

# The Measurement and Evaluation of Information System Success Based on Organizational Hierarchical Culture

**Reni Haerani<sup>1</sup>, Titik Khawa Abdul Rahman<sup>2</sup>, Lia Kamelia<sup>3</sup>**

<sup>1</sup>Department of Informatics Management, Politeknik PGRI Banten, Indonesia

<sup>2</sup>Department of School and Graduates Studies, Asia e University, Malaysia

<sup>3</sup>Department of Electrical Engineering, UIN Sunan Gunung Djati Bandung, Indonesia

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## ABSTRACT

In this study, the adoption of the Delone & McLean information system success model and its adaptation using the organizational hierarchy culture theory is used to explore the state of information system success and examine the factors that suggest success. This research was conducted at universities in Banten Province, which currently rely on information systems in many ways, especially those related to university management. By measuring the evaluation of the success of information systems and the hierarchical culture in organizations using a model that the researcher built according to the integration of 2 models. The results the measurement of the success of information systems were obtained from distributing questionnaires, there were still 85 (63%) respondents, and 84 (61.3%) were satisfied with the performance of the information system success model. The least squares structural equation modeling analysis (PLS-SEM) was then applied due to the sample size. The previous stage consisted of evaluating the reflective measurement model in evaluating the reliability of internal consistency using Composite Reliability, Reliability indicators, Convergent Validity and Discriminant Validity, finally it was concluded that the success of information system by hierarchical culture integration model in the organization on could be passed on the more complex research terms, especially using samples, and different questionnaires.

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### Corresponding Author:

Reni Haerani,

Department of Informatics Management, Politeknik PGRI Banten, Indonesia

Jalan Raya Cilegon KM.12 Serdang. Kramatwatu Serang – Banten 42161, Indonesia

Email: Renihaerani@politeknikpgribanten.ac.id

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## 1. INTRODUCTION

Several organizations or institutions are competing to adopt information systems to enhance their competitive advantage in business. They must successfully deploy information systems to reap the benefits [1]. Means that the success of information systems as the first challenge for users [1]. Organizations have invested heavily in information systems to benefit from these systems. Organizations are concerned with evaluation, and to find out the effects of these systems on them as well as on individuals [2]. Success the information system used in an office is one of the crucial goals for an organization [3]. A well-managed information system, as stated [4] will put concrete benefits for the organization, such as cost reduction, labor efficiency, and increased productivity while the benefits realizing include the availability of information, better processes and the benefits of standardization in system integration. Information systems can support the achievement of organizational plans, as a result the organization can be more competitive in business competition. The use of information systems in universities has become a necessity [5].

Meanwhile, the failure of information systems is a primary problem for organizations, which are close to cost, over a duration of time and do not achieve strategic goals and target lack of competitive advantage. Some researchers, for example [6] warn that the failure of the information systems can result in large financial losses for project owners and even jeopardize their survival. Many researchers, for example [7] proposed the Delone & McLean information systems success model in 1992, have tried to address this problem to increase the success rate of information systems. Delone & McLean updated their model in 2003 to increase quality of service. The

success of information systems the completion of the development of information systems in sync with the time and budget that has been determined. The success of information systems depends on the type of system to be evaluating [8].

According to previous literature studies, some researchers use the PLS method [9][10] which is one of the methods currently used to compensate for the weaknesses of regression method. The research methods of SEM experts are dividing into two methods [11]. The first is to call the Covariance Based SEM (CBSEM) approach and the other is Variance Based SEM or better known as Partial Least Squares (PLS) [12]. In this study, researchers draw heavily on the success model of Delone & McLean information systems [7] and integrate using processional and causal concepts based on organizational hierarchy culture theory in the application of information systems at universities in Banten Province, which is influence by perceptions with leadership elements. [4] [13][14][15] [16] [17]. This modeling approach is in line with [14] [18], and several empirical studies that apply the theory of organizational hierarchy culture that can affect the success of information systems.

In this study, the statistical analysis used to determine the questionnaire testing of the factors that adjust the preparation status of the hierarchical culture in the organization to the success of information systems at universities in Banten Province using the information systems success Delone & McLean (2003) model that starts with on each indicator. Variables formed from the output of the integration model of readiness and usability. The purpose is to perform a statistical evaluation of the output of the questionnaire analysis. The results of this study can provide researchers with input in future questionnaire testing and questionnaire revision, especially regarding the impact of organizational hierarchy culture on the success of information systems.

The study was conducting sequentially through four research phases. In the first term, the researcher reveals the background of the research output. The explanation of the research methodology is included in the second phase, which explains the model used to measure the success of information systems an organizational hierarchy cultural evaluations. The third stage of this research presents the results and discussion of the answers to the problems as stated in the first term. Finally, to the stage of this research, conclusions can be drawn that can describe to desired results according to this research.

## 2. METHOD

### 2.1. Research Stages

This research phase used includes preliminary studies (that is literature studies, model development, and instrument development studies), research programs, model development, research models, instrument development, data collection, data analysis, analysis results, report writing and analysis results, for example shown in Figure 1 below:

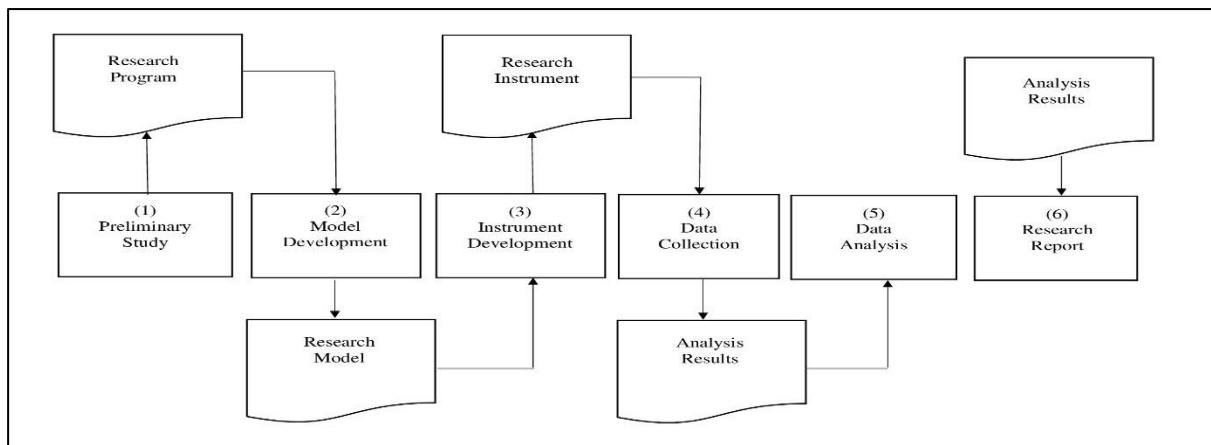


Figure 1. The Research Procedure

This study demonstrates the successful adoption of the information systems model [7] and the Hierarchical Organizational Culture [19]. The research model developed consists of eight variables, namely HCO (Hierarchical Culture Organization) as the independent variable, and the dependent variable, which contains seven factors, namely SYQ (System Quality), IFQ (Information Quality), SVQ (Service Quality), USF (User Satisfaction), ITU (Intention to Use), Use (USE), NBF (Net Benefit). From the established model, a questionnaire is obtained, which is a derivative of the variable indicators included in the model in Figure 2 . Table 1.

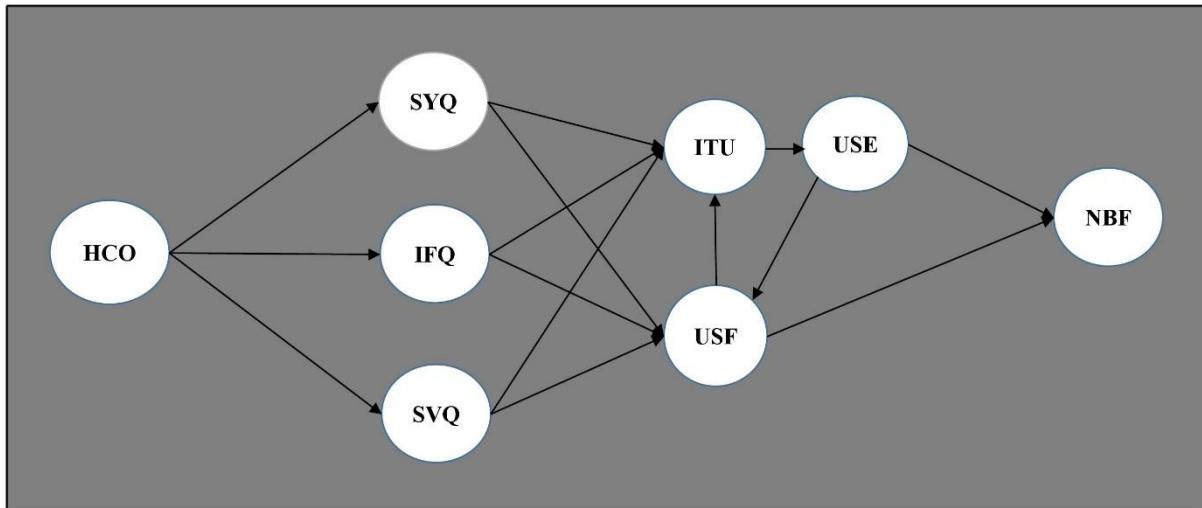


Figure 2. The Developed Research Model

The research model described above aims to explore the effectiveness of organizational hierarchy culture and adoption of information systems success models in the context of higher education.

The proposed research model shown in figure 2 is preparing based on how the level of readiness of the organization can make and use the Information System at the Institution of Higher Learning, so that the institution can be said to be ready in the use of Information Systems. The choice of measurement must consider several aspects such as the objectives of the study, the context of the organization it uses, the aspects of the information system, and the independent variables used to assess its success, its research methods, and the level of analysis whether at the individual, organizational or community level.

Table 1. List of the questions

Variable/Indicator	Statements of the questionnaires	Item Number
Controlling (HCO1)	Ensuring that everything is done a planned	1
Monitoring (HCO2)	Convince the parties concerned	2
Involving (HCO3)	Have a responsibility in organizational development	3
Timeliness (HCO4)	Changes can be completed in a reasonable time	4
Culture (HCO5)	The influence of leadership culture in the application of information systems	5
Ease of Use (SYQ1)	The system is easy to use.	6
Maintainability (SYQ2)	Easy maintenance system.	7
Response Time (SYQ3)	The system is able to respond quickly following the instructions given.	8
Functionality (SYQ4)	The system is able to perform all the functions required in its development.	9
Safety (SYQ5)	The system is safe in its use.	10
Accuracy (IFQ1)	The system produces information accurately.	11
Timeliness (IFQ2)	The system produces information in a timely manner.	12
Completeness (IFQ3)	The system produces complete information.	13
Consistency (IFQ4)	The system produces information consistently throughout its operations.	14
Relevance (IFQ5)	The system produces information according to the needs of its users.	15
Responsiveness (SVQ1)	System to provide services quickly.	16
Flexibility (SVQ2)	The system provides flexible services according to user conditions.	17
Functionality (SVQ3)	The system provides services that meet the requirements in its development.	18
Security (SVQ4)	The system provides safe services.	19
Extension (SVQ5)	The system provides services more than the required functions.	20
Perceived usefulness (ITU1)	Using the system will improve my work performance.	21
Extrinsic motivation (ITU2)	Using the system in my work will increase my productivity.	22
Job-fit (ITU3)	The use of the system can increase the effectiveness of the implementation of work tasks.	23
Relative advantage (ITU4)	Using the system makes it easier to do my work.	24
Outcome Expectations (ITU5)	Using the system can improve the quality of community understanding and ability as a result to be achieved.	25
Variable/Indicator	Statements of the questionnaires	Item Number
The frequency of use (USE1)	How often do users use this system	26
The intensity of use (USE2)	How much time does the user spend with the system during normal days when the user uses the computer.	27
The extent of use (USE3)	How much time does the user spend with the system during normal days when the user uses the computer to meet further needs.	28
Thoroughness of use (USE4)	How accuracy of use of the system in meet services needed.	29
Appropriate use (USE5)	How appropriate of use of the system in meet services needed.	30
Efficiency (USF1)	Users are satisfied with the level of system efficiency.	31
Effectivity (USF2)	Users are satisfied with the level of system effectiveness.	32
Flexibility (USF3)	Users are satisfied with the level of system flexibility.	33
Adequately (USF4)	Users are satisfied with the level of system adequately.	34
Overall Satisfaction (USF5)	Users are satisfied with system performance.	35
Continuity of usability (NBF1)	This system is always useful.	36
Continuance of services provided (NBF2)	Users feel that they are not burdened with the use of the system.	37
Continuation of usage (NBF3)	Users continue to use this system in the future.	38
System continuation (NBF4)	Users strongly advise others to keep using the system.	39
Promote of service (NBF5)	Promote the system to the wider community as a form of service.	40

## 2.2. Method PLS - SEM

The method in this study using PLS-SEM. PLS-SEM is a causal modeling approach designed to maximize variance and standard latent variables that can be explaining by predictors [20]. PLS-SEM has several general reasons for researchers to use it. The first reason is that the PLS algorithm is not limiting in the interaction of indicators with its reflexive latent variables but the PLS algorithm is also using for formative interactions. The

second reason, PLS can be using to estimate the path model using a small sample size. The third reason, PLS-SEM can be using for very complex models where there are still latent variables, without difficulty in estimating the data. In PLS-SEM there are still 2 evaluation models, namely the outer model or measurement model and the evaluation of the inner model or structural model [21] [20] [22].

### 2.3. System Analyze

The research sample was taking by selecting the target population, which includes the population of this study who are users of information systems in universities in Banten Province. In a sample of 92 out of a total of 118 universities, the researchers selected 30 universities to issue questionnaire to five senior managers. The distribution of the questionnaires was carrying out through Google Form. As for the quantity of data, the PLS-SEM method was using at the analysis stage and the answers to the collected questionnaires were processing using SmartPLS 3.0 to evaluating reliability, internal consistency reliability, convergent validity, and discriminant validity assessment. The assessment variable for the development model; uses a Likert Scale ranging from strongly disagree to strongly agree. Use the following parameters to determine the scale : Scores of 1 means Strongly Disagree , 2 Disagree , 3 Neutral, 4 Agree, 5 Strongly Agree as shown in table 2.

Table 2. Alternative Score for Questionnaire Answers

Alternative Answers	Statement for Score	
	Positive	Negative
Strongly Agree	5	1
Agree	4	2
Neutral	3	3
Disagree	2	4
Strongly Disagree	1	5

## 3. RESULTS AND DISCUSSION

During the Results and Discussions phase, the results of the research conducted are visualized. Results and discussions put an image of the output of the research carried out. For example, the reliability of all instruments will be measured using Cronbach's Alpha coefficient, model estimates and evaluations are explained by discussing research questions and hypotheses.

### 3.1. Demographic Information

Table 3 presents the characteristics of the respondents, namely gender, education, and position in measuring the evaluation of the success of the information system on the hierarchical culture in the organization. From the results of data collection, it can be seeing in Table 4 about the characteristics of respondents according to the effect of hierarchical culture in the organization on the success of Delone and McLean information system adoption. The results can provide recommendations for researchers in terms of data consistency between the data collected and the researcher's expectations. There are 61.3% 84 respondents who are satisfied with the performance of the information system success model and 62% 85 respondents said that organizational hierarchical culture affects the success of information systems.

Table 3. Respondents Profiles

Measures	Items	%
Gender	Man	55
	Female	45
Education	Bachelor	15
	Master	77
	Doktor	8
Position	Chancellor/Vice Chancellor	3
	Dean	8
	Head of the study program	26
	Study program secretary	4
	Other	59

### 3.2. The Statistical Analysis Result

At the output stage of the statistical analysis, there are several stages in the processing of the questionnaire. These stages include evaluating the reflection measurement model and evaluating the structural model. Evaluation of reflexivity measures is to evaluate internal consistency reliability by using Composite Reliability, Convergent Validity and Discriminant Validity. Structural model assessment is a step for choosing whether the hypothesis is

basing on the research model, assessing the R2 value of endogenous latent variables in the path model and the last step is assessing the contribution of exogenous constructs to endogenous latent variables.

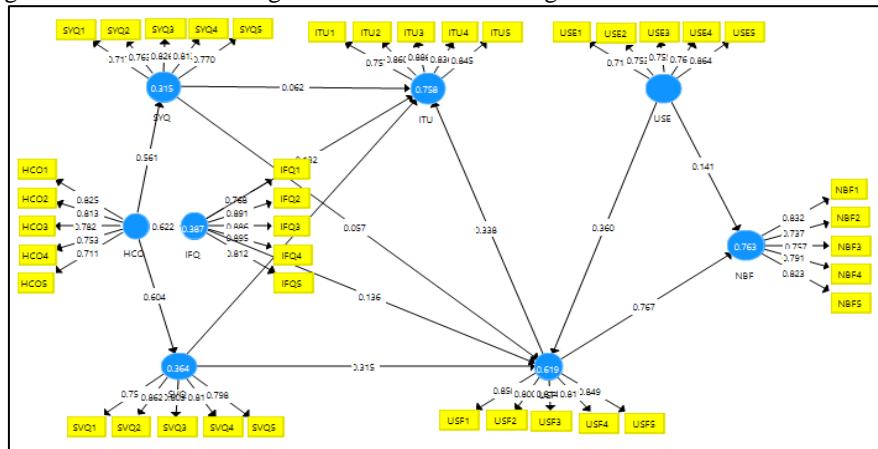


Figure 3. The SmartPLS results of the research model

Table 4. Construct reliability and validity

	Composite Reliability	Cronbach's Alpha	Average Variance Extracted (AVE)	Results
<b>HCO</b>	<b>0,884</b>	<b>0,836</b>	<b>0,605</b>	Valid
<b>IFQ</b>	<b>0,929</b>	<b>0,904</b>	<b>0,726</b>	Valid
<b>ITU</b>	<b>0,922</b>	<b>0,893</b>	<b>0,702</b>	Valid
<b>NBF</b>	<b>0,892</b>	<b>0,848</b>	<b>0,622</b>	Valid
<b>SVQ</b>	<b>0,904</b>	<b>0,867</b>	<b>0,653</b>	Valid
<b>SYQ</b>	<b>0,885</b>	<b>0,838</b>	<b>0,607</b>	Valid
<b>USE</b>	<b>0,880</b>	<b>0,830</b>	<b>0,596</b>	Valid
<b>USF</b>	<b>0,914</b>	<b>0,883</b>	<b>0,681</b>	Valid

From table 4, it can be seeing that the output of the Composite Reliability analysis shows that each variable has a loading factor value  $> 0.70$ , which means that each indicator of each variables has good repeatability or reliability when estimating the latent variable.

The results of the above Cronbach Alpha analysis show that each variable has a value  $> 0.60$ , so it can be concluded that this metric has good reproducibility in calculating latent variables.

While the results of the above AVE analysis show that each latent variable has an AVE value  $> 0.50$ , which means that the metric is more accurate or accurate than error is measuring the latent variable. So, it can be said that every variable measured is valid.

Table 5 of the validity of the convergence describes whether the indicators used as manifest variables can represent and underlie the latent variables that are built. The results of the loading indicator test area is recommended to be 0.70, but as long as the model is still in the development stage, the loading value of the indicator 0.60 is still tolerated. The measurement results can be interpreted as the magnitude of the coefficient of each dimension generated in the latent variables, and the larger the coefficient value, the stronger the influence of these dimensions on the latent variables.

The results of the convergence validity analysis show that the factor loading value of each variable is greater than the required minimum value of 0.70, so that the loading factor is called VALID, meaning that this metric can be used to measure latent variables.

Table 5. Convergent validity

	<b>HCO</b>	<b>IFQ</b>	<b>ITU</b>	<b>NBF</b>	<b>SVQ</b>	<b>SYQ</b>	<b>USE</b>	<b>USF</b>
<b>HCO1</b>	<b>0,825</b>							
<b>HCO2</b>	<b>0,813</b>							
<b>HCO3</b>	<b>0,782</b>							
<b>HCO4</b>	<b>0,753</b>							
<b>HCO5</b>	<b>0,711</b>							
<b>IFQ1</b>		<b>0,768</b>						
<b>IFQ2</b>		<b>0,891</b>						
<b>IFQ3</b>		<b>0,886</b>						
<b>IFQ4</b>		<b>0,895</b>						
<b>IFQ5</b>		<b>0,812</b>						
<b>ITU1</b>			<b>0,750</b>					
<b>ITU2</b>			<b>0,865</b>					
<b>ITU3</b>			<b>0,889</b>					
<b>ITU4</b>			<b>0,835</b>					
<b>ITU5</b>			<b>0,844</b>					
<b>NBF1</b>				<b>0,832</b>				
<b>NBF2</b>				<b>0,733</b>				
<b>NBF3</b>				<b>0,756</b>				
<b>NBF4</b>				<b>0,792</b>				
<b>NBF5</b>				<b>0,826</b>				
<b>SVQ1</b>					<b>0,755</b>			
<b>SVQ2</b>					<b>0,862</b>			
<b>SVQ3</b>					<b>0,803</b>			
<b>SVQ4</b>					<b>0,818</b>			
<b>SVQ5</b>					<b>0,798</b>			
<b>SYQ1</b>						<b>0,717</b>		
<b>SYQ2</b>						<b>0,763</b>		
<b>SYQ3</b>						<b>0,826</b>		
<b>SYQ4</b>						<b>0,813</b>		
<b>SYQ5</b>						<b>0,770</b>		
<b>USE1</b>							<b>0,718</b>	
<b>USE2</b>							<b>0,753</b>	
<b>USE3</b>							<b>0,755</b>	
<b>USE4</b>							<b>0,761</b>	
<b>USE5</b>							<b>0,863</b>	
<b>USF1</b>								<b>0,850</b>
<b>USF2</b>								<b>0,799</b>
<b>USF3</b>								<b>0,814</b>
<b>USF4</b>								<b>0,811</b>
<b>USF5</b>								<b>0,849</b>

Table 6. Discriminant validity

	<b>HCO</b>	<b>IFQ</b>	<b>ITU</b>	<b>NBF</b>	<b>SVQ</b>	<b>SYQ</b>	<b>USE</b>	<b>USF</b>
<b>HCO1</b>	0,825	0,495	0,621	0,514	0,510	0,462	0,441	0,548
<b>HCO2</b>	0,813	0,491	0,611	0,554	0,548	0,438	0,482	0,560
<b>HCO3</b>	0,782	0,492	0,463	0,471	0,432	0,443	0,412	0,418
<b>HCO4</b>	0,753	0,511	0,450	0,485	0,453	0,455	0,622	0,493
<b>HCO5</b>	0,711	0,424	0,421	0,358	0,391	0,380	0,492	0,354
<b>IFQ1</b>	0,437	0,768	0,632	0,548	0,643	0,662	0,583	0,544
<b>IFQ2</b>	0,547	0,891	0,664	0,585	0,688	0,758	0,603	0,622
<b>IFQ3</b>	0,604	0,886	0,681	0,610	0,715	0,750	0,665	0,620
<b>IFQ4</b>	0,533	0,895	0,691	0,610	0,724	0,779	0,642	0,644
<b>IFQ5</b>	0,516	0,812	0,661	0,651	0,802	0,650	0,698	0,627
<b>ITU1</b>	0,440	0,573	0,750	0,525	0,674	0,571	0,530	0,559
<b>ITU2</b>	0,618	0,616	0,865	0,717	0,672	0,546	0,456	0,659
<b>ITU3</b>	0,621	0,672	0,889	0,695	0,721	0,612	0,539	0,646
<b>ITU4</b>	0,442	0,569	0,835	0,571	0,614	0,556	0,507	0,610
<b>ITU5</b>	0,628	0,811	0,844	0,745	0,754	0,682	0,801	0,759
<b>NBF1</b>	0,584	0,641	0,682	0,832	0,626	0,477	0,619	0,749
<b>NBF2</b>	0,373	0,597	0,540	0,733	0,534	0,475	0,575	0,675
<b>NBF3</b>	0,543	0,391	0,471	0,756	0,436	0,390	0,406	0,585
<b>NBF4</b>	0,414	0,539	0,616	0,792	0,558	0,544	0,468	0,668
<b>NBF5</b>	0,519	0,585	0,746	0,826	0,586	0,511	0,621	0,728
<b>SVQ1</b>	0,437	0,700	0,647	0,533	0,755	0,627	0,580	0,534
<b>SVQ2</b>	0,531	0,674	0,715	0,616	0,862	0,555	0,553	0,636
<b>SVQ3</b>	0,415	0,627	0,616	0,440	0,803	0,604	0,498	0,502
<b>SVQ4</b>	0,568	0,793	0,717	0,693	0,818	0,706	0,578	0,685
<b>SVQ5</b>	0,463	0,575	0,613	0,512	0,798	0,566	0,566	0,523
<b>SYQ1</b>	0,391	0,633	0,496	0,406	0,525	0,717	0,471	0,420
<b>SYQ2</b>	0,318	0,598	0,510	0,430	0,595	0,763	0,476	0,417
<b>SYQ3</b>	0,520	0,705	0,645	0,556	0,571	0,826	0,463	0,553
<b>SYQ4</b>	0,530	0,730	0,601	0,557	0,652	0,813	0,538	0,599
<b>SYQ5</b>	0,381	0,611	0,489	0,391	0,614	0,770	0,582	0,486
<b>USE1</b>	0,434	0,460	0,502	0,512	0,478	0,430	0,718	0,439
<b>USE2</b>	0,375	0,535	0,450	0,471	0,482	0,422	0,753	0,487
<b>USE3</b>	0,464	0,496	0,488	0,524	0,422	0,405	0,755	0,549
<b>USE4</b>	0,556	0,606	0,484	0,489	0,533	0,527	0,761	0,539
<b>USE5</b>	0,575	0,753	0,681	0,644	0,699	0,668	0,863	0,704
<b>USF1</b>	0,564	0,604	0,685	0,765	0,615	0,529	0,602	0,850
<b>USF2</b>	0,473	0,614	0,627	0,716	0,558	0,538	0,616	0,799
<b>USF3</b>	0,546	0,467	0,552	0,667	0,484	0,462	0,493	0,814
<b>USF4</b>	0,412	0,608	0,621	0,672	0,617	0,526	0,580	0,811
<b>USF5</b>	0,544	0,655	0,706	0,751	0,679	0,592	0,646	0,849

Discriminant validity table 6 describes whether the construct has sufficient discriminants, which means that each index must have a greater cross loading value for the construct than the cross loading value for the other constructs. Therefore, this indicator is considered to be a valid manifest variable for this construct.

The results of the discriminant validity analysis show that the value of the loading factor of each indicator on the latent variable is greater than the value of the cross loading. The results support the validity of the convergence analysis where the indicator is an appropriate measure of the latent variable.

#### 4. CONCLUSION

This study presents the relevance of Delone & McLean's successful model of information system adoption and adaptation using the theory of hierarchical culture in selected organizations. The assessments of the questionnaire were statistically analyzed for validity and reliability, used as material for model revisions and questionnaires previously constructed through stages of integration and adoption of multiple models. The results of this study there are no results and evaluations that are mandatory for researchers to do to change models and questionnaires, but for researchers who are interested in conducting research in research areas about the success of information systems as a special attraction to be developed using other theories and measuring more. As a big concern about the sample used in this study, considering that the sample used is only in universities in Banten Province which have solid activities for the purpose of successful information systems, it is better if other researchers try to apply the measurement model that has been built including the questionnaire in the section different.

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