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Assessing the User Satisfaction Perspectives of Information System: A Library Case Study in Indonesia

Syopiansyah Jaya Putra, A'ang Subiyakto, Irma Yunita, Muhamad Nur Gunawan, Yusuf Durachman
Syarif Hidayatullah State Islamic University Jakarta, Jl. Ir. H. Juanda No.95 Tangerang 15412
Indonesia Ph/Fax: +6221 7401925/+6221 7493315

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ABSTRACT

User satisfaction is one of the system use variables which is affected by the system creation variables in the information system (IS) success measurements, especially in the mandatory use of IS. This paper reports the relational variable assessments between three variables of the system creation dimension towards the user satisfaction variable in the library information system (LIS) implementation of a sampled university in Indonesia. Practically, the measurement has never been done since the early system implementation in the institution. The study focused on the status of the user satisfaction construct and what are the factors which influenced the construct. The used measurement model was adopted and adapted from the DeLone and McLean's IS success model. A total of 185 respondents were selected in this study using multi-stage purposeful random sampling. The researchers used the partial least squares structural equation modeling (PLS-SEM) with the SmartPLS version 2.0 for analyzing the collected data. Findings of the study showed that users of the LIS were sufficiently satisfied and the proposed hypotheses were accepted. In terms of the adopted model, besides the findings theoretically proved that the user satisfaction construct has affected by the system creation constructs; the findings may also have proposed the practical recommendations to the sampled institution for the next LIS improvements in particular.

Corresponding Author:

Syopiansyah Jaya Putra,
Syarif Hidayatullah State Islamic University Jakarta,
Jl. Ir. H. Juanda No.95 Tangerang 15412,
Indonesia Ph/Fax: +6221 7401925/+6221 7493315.
Email: syopian@uinjkt.ac.id

1. INTRODUCTION

It is like the other IS implementations in the higher education institution's (HEI) business functions, the implementation of an LIS is also indispensable now. It is related to the essential functions of the system for the educational institutions, especially among the developing countries, like Indonesia. It is for supporting the research and data management services [1]. LIS is useful and helpful for students and lectures in the learning and research works. One of the issues of the IS success measurement is the user satisfaction [2-8]. Despite the fact that the previous studies [9, 10] indicated that the user satisfaction of LIS is significantly affected by factors of the system creation dimension and the satisfaction factors also affects the system success, in terms of the IS success model [2-8]; the phenomenon seems to be ignored in many LIS implementations among HEIs in Indonesia, including in the sampled institution. Despite LIS has been implemented for almost ten years, the preliminary study findings indicated that the system is not yet to be done by the stakeholders. Therefore, the user satisfaction assessment is still indispensable to be performed here.

This study was performed to know the status of the user satisfaction and to assess what factors that influenced the user satisfaction variable of the LIS. The objectives were to present status based on the user perspectives and to examine the influential factors referring to the used research model. In this study, the researchers adopted four constructs of the DeLone and McLean's [2] IS success model.

The paper is organized into five sections. In the introduction section, the authors explain the study background. In the literature review section, the scholars explain the literature review results and elucidate the theoretical framework of the used research model. In the research method section, the methodological explanations of the study are described sequentially following the research procedure. In results and analysis section, the researchers present the experimental results, its analysis, and the interpretation. Finally, the article is closed with the conclusion section.

2. LITERATURE REVIEW

The DeLone and McLean's [2] IS success model which is developed by the authors based on the process and the causal relationship of the dimensions in the model [11, 12]. Many studies have been referring and using the model [11, 12]. The popularity of the models shows strong evidence of the need to integrate research findings in a comprehensive manner in the IS success measurement topic. This model becomes a concern the researchers, as like Seddon [13] who criticize the model. According to Seddon, the main problem of the IS success model is trying to combine the processes and causal explanation of the success of IS in their models. Thus their model mixes between a process model and the variance model. Another criticism is that the system use is a behavior, so it should be removed as a success measurement of the causal model.

However, the authors of the IS success mode argue that system use must precede the impacts and benefits. They believe that the use of a system is an appropriate measurement to measure success in most cases [11, 12], as it is presented by many previous studies, especially in the 10 years since the model was first introduced. By examining more than 100 articles published in well-known journals of IS, e.g., the Journal of Management Information Systems, and MIS Quarterly since 1993, DeLone and McLean [11, 12] revise their model which now consists of six variables: information quality, system and service quality, intention to use / use, user satisfaction, and net benefits. Referring to the study of DeLone and McLean's [2] IS success model theory, the researchers adopted the 4 variables of the model, especially variables associated with user satisfaction, i.e., information quality (INQ), system quality (SYQ), service quality (SVQ), and user satisfaction (USF) (Figure 1). In terms of the mandatory issues [13-15], the usability variable was not used here. In detail, Table 1 shows the list of the used indicators of the model and Figure 1 shows the three hypothetical paths between three independent variables with the dependent one.

Table 1. References of the indicators

Code	Indicators	References
INQ1	Accuracy	DeLone & McLean [2] Urbach et al. [16] Al-Debei et al. [17]
INQ2	Consistency	
INQ3	Reliability	
INQ4	Timeliness	
INQ5	Customisation	
SYQ1	Ease of use	DeLone & McLean [2] Urbach et al. [16] Kwan [18] Yang et al. [19] Al-Debei et al. [17]
SYQ2	Reliability	
SYQ3	Flexibility	
SYQ4	Searchability	
SYQ5	Security	
SYQ6	Accessibility	
SVQ1	Reliability	DeLone & McLean [2] Roses et al. [20] Gorla et al. [21] Al-Debei et al. [11, 17]
SVQ2	Responsiveness	
SVQ3	Empathy	
SVQ4	Assurance	
USF1	Adequacy	DeLone & McLean [2] Petter et al. [11] Subiyakto & Ahlan[4]
USF2	Effectiveness	
USF3	Efficiency	
USF4	Overall satisfaction	

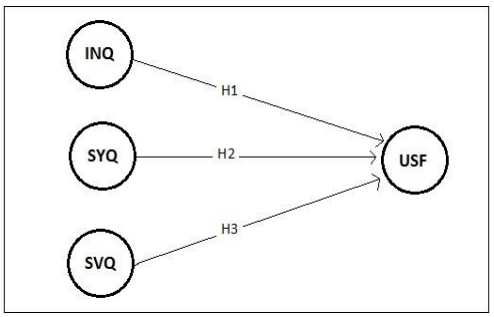

Figure 1. The research model

3. RESEARCH METHOD

This study was performed across its eight gradual stages, from the literature study in the first step into the report writing in the last one. Figure 2 presents the sequential implementation of the procedure, including the output of each stage. The population of the study (N= ± 21.067) was identified based on the human resource department database of the year 2016 in the sampled institution. The survey was conducted

by using a multi-stage purposeful random sampling technique [22-23] . Around 185 valid answers were then collected by online invitation survey. The first step was purposive sampling with the criteria that the respondents are the LIS users and the second step was simple random sampling technique. The instrument of the data collection technique was an online questionnaire using the Google Doc. This data collection instrument consisted of two main parts, i.e. the invitation letter page and question pages. The question part comprised of the six demographic questions and its 19 five-point Linkert scale questionnaires. The collected data were then processed by using the Microsoft Excel 2007 and the IBM SPSS version 20 to prepare for the analysis stage.

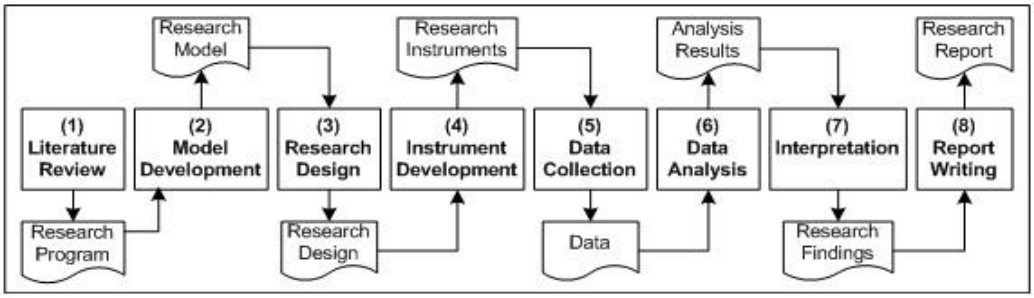

Figure 2. The research procedure

Sequentially, the researchers then analyzed the processed data by using the PLS-SEM method with the SmartPLS 2.0 statistic software [16, 24-29]. In the descriptive part of the analysis stage, the researchers analyzed the demographic data by using the Microsoft Excel 2007 in order to look the dissemination of the collected data. In addition, the inferential analysis was then performed through two assessments; i.e., the measurement and structural model assessments following the above mentioned the PLS-SEM studies. The first assessment was carried out by employing the indicator reliability, internal consistency reliability, convergent validity, and the discriminant validity examinations, in order to assess the psychometric properties of the outer model. On the other side, the second one was performed by implementing the path coefficient (β), the coefficient of determination (R2), t-test, effect size (f2), predictive relevance (Q2), and the relative impact (q2) assessments for evaluating its inner model. Furthermore, the interpretation stage was then focused on the hypothetical assessment among the six above mentioned assessments, referring to the determined research programs. Moreover, besides the results of the descriptive analysis, the previous findings of the similar studies were also discussed in the reporting stage.

4. RESULTS AND ANALYSIS

4.1. The demography information

Table 2 shows the demographic information, including gender, faculty, semester, and respondent opinion about library information system. The information indicated that most of them (73.5%) are the female respondents and the rest ones were male, majority of the people (44.3%) are from the science and technology students, the distribution is dominated by the final year students above 8th semester (33%), and then most of them (66.5%) use the systems only less than 3 times a week. Furthermore, majority respondents (92.5%) felt helped by the system, 22.2% of them even said that the system is very helpful in completing the work/study and 45.3% of the people were quite satisfied in using the system. In regard to the first purpose and objective of the study, it can be seen that the above-mentioned results indicated the user satisfaction status of the LIS implementation in the sampled institutions.

4.2. Results of the Statistical Analysis

First, results of the measurement model assessment show statistically that the measurement model indicates the good psychometric properties, even with two indicator rejections (i.e., SYQ3 and SYQ6). In detail, Table 3, Table 4 and Figure 3 describe the results.

a) Individual item reliability was evaluated by checking the value of standardized loading factor. The value describes the correlation between each measurement (indicators) item and its construct. The loading factor value above 0.7 considered as ideal. After three assessment times, SYQ3 and SYQ6 were then rejected because their loadings are under the threshold value (Table 3 and Figure 1).

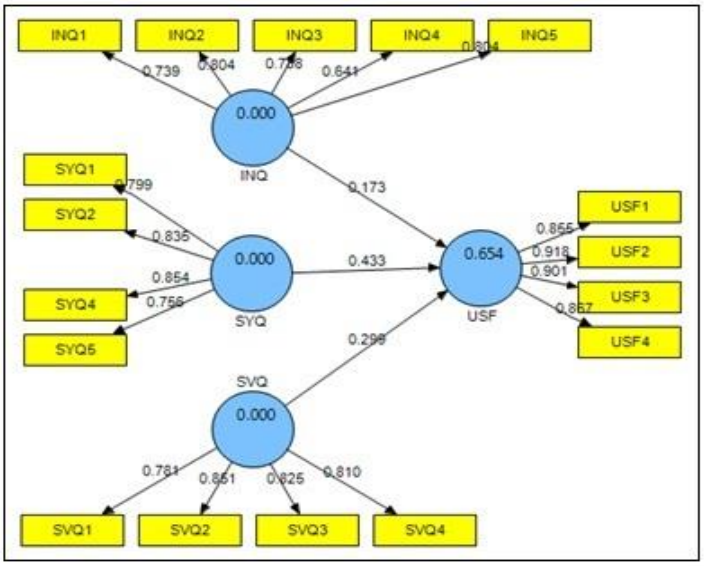

Figure 3. Results of the measurement model assessment

Table 2. Demographic information

Measures	Items	%
Gender	Female	73.5
	Male	26.5
Faculty	Islamic Studies	0.5
	Education	13
	Law	9.7
	Humaniora	3.2
	Philosophy	2.7
	Communication	2.7
	Science and Technology	44.3
	Economy and Business	9.7
	Social and Political Science	3.8
	Psychology	4.3
	Medicine	5.9
Semester	1 – 2	1.6
	3 – 5	36.2
	6 – 8	29.2
	> 8	33
The intensity of the system use in a week	< 3	66.5
	3 – 5	22.2
	5 – 10	7.6
	> 10	3.8
The role of LIS	Very helpful	22.2
	Helpful	31.4
	Quite helpful	38.9
	Less helpful	7
	Not helpful	0.5
User satisfaction level of LIS	Very satisfied	6.5
	Satisfied	31.4
	Quite satisfied	47
	Less satisfied	14.6
	Not satisfied	0.5

Table 3. Results of the outer model assessments

Items	Cross Loadings				AVE	CR
	INQ	SVQ	SYQ	USF		
INQ1	0.739	0.393	0.456	0.422	0.574	0.87
INQ2	0.804	0.462	0.474	0.473		
INQ3	0.788	0.454	0.491	0.505		
INQ4	0.641	0.416	0.395	0.37		
INQ5	0.804	0.618	0.653	0.631		
SVQ1	0.461	0.781	0.552	0.59	0.667	0.889
SVQ2	0.601	0.851	0.659	0.587		
SVQ3	0.416	0.825	0.512	0.51		
SVQ4	0.565	0.81	0.575	0.628		
SYQ1	0.44	0.511	0.799	0.556	0.659	0.885
SYQ2	0.612	0.644	0.835	0.665		
SYQ4	0.633	0.589	0.854	0.686		
SYQ5	0.452	0.541	0.756	0.54		
USF1	0.558	0.595	0.644	0.855	0.784	0.936
USF2	0.59	0.671	0.714	0.918		
USF3	0.571	0.623	0.705	0.901		
USF4	0.583	0.637	0.622	0.867		

Tabel 4. Discriminant validity

Items	INQ	SVQ	SYQ	USF
INQ	0.758			
SVQ	0.631	0.817		
SYQ	0.667	0.707	0.812	
USF	0.65	0.713	0.759	0.886

b) Internal consistency reliability was examined using composite reliability (CR) with the threshold value of 0.7 and above. Table 3 shows that overall CR values of the three variables were above 0.7.
c) Average variance extracted (AVE) was assessed with the limit value of 0.5 or above. The result can be seen in Table 3 which shows AVE values of the three variables were above 0.5.
d) Discriminant validity was tested by analyzing the cross-loading and comparing it to the root of AVE. The size of the cross loading is compared the correlation of indicator with its own construct and other

blocks construct. When the correlation between the indicators with its construct is higher than the correlation with another block, it indicates that the construct predicts the size of the block is better than the other block. The size of other discriminant validity is that the root value of AVE should be higher than the correlation between a construct and another construct. The result can be seen in Table 3 and Table 4 which shows that the value of cross loading indicator with a construct of the entire variable is higher than the correlation to construct another block. Similarly, AVE root value is higher than the correlation between a construct with the other construct.

Second, referring to the descriptions of the previous studies [16, 24-28], the psychometric properties of the outer model was then used as the standing point for continuing the inner model assessments. Table 5 shows that the structure model assessment results by using path modeling, bootstrapping, and blindfolding procedures.

a) Path coefficient (β) was evaluated with threshold value 0.1 or above to identify the significance of the path influence in the model. Results of this evaluation indicated that the three links were the significant paths.
b) The coefficient of determination (R2) was evaluated with three thresholds, i.e, around 0.67, about 0.33, approximately 0.19 and lower as substantial, average, and weak. Figure 1 presents that the three independent variables of the model explained substantially (65.4%) the USF variance.
c) the t-test was assessed by using bootstrapping method with the two-tailed test with 5% significance level to test the hypotheses of the study. Those hypotheses will be accepted if the value has a greater than 1.96. Table 5 shows that all hypotheses are accepted.
d) Effect size (f2) was assessed to predict the influence of each variable toward another in the model structure with threshold value about 0.02 for a small, 0.15 for medium, or 0.35 large influences. Table 5 represents that only one path that has a medium effect and the others has small effects.
e) Predictive relevance (Q^2) was evaluated by using blindfolding method to represent predictive relevance of the target endogenous variable with threshold value above the zero. Table 5 shows that of all the variables are predictive relevance.
f) Relative impact (q^2) was tested by using blindfolding method for measuring the relative influence of a certain predictive variables relationship with another variable with a value threshold of about 0.02 for a small influence, 0.15 for a medium/moderate influence, and 0.35 for a large influence. Table 5 shows the three paths have small influences.

Table 5. Results of the structural model assessment

Hs	B	t-test	R^2	f^2	Q^2	q^2			Analysis				
			R^2-in	R^2-ex	$\sum f^2$	Q^2-in	Q^2-ex	$\sum q^2$	β	t-test	R^2	f^2	q^2
H1	0.173	2.101	0.654	0.639	0.043	0.509	0.498	0.022	Sign	Acc	Mid.	Small	Small
H2	0.299	3.615	0.654	0.576	0.225	0.509	0.449	0.122	Sign	Acc	Mid.	Mid.	Small
H3	0.433	4.483	0.654	0.613	0.118	0.509	0.478	0.063	Sign	Acc	Mid.	Small	Small

It can be clearly seen that both demographic and hypothetical results above-mentioned are interrelated among others. Results of the structural model measurements proofed the user satisfaction indications of the LIS implementation in the sampled institution. Besides, majority respondents (92.5%) felt be helped by the system, 22.2% of them even said that the system is very helpful in completing the work/study, and 45.3% of the people were quite satisfied in using system; results of the statistical analysis also presented that the user satisfaction factor is presented substantially (65.4%) by the information quality, system quality, and service quality factors. As it was also presented by several prior IS success measurement studies [3-8], [30].

5. CONCLUSION

The success of LIS implementation is indispensable for HEIs in developing countries like Indonesia. It is related to the essential functions of the system for the institutions related to support their research and data management services. In this case study, the findings indicated that majority of the users are the senior students who revealed that LIS is quite helpful and satisfactory for their research works. Despite the fact that, results of the measurement model analysis show two indicator rejections (SY3 and SY6), but the outer model of the used model had a good psychometric property. Therefore, it was then used as starting point for the inner model assessments. In addition, although the three independent variables had the small relative impact towards the dependent variable, their path coefficients were significant with the middle level in the coefficient of determination. Thus, acceptance of the hypotheses was reliable. Furthermore, it is unsurprising

that the outer part of the used model has the psychometric properties and the inner part also presented the positive indications. It may in regard to utilization of the popular IS model. In respect of the two indicator rejection, it may relate to the used instrument and data in the study. This may be one of the consideration points for the similar studies in the future. This case study may not contribute theoretically to the user satisfaction measurement topics, but findings of the study may still interesting, in terms of the practical issue in the sampled institution. As it is presented by the findings, the three factors have only explained 65.4% of the user satisfaction explanation. Therefore, the findings can be one of the next consideration points for institutions for further system development, in respect of the user satisfaction points.

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