1.

Table 1. CHARACTERISTICS OF RESPONDENTS

Total Respondent n = 117		**Total**	**Percentage**
Gender	Male	78	66,66%
	Female	39	33,33%
Age	17 sd 27 year	79	67,52%
	28 sd 38 year	18	15,38%
	39 sd 49 year	18	15,38%
	>50 year	2	1,70%
Status	Lecture	10	8,54%
	Employee	32	27,35%
	Student	75	64,10%

The measurement model will emphasize measurements on Convergent and Discriminant Validity [28]. Convergent Validity will measure three things, namely: item reliability or question indicators on the questionnaire, Composite Reliability (CR) of the construct, and Average Variance Extracted [29]. Discriminant Validity has an aim to ensure that reflective constructs have the strongest relationship with their indicators compared to other constructs in the PLS pathway model [30].

The measuring outputs of the model are shown in Table 2 and 3. The reliability of the successful indicators is assessed on the basis that the loadings will surpass 0.70 [31, 32] (Outer Loadings). As shown in table 2, Loadings are above 0.70. Only IQ6 and U1 items have a loading value of less than 0.7. Especially for the two (2) items removed from the model. CR results which are greater than 0.7 suggest strong internal consistency for the model [33]. Average Extracted Variance (AVE) is used to check the validity of the convergent. AVE must be above 0.50 because latent variables clarify over half the predictor variants. [29-31, 34, 35].

Table 2. ISSM Model Measurement Results On Mb

Construct	**Item**	**Loading**	**AVE[b]**	**CR[c]**	**RhoA[d]**
Information Quality	IQ1	0.834	0.710	0.924	0.902
	IQ2	0.829			
	IQ3	0.874			
	IQ4	0.856			
	IQ5	0.818			
System Quality	SQ1	0.906	0.782	0.915	0.861
	SQ5	0.912			
	SQ6	0.833			
Service Quality	SRVQ1	0.791	0.659	0.885	0.845
	SRVQ2	0.875			
	SRVQ3	0.855			
	SRVQ4	0.717			
Use	U2	0.835	0.766	0.867	0.744
	U3	0.913			
User Satisfaction	US1	0.927	0.869	0.952	0.928
	US2	0.937			
	US3	0.933			

Item issued: item indicator <0.7: IQ6 and U1

The validity of the discriminant applies to two factors. At first, the square root of the AVE (diagonal element) is larger than the correlation between each pair of constructs (elements outside diagonal numbers) [29]. Table 3 shows that the square root AVE (in bold) is higher than that of a construct.

To fulfill the Fornell and Larcker criteria, this study released three items, namely SQ2, SQ3, and SQ4. This is because the AVE square value of the SQ construct is smaller than the US construct.

Second, to ensure discriminant validity, the value of loading items associated with a construct (in bold) must be greater than the value of Cross-Loadings (vertical and horizontal values of other constructs) [36-37]. Item US4 (0.761) is excluded from the model because the loading value is smaller than from SQ5 (0.782) and U3 (0.792). After removing the item, the model can meet the requirements of Cross Loadings.

Table 3. Fornell & Larcker Measurement Results

	IQ	**SQ**	**SRVQ**	**U**	**US**
IQ	**0.843**				
SQ	0.754	**0.884**			
SRVQ	0.574	0.560	**0.812**		
U	0.623	0.750	0.610	**0.875**	
US	0.721	0.800	0.632	0.783	**0.932**

Measurement tests of the measuring model show that the model has internal consistency, variable reliability, convergent validity, and strong discriminating validity. Table 4 shows the cross loadings measurement.

Table 4. Cross Loadings Measurement

	IQ	SQ	SRVQ	U	US
IQ1	**0.834**	0.689	0.522	0.562	0.622
IQ2	**0.829**	0.599	0.471	0.501	0.648
IQ3	**0.874**	0.706	0.523	0.582	0.651
IQ4	**0.856**	0.590	0.428	0.502	0.597
IQ5	**0.818**	0.579	0.469	0.466	0.500
SQ1	0.587	**0.906**	0.462	0.651	0.692
SQ5	0.645	**0.912**	0.448	0.672	0.745
SQ6	0.770	**0.833**	0.577	0.665	0.684
SRVQ1	0.381	0.294	**0.791**	0.358	0.380
SRVQ2	0.488	0.410	**0.875**	0.467	0.483
SRVQ3	0.360	0.361	**0.855**	0.414	0.426
SRVQ4	0.551	0.623	**0.717**	0.630	0.649
U2	0.405	0.546	0.474	**0.835**	0.569
U3	0.655	0.744	0.584	**0.913**	0.779
US1	0.624	0.712	0.582	0.682	**0.927**
US2	0.665	0.735	0.553	0.731	**0.937**
US3	0.721	0.786	0.628	0.772	**0.933**

In Figure 2, which is the result of measurements in this model, it can be seen that the R-Square Adjusted Model for the Use is 0.606. This means that the ability of exogenous variables IQ, SQ, SRVQ in explaining Use is 60.6% or can be categorized as moderate [35, 38]. The R-Square Adjusted Model for US is 0.739. This means that the ability of IQ, SQ, SRVQ, U in explaining US by 73.9% is included in the medium category [35, 38].

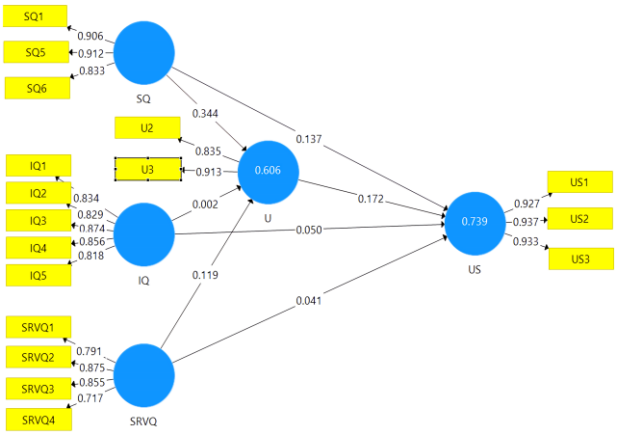

Figure 2. Statistic Model

IQ (β = 0.179, ** p <0.05) shows statistical significance in explaining User Satisfaction, so that the H2 hypothesis is accepted. However, IQ is not statistically significant in explaining Use, so that the H1 hypothesis is rejected. The value of SQ (β = 0.570, *** p <0.01) shows that it is statistically significant in explaining Use, so that the H3 hypothesis is accepted. Likewise, the significance of SQ (β = 0.338, *** p <0.01) on US means that H4 is accepted. SRVQ (β = 0.269, *** p <0.01) shows statistical significance in explaining Use, so that the H5 hypothesis is accepted. However, IQ is not statistically significant in explaining Use, so hypothesis H6 is rejected. Use values (β = 0.336, *** p <0.01) show statistically important to describe US. All the β values in Table 5 are positive showing that H2, H3, H4, H5, and H7 have a positive effect on the endogenous construct of Use and US.

Table 5. Hypothesis Test Results

Hypothesis	β	Result	f^2	Effect Size
H1: Information Quality to Use	0.039	Rejected	0.002	none
H2:Infomation Quality to User Satisfaction	0.179**	Accepted	0.050	small
H3:Sytems Quality to Use	0.570***	Accepted	0.344	medium
H4:Sytems Quality to User Satisfaction	0.338***	Accepted	0.137	small
H5:Service Quality to Use	0.269***	Accepted	0.119	small
H6: Service Quality to User Satisfaction	0.135	Rejected	0.041	none
H7:Use to User Satisfaction	0.336***	Accepted	0.172	medium

Notes: Effect size: > 0.350 large; 0.150 and ⩽ 0.350 intermediate; 0.020 and ⩽0.150 are small [36, 39]. Path β: * p <0.10; ** p <0.05; *** p <0.001

Table 5 reports on the f2 evaluation of the structural model [40]. The effects of one structure on another were calculated by comparing the R2 values of all endogenous constructs. All organizational paths that are important to US and use in this model have a small to medium-sized impact. This research was carried out using a path model blindfolding technique (Q2) to test the predictive value. Q2 value greater than 0 suggests that the model has a predictive potential for certain endogenous constructions. On the other hand, the values 0 and below display a lack of predictive ability [31]. Within this model all Q2 values have been substantially higher than 0 (Use = 0.419; US = 0.599).

Mediation analyses take place when an intermediary role plays in the third construct (mediator construct) between the two associated constructs [41, 42]. It is defined in more detail in PLS-SEM [30]. The analysis was carried out by looking at the coefficient of the significance of the t value from the exogenous variable

P1 to the mediator variable. The P2 value measures the coefficient of the significance of the t value from the mediator variable to the exogenous variable. While the P3 value is the significance coefficient of the t value from the exogenous variable to the endogenous variable (direct path). P3 value indicates a very strong significance ($p < 0.01$) between Use and US. This has fulfilled the requirements for measuring the effects of mediation [41].

From table 6 it can be seen that the mediating effect of Full Mediation occurs between the SRVQ construct and the US mediated by the Use construct.

Table 6. Analysis of Mediation Effects

Mediation Effect	Direct Effect (P1)	Direct Effect (P2)	Direct Effect (P3)	Indirect	Interpretation
IQ -->U--> US	0.039(0.386)	0.336***(4.145)	0.179**(2.108)	0.013(0.379)	No Mediation
SQ -->U--> US	0.570***(6.900)	0.336***(4.145)	0.338***(3.541)	0.192***(3.265)	Partial Mediation
SRVQ-->U-->US	0.269***(3.145)	0.336***(4.145)	0.135(1.690)	0.090**(2.425)	Full Mediation

Path β: *p<0.10; **p<0.05; ***p<0.001

3.2. Discussion

Based on the findings outlined in the sections above, it indicates that the proposed research model tested in this study was able to achieve a satisfactory degree of predictive power obtained by dependent constructs: Use (60%) and User Satisfaction (73%). SQ and IQ affected US in MB systems, which aligns with the previous study [8 11]. SQ and SRVQ affected Use, which is in line with previous research [10]. The mediation effect of Use from SRVQ to US was Full Mediation, and this result is in line with the previous study [43].

4. CONCLUSION

The validation of the ISSM model that is formed through SQ and IQ is proven to affect US on MB services. Banks as MB service providers must continue to improve the quality of the system according to the criteria expected by users, so that the level of use will increase. Apart from that, in the future, the quality of information must be maintained and improved. Unattractive information, inaccurate information, and language that are not easily understood are the deficiencies of the quality of information that can reduce customer satisfaction. To use MB for a long time, more responsive service quality and a solution to the disturbances experienced by users are needed.

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