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The User Satisfaction Perspectives of the Information System Projects

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Abstract

It is inevitable that information system (IS) has been the essential role in the management and academic functions of the higher education institutions (HEIs) in developing countries, like Indonesia. In this country, despite the IS project developments have been performed since 1980s, but its performances tended still low. The efforts have been performed for responding this issue, but the studies have been remained in limited number. Accordingly, this study was carried out to know what factors that influence the satisfactions, in respect of its significant effects towards the project performances. The internal stakeholders were the population, which was sampled using the purpose random sampling. The 52 (87%) paper based data and the 61 (9%) online ones were then used in the data analysis stage with the partial least squares-structural equation modeling (PLS-SEM) method. The results revealed that, besides the system and service qualities directly affected the endogenous variable, the institutional contexts also indirectly influenced the variable. The study remained limitations, but its findings may theoretically and practically contributes towards the user satisfaction measurement, especially from the perspectives of the Islamic HEIs in Indonesia.

Keywords*: User satisfaction, internal project stakeholders, information system project, HEI, PLS-SEM*

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1. Introduction

The Southeast Asian Ministers of Education Organization (SEAMEO) [1] revealed that the performance of the management and academic functions of an HEI is necessity to be enhanced by employing information and communication technology (ICT) in this era. It is essentially related to the significant role of the HEIs, particularly in the developing nations like Indonesia [2-4]. In this country, despite the fact that the technological developments have been conducted since 1980s [2], its implementations have been still low compared with the neighbouring countries [1, 5]. In contrast, the findings of the prior studies [6-8] indicated the performances are tended in the positive level. Meanwhile, besides the theoretical gaps of the research area [9-10], the quantity of the study also still tends in the small number. Thus, the continuous study is needed to be done in order to know and understand what have been occurring in the field.

This study assessed the user satisfaction of the IS projects among the Islamic HEIs in Indonesia in particular. The aim was to know what factors that affected the user satisfaction, especially from the internal stakeholder perspectives. The researchers assumed that knowing the factors of the user satisfaction may be one of the preliminary stages for understanding the above mentioned gap. Numerous studies [11-14] indicated the user satisfaction is one of the significant criteria to justify the success of a project, including the IS projects [9-10]. In this research, the researchers adopted and combined the selected constructs of the famous IS success model [15] and the project classificatory framework [16] to develop the research model. As it is represented by the Figure 1, the 12 research questions and its hypotheses were proposed in this study. Following [17], the term of ICT and IS projects were employed interchangeably here.

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The paper is arranged in five main sections. The introduction section elucidates the background, problem statements, purpose, objective, questions and the hypotheses of the study. The literature review section describes the debates around the research area in respect of the model development. The third section describes the methodological aspect of the study. The results and analysis section explains the results of the analysis stage, its discussions, limitations, and suggestions for the future researches. In the last part, the article is then concluded by the conclusion section.

2. Literature Review

It is a common issue that the social science researches are carried out based on the previous studies [18-19]. The perspectives of the project success definitions and its measurements have been discussed in respect of the model development. Many studies [20-21] indicated that the success definition of a project is still questionable because it has been defined over times, debated oftentimes, and still on its agreement absence related to the judgments and the criteria of its measurements. Retrospectively, the fulfilment of its objectives had been the common criteria of the success [11] during 1980s. The study then proposed to separate between the project management part and the project itself.

Continuously, in the last 1990s decade, this idea was then extended in the project life cycle term by separating the project management and its product life cycles [22]. It was then adopted by Atkinson [23] by proposing his triangle model, especially by tracking where and what are the causes of the project failures across its implementation. However, many researchers [24-25] claimed that it was incapable to demonstrate a lot more complex criteria. Further, the above mentioned concepts were then improved by considering the project stakeholder satisfactions by several researchers [12-13]. They assumed that, each of people has a different view towards the success of a project depended on their roles. Meanwhile, several scholars [16, 26-27] revealed the environmental factors of a project in their studies. The concepts are consistent with the general system theory of Von Bertalanffy [28] by assuming that a project is the open system. The prior studies [6-10], [29-30] demonstrated this issue by adopting the contextual and its institutional variables of a project itself. It can be clearly seen that the project stakeholder satisfaction is one of the essential issues of the project success measurement referring to the contextual and environmental aspects of a project.

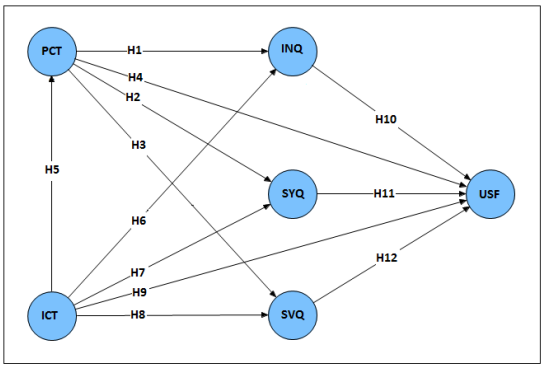

Figure 1. The research model

In addition, it is inevitable that the DeLone and McLean's [15] IS success model has been the most popular IS model since it was proposed by the authors in the early 1990s [31-21]. Petter et al., [31] described that the user satisfaction positively contributes towards the net benefit in both individual and institutional levels. Specifically, the scholars proposed two main revisions in regard to the system use [33-34] and the net benefits [35-36] constructs. The authors themselves suggested to use the overall variables of the model in order to reach the quality of the research findings. In short, it is clear that the use of the model is still interested now. Accordingly, the researchers adopted, combined, and adapted the two above mentioned

points to develop the research model in this study. Figure 1 above presents the research model. The project content (PCT) and the institutional context (ICT) variables were adopted from the McLeod and MacDonell's [16] framework referring to the environmental concepts of a project [26-27]. Information quality (INQ), system quality (SYQ), service quality (SVQ), and the user satisfaction (USF) variables were used based on the suggestions of the prior literature [31-32]. Specifically, the rejection of the system use variable was carried out referring to the previous studies [6, 8], [33-34].

Table 1. List of the Indicators and Its References

	Indicators	References
ICT1	Institutional culture	[7-8, 16, 26-27]
ICT2	Institutional policies	
ICT3	Institutional project experience	
ICT4	System existence	
ICT5	Infrastructure availability	
ICT6	External environments	
INQ1	Accuracy	[7-8, 15, 29, 31-32]
INQ2	Timeliness	
INQ3	Completeness	
INQ4	Consistency	
INQ5	Relevance	
PCT1	Project Size	[7-8, 16, 26-27]
PCT2	Project complexity	
PCT3	Cost availability	
PCT4	Human resources availability	
PCT5	Clarity of the project management structure	
SVQ1	Responsiveness	[6, 8, 15, 29, 37-39]
SVQ2	Flexibility	
SVQ3	Security	
SVQ4	Functionality	
SVQ5	Extension	
SYQ1	Ease-of-use	[6, 8, 15, 29, 31-32, 40]
SYQ2	Maintainability	
SYQ3	Response time	
SYQ4	Functionality	
SYQ5	Safety	
USF1	Efficiency	[[6, 8, 15, 29, 33-34, 41-42]
USF2	Effectiveness	
USF3	Flexibility	
USF4	Overall satisfaction	

3. Research Method

Procedurally, this study was done within its eight stages, including the literature study, research model development, research design, instrument development, data collection, data analysis, interpretation and the report writing stages. A number of the internal project stakeholders were listed based on the Islamic Education Directory of the Ministry of Religion in the year 2012, which listed about 645 HEIs. In respect of the resource availability of the researches and considering to the success of the study [43], a purposive random sampling was then carried out in order to reach the sample [44]. The respondents were the internal stakeholders of the projects by considering the key informant issue [44-45].

In the data collection stage, approximately 60 paper based questionnaires were distributed at the two national academic events with almost 52 (87%) usable data. Besides that, the on-line questionnaires were also sent by email into around 750 the respondent candidates with about 61 (9%) responses. The combined technique was chosen in regard to the depth and breadth information [47], the response rate and its data quality [48], and the efficiency and effectiveness of the data collections [49]. The data collection instrument of this survey study consisted of its three parts, i.e., the invitation letter, research summary, and the question parts. Referring to the used sampling technique, the two first parts were used in order to obtain the experiential data from the appropriate people, who had been directly experienced in the IS projects [51-55] and to encourage the response rate [50]. The 30 five-Linkert's scale questions were the main part of the survey instrument.

In addition, the collected data were then statistically analysed using PLS-SEM method. The descriptive analysis was conducted to provide the demographic information of the respondents. Sequentially, the *variance-based* method [51-54] was then employed in the inferential analysis with the SmartPLS 2.0 M3 software was used to assess the measurement and structural models. The measurement model assessment was performed in assessing the outer model through the indicator reliability, internal consistency reliability, convergent validity, and the discriminant validity examinations. The inner model was then assessed by the structural model assessment through the path coefficient (β), coefficient of determination (R^2), *t*-test, effect size (f^2), predictive relevance (Q^2), and the relative impact (q^2) examinations. Moreover, the interpretation stage was then conducted referring to the results of both above mentioned analysis types.

3. Results and Discussion.

Table 2 and 3 describe the profiles of the respondents and their affiliations. Table 2 elucidates that, although most (±72%) of the people was from the HEIs in the Java area, but the seven main areas of the country were covered. It is consistent with the descriptive HE database of the Ministry of Religion. Meanwhile, the typical institution of the respondent was dominated by the public institutions (±69%). Meanwhile, Table 3 presents that majority of the respondents were the university graduation (±98%) with around 49% were the master degrees. Besides that, the participated respondents in the study were dominated by the people who had the IS project experiences under 10 years (±82%). Moreover, most of them experienced in the projects as the project team members (±49%) and the top manager (±23%). The smallest number of the people was the business unit manager with only around 4%.

Table 2. Profile of the Respondent Affiliations

Profile	Description	%
Affiliation territory	Sumatera	11.5
	Java	71.7
	Borneo	1.8
	Celebes	10.6
	Bali & Nusa Tenggara	0.9
	Moluccas	1.8
	Papua	1.8
Affiliation Type	Public	69
	Private	31

Table 3. Profile of the Respondents

Profile	Description	%
Education	High School	2
	Diploma	25
	Bachelor	4
	Master	49
	PhD	21
Project experience	< 2 years	34
	2-5 years	30
	5-10 years	28
	> 10 years	8
Position	Top manager	23
	Business unit manager	4
	IT unit manager	13
	Project manager	3
	Project team member	49
	Employee	9

3.2. Results of the Inferential Analysis

3.2.1. Results of the Measurement Model Assessments

1. Table 3 shows that ICT1, ICT2, ICT6, PCT1, PCT2, and SYQ5 were deleted because their loading values were under the threshold value (0.6) and the loading values did not fulfil the cross loading matrix of the indicator reliability. On the other hand, the rest indicators fulfilled the two parameters of this first measurement model examination.
2. Table 4 describes that the rest (24) indicators covered the composite reliability value of each variable over the threshold value (0.7) in the internal consistency reliability examination and it has also demonstrated the threshold value of the *average variance extracted (*AVE) the six variables over 0.5 in the convergent validity examination.
3. Besides that, the variables have also fulfilled the discriminant validity examination based on the cross-loading of the square root of the AVE [55].
4. In brief, the results of the measurement model assessments demonstrated statistically the psychometric properties of the outer model

Table 3. Cross loading value

	ICT	INQ	PCT	SVQ	SYQ	USF
ICT1			Rejected			
ICT2			Rejected			
ICT3	**0.87**	0.22	0.33	0.30	0.33	0.32
ICT4	**0.74**	0.08	0.24	0.15	0.14	0.11
ICT5	**0.69**	0.12	0.28	0.18	0.08	0.20
ICT6			Rejected			
INQ1	0.12	**0.87**	0.17	0.42	0.54	0.51
INQ2	0.16	**0.85**	0.19	0.44	0.50	0.35
INQ3	0.24	**0.91**	0.30	0.57	0.61	0.55
INQ4	0.11	**0.80**	0.15	0.47	0.44	0.32
INQ5	0.20	**0.82**	0.24	0.63	0.61	0.59
PCT1			Rejected			
PCT2			Rejected			
PCT3	0.33	0.17	**0.79**	0.24	0.12	0.28
PCT4	0.30	0.22	**0.79**	0.16	0.19	0.17
PCT5	0.17	0.22	**0.64**	0.06	0.02	0.13
SVQ1	0.24	0.59	0.19	**0.82**	0.65	0.61
SVQ2	0.30	0.43	0.10	**0.76**	0.60	0.50
SVQ3	0.22	0.46	0.29	**0.76**	0.54	0.43
SVQ4	0.19	0.49	0.16	**0.76**	0.58	0.53
SVQ5	0.15	0.29	0.10	**0.67**	0.42	0.37
SYQ1	0.20	0.45	0.05	0.66	**0.80**	0.50
SYQ2	0.18	0.42	0.01	0.58	**0.79**	0.44
SYQ3	0.25	0.65	0.15	0.61	**0.84**	0.59
SYQ4	0.22	0.53	0.29	0.55	**0.80**	0.52
SYQ5			Rejected			
USF1	0.28	0.51	0.24	0.64	0.65	**0.91**
USF2	0.24	0.44	0.19	0.54	0.54	**0.84**
USF3	0.24	0.49	0.20	0.59	0.51	**0.85**
USF4	0.26	0.51	0.31	0.48	0.49	**0.82**

Table 4. List of CR, AVE, and R^2

	ICT	INQ	PCT	SVQ	SYQ	USF
CR	0.81	0.93	0.79	0.87	0.88	0.92
AVE	0.59	0.72	0.55	0.57	0.65	0.74
R^2	0.00	0.08	0.14	0.10	0.08	0.52

Table 5. The Fornell & Larcker's Cross-Loading

	ICT	INQ	PCT	SVQ	SYQ	USF
ICT	**0.77**					
INQ	0.20	**0.85**				
PCT	0.37	0.26	**0.74**			
SVQ	0.30	0.61	0.22	**0.76**		
SYQ	0.27	0.65	0.17	0.75	**0.81**	
USF	0.30	0.57	0.27	0.66	0.64	**0.86**

In summary, this inferential analysis stage shows that the outer model performance fulfilled the requirements of the inner model assessments, despite the fact that the six indicators of the three variables must be rejected. The researchers hypothesized that it may relate to the used instrument of the data collection stage, the perceptions of the respondents towards the indicators, the contextual phenomena of the study, or the appropriateness of the indicators themselves. Therefore, it can be noticed for the future studies.

3.2.2. Results of the Structural Model Assessments

Table 6 and Figure 2 below show that each of the inner model assessments. The *β* assessment results presented that five of the 12 paths are insignificant ones. Besides that, these paths have also rejected in the hypothesis examination. In the R^2 assessment, ICT directly described 13.9% of PCT. This description is also supported by the significant path and its accepted hypothesis. In addition, despite INQ together with SYQ and SVQ directly explained 51.7% of USF, but its hypothesis was rejected in the *t*-test. Table 6 demonstrates that the four of 12 paths were accepted by the hypothesis examination, including ICT→PCT (H1), ICT→SVQ

(H8), SYQ→USF (H11), and SVQ→USF (H12). The f^2 assessment results showed that the five of 12 paths have the medium effect and the rest paths have the weak effect. Based on the Q^2 assessment, the relevance of the overall paths of the model was predictive. In the q^2 examination, the 12 paths were relatively identified as the large (five paths) and the medium (seven paths) impact paths.

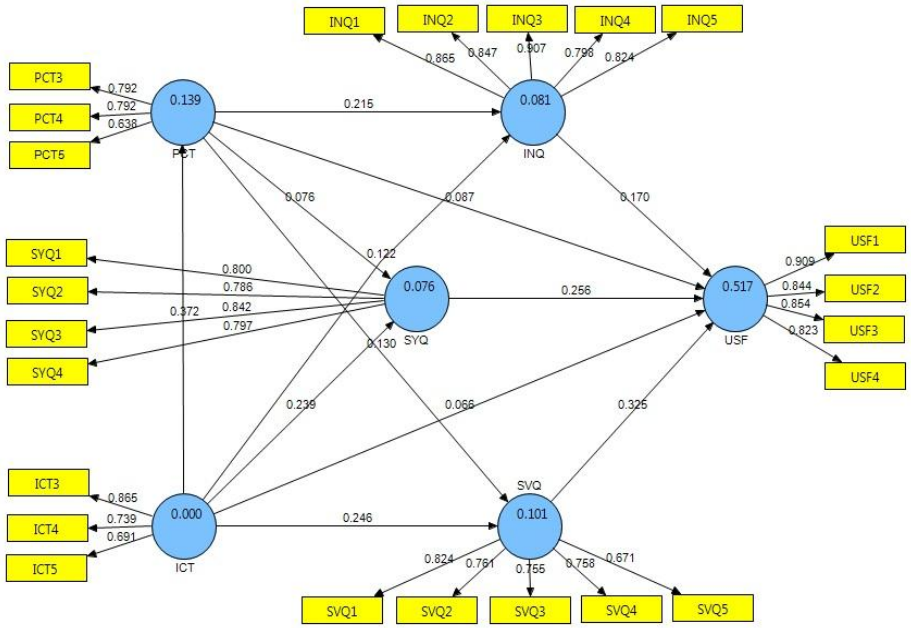

Figure 2. The results of the PLS-SEM calculation

Referring to the research program which was emphasized to the hypothetical relationship among the variables of the model, there are the three highlighted points of the findings. Although the three relational hypotheses of ICT (H6, H7, and H9) were the rejected, the two ones were accepted (H5 and H8). The factor described around 14% of PCT and about 10% of SVQ. Despite this factor did not directly relate to USF, but the accepted relation of the factor towards SVQ can be considered its effects. It is consistent with the findings of the previous study [8] and the used environmental concepts of a project [16], [26-27].

Table 6. The Results of the Structural Model Assessments

Hypotheses								Analysis					
No.	Descriptions	β	t-test	R^2	f^2	Q^2	q^2	β	t-test	R^2	f^2	Q^2	q^2
H1	PCT→INQ	0.14	1.93	0.08	0.14	1.93	0.08	Sign	R	W	S	P	Me
H2	PCT→SYQ	0.06	0.64	0.08	0.06	0.64	0.08	Insign	R	W	S	P	Me
H3	PCT→SVQ	0.09	1.19	0.10	0.09	1.19	0.10	Insign	R	W	S	P	Me
H4	PCT→USF	0.06	1.04	0.52	0.06	1.04	0.52	Insign	R	W	S	P	L
H5	ICT→PCT	0.31	3.91	0.14	0.31	3.91	0.14	Sign	A	W	Me	P	Me
H6	ICT→INQ	0.06	1.34	0.08	0.06	1.34	0.08	Insign	R	W	S	P	Me
H7	ICT→SYQ	0.16	1.96	0.08	0.16	1.96	0.08	Sign	R	W	Me	P	Me
H8	ICT→SVQ	0.14	2.40	0.10	0.14	2.40	0.10	Sign	A	W	S	P	Me
H9	ICT→USF	0.04	0.79	0.52	0.04	0.79	0.52	Insign	R	Mo	S	P	L
H10	INQ→USF	0.19	1.78	0.52	0.19	1.78	0.52	Sign	R	Mo	Me	P	L
H11	SYQ→USF	0.22	2.15	0.52	0.22	2.15	0.52	Sign	A	Mo	Me	P	L
H12	SVQ→USF	0.33	3.08	0.52	0.33	3.08	0.52	Sign	A	Mo	Me	P	L

Further, the results of this study revealed that overall hypothesis paths of PCT towards INQ, SYQ, SVQ, and USF were rejected. Despite the fact that, it is consistent with the previous one [8], but these results are inconsistent with the environmental project theories [16], [26-27].

Furthermore, unlike INQ, besides SYQ and SVQ were accepted to affect USF, the three factors have also moderately described 51.7% of the endogenous variable.

In regard to the insignificance paths and the hypothetical rejections, the researchers hypothesize that it may relate to the used indicators, its designed instrument, or the contextual phenomena of the study. The efforts have been done related to these issues, but something uncontrolled may have happened. Thus, these issues may be limitations of this study. It is recommended for the future work to review the above mentioned points for the future studies. Despite the fact that the study remains the limitations, but the findings can be one of the practical considerations for the sampled institutions, especially to the above mentioned findings.

4. Conclusion

Retrospectively, despite most of the respondents were from public institutions, but the territorial distribution of these affiliations represented the factual data. In addition, the majority of the sampled people were from the university degree (±98%), experienced in the IS project under 10 years (±92%), and directly involved in the projects (±91%). In the measurement model assessment stage, although the six indicators were deleted, its results explained statistically the psychometric properties of the outer model. Further, the inner model assessments indicated that the user satisfaction of IS projects among Islamic HEIs was affected by the system and service qualities of the systems themselves. Both Variables together demonstrated around 52% of the endogenous factor. Besides that, the institutional contexts revealed the indirect effect the user satisfaction through about 10% of the service quality factor. In terms of the environmental concepts of a project, the findings clearly presented that the institutional contexts of a project affect the user satisfaction. Although the study remained its limitations, the findings may theoretically and practically contribute towards the user satisfaction measurement of an IS project, especially from the perspectives of the Islamic HEIs in Indonesia.

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