

Analysis of The Success of *My Pelindo* Application at PT Pelabuhan Indonesia III Based on DeLone and McLean ISSM

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ABSTRACT – As an organization with an important role in the port sector, PT Pelabuhan Indonesia has implemented information technology to support activities in all company sectors. In 2017, PT Pelindo launched an integrated application called *My Pelindo*, which serves employee administration needs. Since its launch, no evaluation has been conducted on the use of *My Pelindo*, especially at PT Pelindo III. Therefore, an evaluation is needed to measure user acceptance of the application. Currently, several methods exist to evaluate the success of information technology use, such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the DeLone and McLean Information System Success Model (D&M ISSM). Since the use of *My Pelindo* is mandatory and no alternative applications are available for comparison, the D&M ISSM was chosen to measure the success of *My Pelindo* from the users' perspective. Data was collected via surveys using questionnaires distributed to employees of PT Pelindo III Sub Region Java who use the application. The questionnaire was designed based on the six variables of the D&M ISSM: Information Quality, System Quality, Service Quality, Intention to Use, User Satisfaction, and Net Benefits. The survey data were analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) to identify relationships among variables and factors influencing the success of *My Pelindo*. The results showed that all indicators were valid, reliable, and significant in measuring their respective latent variables. It was found that Information Quality affects Intention to Use and User Satisfaction, while User Satisfaction and Intention to Use influence Net Benefits. Additionally, Net Benefits impact both Intention to Use and User Satisfaction.

Keywords – DeLone and McLean ISSM, PLS-SEM, Information System Success, *My Pelindo*, Port Administration

I. INTRODUCTION

Technology has become an inseparable part of daily life, influencing various aspects of human activities by providing easy access to information and communication without spatial limitations. Organizations, especially those in the business sector, utilize technology to achieve their goals and make their operations more effective and efficient. One critical technology is information technology, which plays a key role in ensuring the continuity and development of business processes in the face of global changes [1]. PT Pelabuhan Indonesia (Persero), commonly known as PT Pelindo, is one company that incorporates information technology into its business activities. PT Pelindo manages port operations in Indonesia and has several subsidiaries, including PT Pelabuhan Indonesia III Sub Region Java.

PT Pelindo III has implemented information technology to enhance its operational efficiency, including the introduction of *My Pelindo* application in 2017. This application is utilized by employees and offers various features such as attendance tracking, administrative management, meal payment services, access to company regulations, and other relevant functions. Despite its extensive use in facilitating administrative tasks, a formal evaluation of *My Pelindo* application has not yet been conducted. Therefore, a comprehensive assessment is necessary to evaluate the success of its implementation.

Several models can be considered for evaluating application usage, including the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the DeLone and McLean Information System Success Model (D&M ISSM). TAM explains the factors that determine user acceptance of an information system [2]. UTAUT effectively explains technological acceptance from a consumer context. Meanwhile, D&M ISSM is a comprehensive theoretical framework used to measure the success of an information system implementation [3].

In practice, the TAM and UTAUT models are considered more appropriate for assessing voluntary or optional information technology use, while the D&M ISSM is better suited for analyzing the use of mandatory applications, such as those required for employees within an organization. Therefore, the D&M ISSM was selected to analyze the usage of *My Pelindo* application from the users' (employees') perspective. To examine the relationships among the variables in the D&M ISSM, Partial Least Squares-Structural Equation Modeling (PLS-SEM) was employed. The choice of PLS-SEM was motivated by the relatively limited number of employees at PT Pelindo, which restricts the sample size. Additionally, PLS-SEM is robust in handling data that does not follow a normal distribution.

II. LITERATURE REVIEW

A. TAM and UTAUT

The Technology Acceptance Model (TAM), developed by Davis (1986), is the most widely used model explaining technology adoption through Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Venkatesh and Davis extended it to TAM 2 in 2000 by adding social influence and cognitive factors, and later to TAM 3 in 2008 by including moderating variables affecting PEOU [2] [4]. The Unified Theory of Acceptance and Use of Technology (UTAUT) extend TAM to explain user behavior toward information technology. UTAUT 2, developed later, adds three variables: Hedonic Motivation, Price Value, and Habit, along with three moderating factors: Age, Gender, and Experience [4]. The following is a figure of the UTAUT 2 model:

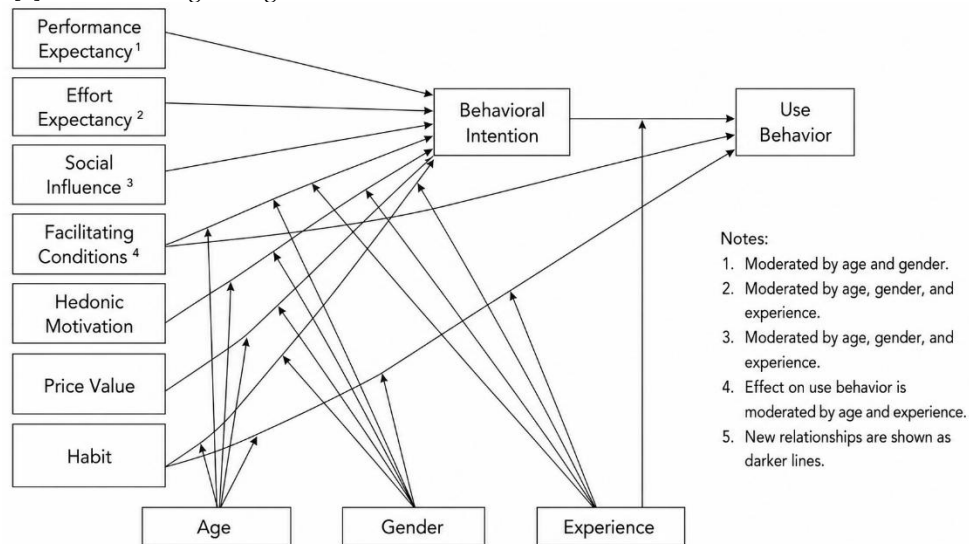


Figure 1: UTAUT 2 Model

The UTAUT 2 model includes independent, dependent, and moderating variables that influence each other. Independent variables such as Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price Value, and Habit affect the dependent variables: Behavioral Intention (BI) and Use Behavior (UB). The effects are moderated by Age, Gender, and Experience [5].

Performance Expectancy refers to the belief that technology will improve job performance. Effort Expectancy describes the ease of use. Social Influence is the perceived pressure to use technology from others. Facilitating Conditions indicate the availability of support infrastructure. Behavioral Intention represents the willingness to use the system, while Use Behavior measures actual usage frequency. Hedonic Motivation reflects enjoyment, Price Value concerns cost, and Habit denotes routine use [6].

B. DeLone and McLean Information System Success Model (D&M ISSM)

In 1992, William H. DeLone and Ephraim R. McLean proposed a theory on information system success. They addressed the lack of dependent variables in information systems research by identifying factors that contribute to the success of information systems. In the DeLone and McLean (1992) model, there are six variables, and the model can be seen in the journal "Information System Success: The Quest for the Dependent Variable" [7].

The 1992 model was updated to include "Intention to Use" and "Service Quality," with all impacts combined into a single category called "Net Benefits." This revised version is known as the DeLone and McLean Information System Success Model (D&M ISSM) [8]. This model shows that user satisfaction depends on system use, which then influences the intention to continue. Net Benefits affect both User Satisfaction and Intention to Use/Use, highlighting their role in system usage and satisfaction levels. The D&M ISSM model is presented in the journal "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update" [8]. The variables in the D&M ISSM model will be explained in the following section.

Information Quality refers to the characteristics of system output expected by users, such as understandability, timeliness, completeness, and format [3]. System Quality relates to the design and functionality of the system, indicated by adaptability, ease of use, reliability, and response time. Service Quality measures the support provided by the system provider to meet user expectations, indicated by assurance, empathy, flexibility, and responsiveness [9]. Intention to Use reflects users' motivation to engage with a system; this is the relevant variable for mandatory systems like *My Pelindo*, with indicators such as daily use and nature of use. User Satisfaction measures the level of satisfaction users experience after using an information system, indicated by information satisfaction, efficiency, and overall satisfaction [10]. Net Benefits is the final variable in the D&M ISSM. Net Benefits reflect the impact of system usage on individual or organizational performance, measured by decision effectiveness, job effectiveness, job simplification, and productivity [9] [11].

This study employs two models based on the D&M ISSM to analyze the use of *My Pelindo* application by permanent employees at PT Pelindo III Sub Region Java. The first model utilized in this study is presented as Figure 2.

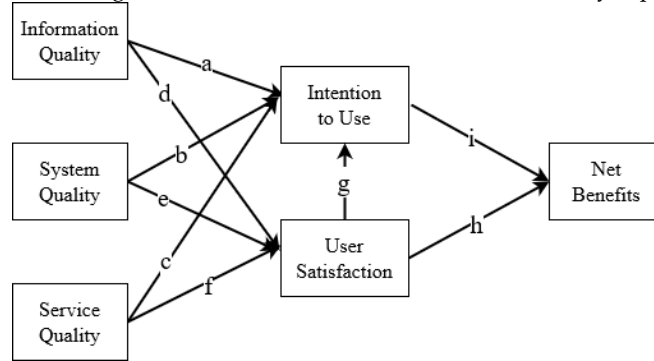


Figure 2: Analysis Model 1

In the D&M ISSM, Net Benefits influences both User Satisfaction and Intention to Use. However, due to limitations in analytical methods, this relationship is modeled separately from the first model. The second analytical model used in this study is presented as follows.

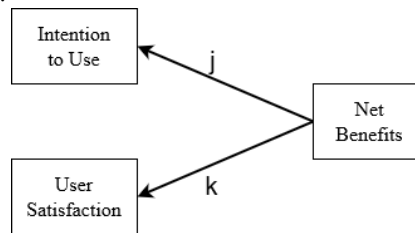


Figure 3: Analysis Model 2

C. Validity and Reliability Testing of the Questionnaire

Validity testing assesses whether an instrument accurately measures the intended construct [12]. An instrument is valid if its Pearson correlation coefficient exceeds the critical r-value (r-table) at the chosen significance level α and degrees of (n-2). To assess the instrument, validity testing compares the calculated r-value with the critical r-value at a 0.05 significance level; the item is valid if the calculated value is positive and higher. Next, a reliability is then tested using Cronbach's alpha, where values above 0.6 indicate instrument is reliable [6].

D. Partial Least Squares Structural Equation Modeling (PLS-SEM)

Structural Equation Modeling (SEM) analyzes relationships between latent variables, which are abstract concepts measured through indicators [8]. Latent variables can be exogenous (influencing others) or endogenous (being influenced), while manifest variables are measurable indicators. PLS-SEM is a predictive statistical method with two models: measurement (outer) and structural (inner). Unlike CB-SEM, which confirms theories via covariance estimation, PLS-SEM maximizes explained variance of dependent variables. It is suitable for small samples, non-parametric data, and assesses prediction accuracy [9] [10] [13].

In Partial Least Squares Structural Equation Modeling (PLS-SEM), the analysis involves three key components: the outer model, inner model, and weight relation. The outer model, or measurement model, describes the relationship between latent variables and their indicators. The inner model, also known as the structural model, depicts the relationships among latent variables, where constructs can be exogenous or endogenous. Since actual values of latent variables are unknown, the weight relation connects the outer and inner models by defining weights used to estimate the exogenous and endogenous latent variables.

1) Outer Model Evaluation

Evaluation of reflective measurement models assesses reliability at both indicator and construct levels, and validity through convergent validity (indicator representation) and discriminant validity (distinctness of constructs) [14].

The first measurement in the outer model is indicator reliability. Assessment is based on outer loading with a minimum value of 0.7. Values between 0.40 and 0.70 are considered for removal if deleting them improves reliability or validity, and items with values below 0.40 are removed [14].

The next step involves measuring internal consistency reliability, which is commonly assessed using Cronbach's alpha and Composite Reliability. Both range between 0 and 1, with higher values indicating better reliability. The recommended threshold value is 0.6 [14]. The Cronbach's alpha equation is:

$$\text{Cronbach's } \alpha = \left(\frac{m}{m-1} \right) \left(1 - \frac{\sum_{i=1}^m s_i^2}{s_t^2} \right) \quad (1)$$

s_i^2 represents the variance of indicator variable i , and s_t^2 is the variance of the sum of all m indicators from the construct. The equation for composite reliability is as follows.

$$\rho_c = \frac{(\sum_{i=1}^m \lambda_i)^2}{(\sum_{i=1}^m \lambda_i)^2 + \sum_{i=1}^m \text{var}(e_i)} \quad (2)$$

Next, convergent validity is assessed by evaluating the Average Variance Extracted (AVE). AVE is calculated as the average of the squared loadings and is recommended to have a minimum value of 0.50 [14].

$$AVE = \left(\frac{\sum_{i=1}^m \lambda_i^2}{m} \right) \quad (3)$$

There is also discriminant validity, which measures how distinct a construct is from others in the model. It is evaluated using cross loadings, where an indicator's loading on its own construct must exceed its correlation with other constructs, and the Fornell-Larcker criterion, which requires the square root of a construct's AVE to be greater than its highest correlation with other constructs [14].

2) Inner Model Evaluation

After conducting reliability and validity checks on the outer model or measurement model for the constructs, the next step is to test the predictive ability of the model and the relationships among constructs in the evaluation of the inner model or structural model.

The first step is to check for collinearity using the Variance Inflation Factor (VIF). The recommended VIF value should be below 5, indicating the absence of multicollinearity.

Next, there are path coefficients to assess the significance of the structural model. They estimate the hypothesized relationships between constructs. This study uses a critical value of 1.96 and a p-value of 0.05 for significance testing [14]. The next step is calculating the coefficient of determination (R^2), which represents the combined effect of exogenous latent variables on endogenous latent variables in a structural equation model. It measures the proportion of variance in endogenous variables explained by exogenous variables. The formula for R^2 is as follows:

$$R^2 = 1 - \frac{\sum_{i=1}^n (Y_i - \hat{Y}_i)^2}{\sum_{i=1}^n (Y_i - \bar{Y})^2} \quad (4)$$

Adjusted R^2 can be used to avoid bias, as the R^2 value increases with the addition of exogenous variables in the model, even if those constructs have weak relationships with the endogenous constructs.

$$R_{adj}^2 = 1 - (1 - R^2) \frac{n - 1}{n - k - 1} \quad (5)$$

The R^2 value can also be used to measure the strength of the structural model relationship through the effect size (f^2). The effect size is calculated using the formula:

$$f^2 = \frac{R_{include}^2 - R_{exclude}^2}{1 - R_{include}^2} \quad (6)$$

Values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively, of exogenous latent variables. Effect sizes below 0.02 indicate no measurable effect [15].

The R^2 value only indicates the explanatory power of the model within the sample used (in-sample) and does not provide information on the model's predictive power outside the sample (out-of-sample). Therefore, Shmueli et al. (2016) proposed procedures for out-of-sample prediction, involving model estimation on the analysis sample (training sample) and evaluating predictive performance on a separate holdout sample [14].

Out-of-sample prediction in PLS-SEM uses a training sample to estimate the model and evaluates its performance on a holdout sample. Predictive power is assessed with metrics like Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE), where MAE measures average error and RMSE emphasizes larger errors. A positive $Q_{predict}^2$ value indicates the model predicts better than a simple benchmark. RMSE and MAE values from the PLS model are compared with those from a linear regression model (LM) benchmark to assess predictive accuracy [14].

3) Bootstrapping Method

PLS-SEM does not require normally distributed data, so parametric significance tests cannot be used for coefficients such as outer loadings and path coefficients. Therefore, in PLS-SEM, model parameter significance is tested using the bootstrapping method. In this method, multiple samples are repeatedly drawn from the original sample with replacement; in this study, 10000 bootstrap samples were used [14].

The rejection region for the hypotheses is determined using t-statistics and p-values. Coefficient is considered significant if the t-value is greater than the critical value. In this study, the critical value is 1.96, corresponding to an alpha of 0.05 [14].

E. Conceptual Model

There are two conceptual models used, namely Conceptual Model 1 and Conceptual Model 2. The conceptual models used in this research are presented in the following section.

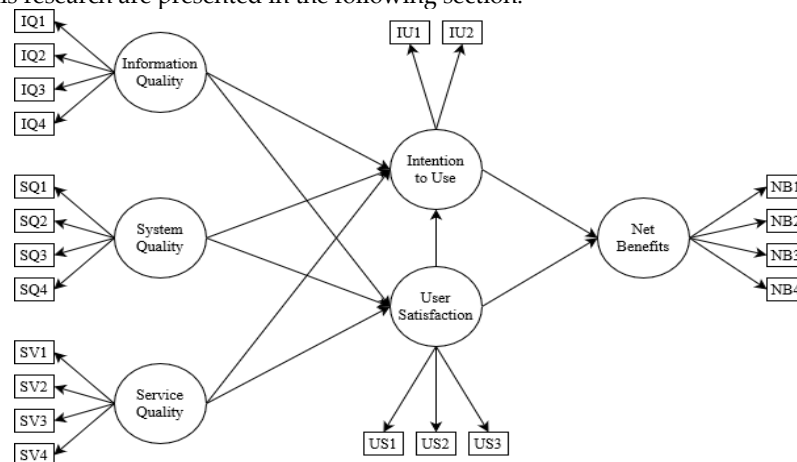


Figure 4: Conceptual Model 1

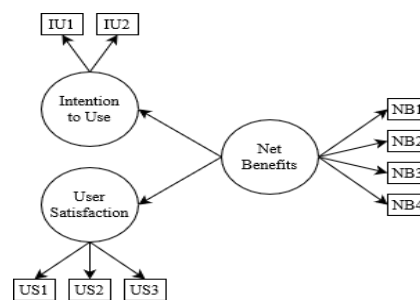


Figure 5: Conceptual Model 2

III. METHODOLOGY

The research variables are based on the conceptual framework of the ISSM D&M model, the detailed indicators and operational definitions of which are presented in Table 1.

Table 1 Variables, Indicators, and Research Question Items

Variable : Information Quality		
Indicator	Code	Questionnaire
Understandability	IQ1	The information or instructions received from the <i>My Pelindo</i> application are easy to understand
Timeliness	IQ2	When there is information related to the company or employee interests, <i>My Pelindo</i> can present that information in a timely manner
Completeness	IQ3	<i>My Pelindo</i> can provide information in a comprehensive manner
Format	IQ4	<i>My Pelindo</i> has a clear display format (for example, in tables, text, or data entry columns)
Variable : System Quality		
Indicator	Code	Questionnaire
Adaptability	SQ1	The application can be accessed using various web platforms and devices other than mobile phones (e.g., computers or tablets)
Ease of Use	SQ2	<i>My Pelindo</i> is easy to use
Reliability	SQ3	<i>My Pelindo</i> is always available when needed
Response Time	SQ4	Features/menus can be used immediately or do not require long loading times
Variable : Service Quality		
Indicator	Code	Questionnaire
Assurance	SV1	When issues occur with the application, the service provider helps resolve them until the problem is fully addressed
Empathy	SV2	When users encounter difficulties, the service provider serves them with friendliness and empathy
Flexibility	SV3	When environmental changes occur, the service provider can adapt those changes to meet users' needs
Responsiveness	SV4	The service provider responds quickly and promptly to users' needs
Variable : Intention to Use		
Indicator	Code	Questionnaire
Daily Use	IU1	I frequently use the application for attendance, administration, and monitoring company activities
Nature of Use	IU2	Every day, I plan to open <i>My Pelindo</i> to assist with work or just to check for news updates

Table 2 Variables, Indicators, and Research Question Items (Continued)

Variable : User Satisfaction		
Indicator	Code	Questionnaire
Information Satisfaction	US1	I am satisfied with the information and features in the <i>My Pelindo</i> application
Efficiency	US2	<i>My Pelindo</i> helps with tasks that need to be completed, making them finish more quickly
Overall Satisfaction	US3	I am satisfied with the performance of the <i>My Pelindo</i> application
Variable : Net Benefits		
Indicator	Code	Questionnaire
Decision Effectiveness	NB1	<i>My Pelindo</i> helps me make more accurate decisions
Job Effectiveness	NB2	With <i>My Pelindo</i> , work becomes more effective
Job Simplification	NB3	<i>My Pelindo</i> helps simplify the tasks being performed
Productivity	NB4	Using <i>My Pelindo</i> increases productivity

IV. RESULTS AND DISCUSSIONS

A. Questionnaire Evaluation

This study's instrument validity test used a sample size of 30 at a 0.05 significance level, with an r-table value of 0.361. An instrument is valid if the Pearson correlation coefficient exceeds 0.361 and the p-value is below 0.05. As a result, all instrument indicators are valid with correlation coefficients exceeding the r-table value of 0.361 at a 0.05 significance level ($p < 0.05$), indicating suitability for use.

After confirming the validity of the indicators, reliability was conducted using Cronbach's alpha. The Cronbach's alpha value was 0.966, which exceeds the minimum threshold of 0.6, indicating that the 21 questionnaire items have good internal consistency and that the instrument is reliable.

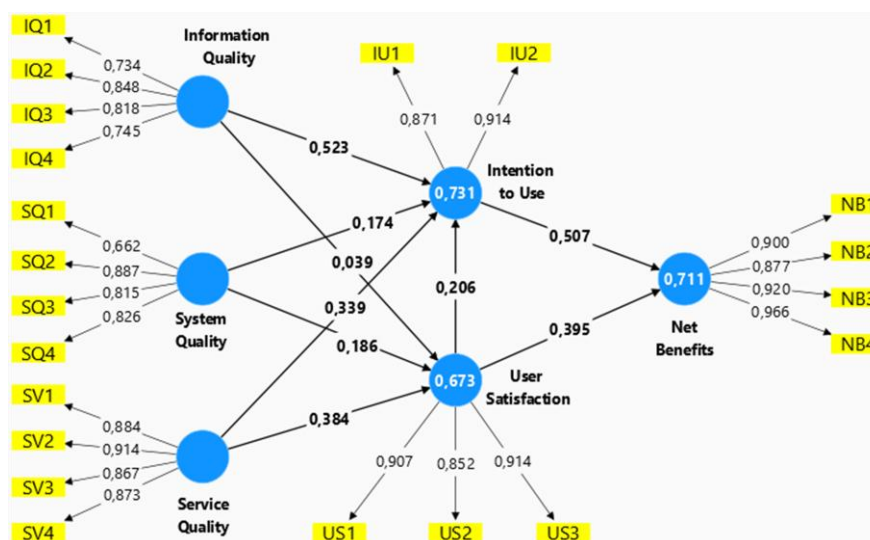
B. Analysis of My Pelindo Application Success Model

Extreme care should be taken in preparing mathematical typescripts. All mathematics should be legible, precise and carefully aligned. The following shows an example of putting an equation in the text:

In this study, 42 survey responses were collected, but 8 of them showed no variation because all answers were identical, indicating possible inattentiveness. Therefore, the analysis proceeded with 34 valid responses.

1) Evaluation of the Relationship between Indicators and Latent Variables in Model 1

In the outer model analysis, the first step is to evaluate indicator reliability. The outer loading results for Model 1 are presented in Figure 6.


Figure 6: PLS-SEM Result Model 1

There is one loading value for indicator SQ1 below 0.7 (0.662), but it is retained since it is above 0.4, which is considered acceptable. All other indicators have loadings above 0.7, meaning over 50% of their variance is explained by their latent constructs.

Next, internal consistency reliability for Model 1 is assessed to determine the reliability of the variables. Both composite reliability and Cronbach's alpha are used, with a threshold value of 0.6 as the minimum acceptable criterion for reliability. All six latent variables in Model 1 have composite reliability and Cronbach's alpha values greater than 0.6. A Cronbach's alpha value above 0.6 indicates that the indicators consistently measure their respective constructs.

The next step is to evaluate convergent (AVE) value.

Table 3 Convergent Validity Model 1

Variable	(AVE)
Information Quality	0.620
System Quality	0.643
Service Quality	0.782
Intention to Use	0.797
User Satisfaction	0.795
Net Benefits	0.839

The AVE values show that all six latent variables have AVE values above the criterion of 0.5, indicating adequate convergent validity. For example, Information Quality variable explains an average of 62% variance from its four indicators.

The next step in measurement model evaluation is discriminant validity. This validity can be assessed using cross-loading and the Fornell-Larcker criterion.

Table 4 Cross Loading Model 1

	IQ	SQ	SV	IU	US	NB
IQ1	0.734	0.468	0.491	0.658	0.553	0.443
IQ2	0.848	0.711	0.652	0.683	0.613	0.562
IQ3	0.818	0.513	0.567	0.661	0.551	0.467
IQ4	0.745	0.413	0.550	0.578	0.612	0.605
SQ1	0.407	0.662	0.357	0.458	0.307	0.404
SQ2	0.663	0.887	0.716	0.652	0.680	0.638
SQ3	0.367	0.815	0.458	0.479	0.446	0.451
SQ4	0.640	0.826	0.716	0.610	0.686	0.642
SV1	0.605	0.629	0.884	0.659	0.699	0.606
SV2	0.686	0.729	0.914	0.649	0.701	0.676
SV3	0.604	0.574	0.867	0.583	0.703	0.575
SV4	0.653	0.665	0.873	0.582	0.590	0.562
IU1	0.690	0.533	0.582	0.871	0.573	0.632
IU2	0.770	0.699	0.664	0.914	0.742	0.786
US1	0.711	0.649	0.681	0.635	0.907	0.701
US2	0.564	0.521	0.657	0.644	0.852	0.647
US3	0.697	0.682	0.704	0.708	0.914	0.716
NB1	0.593	0.589	0.550	0.664	0.617	0.900
NB2	0.559	0.565	0.584	0.728	0.677	0.877
NB3	0.626	0.610	0.653	0.729	0.754	0.920
NB4	0.638	0.737	0.711	0.805	0.769	0.966

Table 5 Fornell-Larcker Model 1

	IQ	SQ	SV	IU	US	NB
IQ	0.787					
SQ	0.673	0.802				
SV	0.720	0.734	0.885			
IU	0.821	0.698	0.700	0.893		
US	0.740	0.695	0.764	0.744	0.891	
NB	0.660	0.686	0.686	0.801	0.772	0.916

In Model 1, the loading values for each indicator are higher within their own construct than with other constructs, confirming indicator validity. The model passed the Fornell-Larcker criterion for discriminant validity, where the square root of each construct's AVE is greater than its correlation with other constructs. This shows that constructs predict their own indicators better than those of other constructs. However, the Information Quality construct showed an exception, with its AVE square root lower than its correlation with Intention to Use, likely due to high indicator loadings in Intention to Use increasing their correlation.

2) Evaluation of Relationship between Indicators and Latent Variables in Model 2

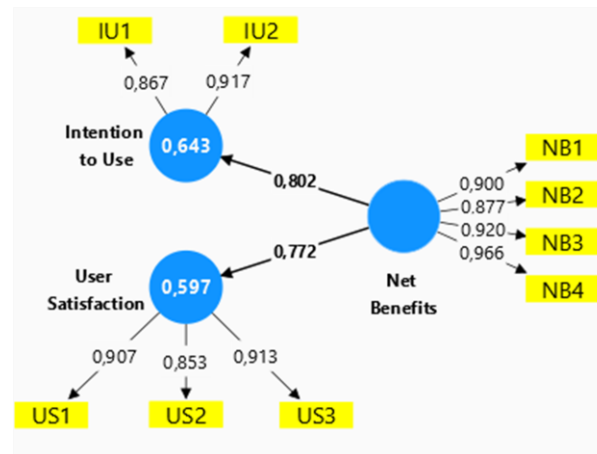
The first analysis in the measurement model for Model 2 is the evaluation of indicator reliability, which is assessed based on the loading factor. The loading factor values for Model 2 are shown in Figure 7.

The loading factor values in Figure 7 meet the criterion, which is a minimum value of 0.7. All indicators meet the minimum threshold, so indicator reliability for Model 2 is acceptable. The analysis continues with internal consistency reliability, the Cronbach's alpha values for the three variables exceed the threshold of 0.6, ranging from 0.70 to 0.96. This indicates that the indicators in Model 2 effectively measure their respective constructs.

Next, convergent validity for Model 2 is assessed using AVE, with a minimum acceptable value of 0.5 for good validity.

Table 6 Convergent Validity Model 2

Variable	AVE
Net Benefits	0.839
Intention to Use	0.796
User Satisfaction	0.795

**Figure 7:** PLS-SEM Result Model 2

The AVE values for the three variables exceed the minimum threshold of 0.5.

The analysis continues with an evaluation of discriminant validity for Model 2 using cross-loading and the Fornell-Larcker criterion to ensure that each construct is distinct and measures unique concepts.

Table 7 Cross Loading Model 2

	NB	IU	US
NB1	0.900	0.666	0.617
NB2	0.877	0.728	0.677
NB3	0.920	0.729	0.753
NB4	0.966	0.806	0.769
IU1	0.631	0.867	0.572
IU2	0.786	0.917	0.742
US1	0.701	0.637	0.907
US2	0.647	0.645	0.853
US3	0.716	0.708	0.913

Table 8 Fornell-Larcker Model 2

	NB	IU	US
NB	0.916		
IU	0.802	0.892	
US	0.772	0.745	0.891

The indicator loadings are higher than their correlations with other constructs, confirming the validity of the indicators in Model 2. Additionally, the square root of the AVE for the three variables exceeds their correlations with other variables, supporting convergent validity.

3) Evaluation of the Relationship between Exogenous and Endogenous Latent Variables in Model 1

The evaluation continues with an analysis of the structural model (inner model). In Model 1, collinearity is assessed using VIF values. Below are the VIF values for Model 1.

Table 9 VIF Model 1

	IQ	SQ	SV	IU	US	NB
IQ				2.641	2.290	
SQ				2.500	2.394	
SV				3.166	2.716	
IU						2.238
US				3.058		2.238
NB						

The VIF values for Model 1 presented in Table 8 are all below 5. Therefore, no multicollinearity exists in Model 1.

The bootstrapping method was employed for testing, with 10000 repetitions conducted in this study. The output for Model 1 after bootstrapping is shown in Figure 8.

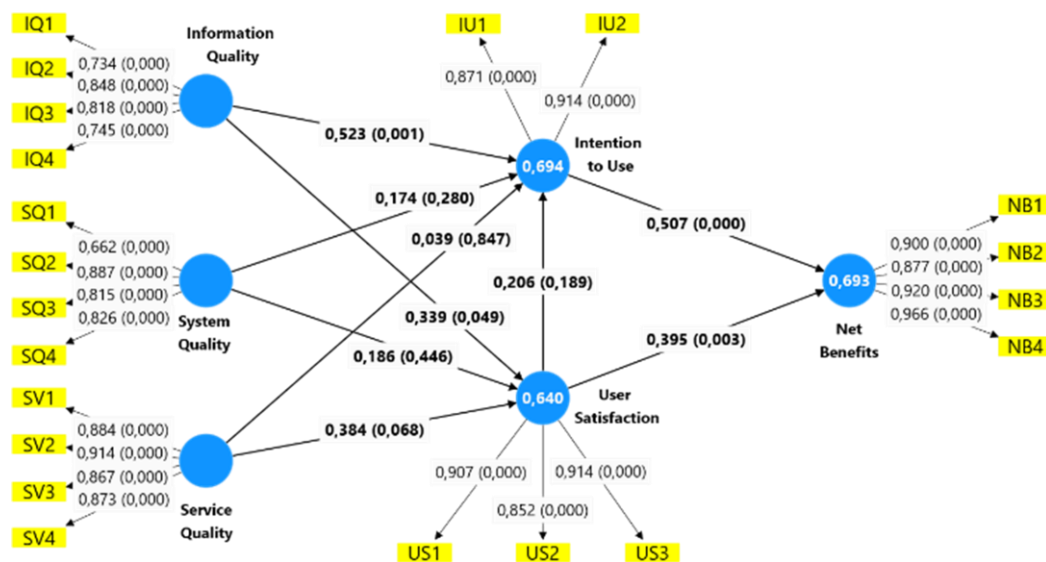


Figure 8: Bootstrap Result for Model 1

The testing of the measurement model is based on the T-statistic values obtained from the loadings after bootstrapping with 10000 repetitions. Through Figure 8, it is shown that the measurement model for each latent variable is adequate. This is indicated by T-statistic values exceeding 1.96. Additionally, the p-values for all relationships are less than 0.05.

Next, the path coefficient analysis for Model 1 will be conducted. In Figure 8, for example, the relationship between Information Quality and Intention to use has a path coefficient value and p-value of 0.523 (0.001) respectively. Based on the tests performed, four significant relationships were identified:

1. There is a significant relationship between Information Quality and Intention to Use.
2. There is a significant relationship between Information Quality and User Satisfaction.
3. There is a significant relationship between User Satisfaction and Net Benefits.
4. There is a significant relationship between Intention to Use and Net Benefits.

The structural model is then evaluated using the Coefficient of Determination (R^2). Figure 8 shows that Intention to Use is explained by Information Quality, System Quality, Service Quality, and User Satisfaction at 69.4%. User Satisfaction is explained by Information Quality, System Quality, and Service Quality at 64%. Meanwhile, Net Benefits are explained by Intention to Use and User Satisfaction at 69.3%.

Next, the effect size (f^2) for Model 1 will be analyzed in Table 9.

Table 10 f^2 Values Model 1

	IQ	SQ	SV	IU	US	NB
IQ				0.385	0.153	
SQ				0.045	0.044	
SV				0.002	0.166	
US				0.052		0.242
IU						0.398
NB						

Effect size is categorized into three levels: small, moderate, and large, corresponding to values of 0.02, 0.15, and 0.35, respectively.

Another measure to be analyzed is the PLSpredict value, which is presented in Table 10.

Table 11 $PLS_{predict}$ Model 1

	$Q^2_{predict}$	PLS-SEM RMSE	PLS-SEM MAE	LM_RMSE	LM_MAE
IU1	0.395	0.483	0.409	0.719	0.588
IU2	0.543	0.541	0.453	0.708	0.599
US1	0.447	0.390	0.301	0.430	0.338
US2	0.301	0.482	0.375	0.498	0.403
US3	0.444	0.508	0.399	0.633	0.500
NB1	0.341	0.526	0.432	0.763	0.571
NB2	0.295	0.490	0.384	0.550	0.461
NB3	0.375	0.457	0.361	0.664	0.534
NB4	0.467	0.561	0.455	0.686	0.554

Based on Table 10, the $Q^2_{predict}$ values for all indicators of the endogenous variables are above 0, indicating that the PLS model performs better than the simplest benchmark. The next analysis examines the RMSE and MAE values of both the PLS model and the regression model. All RMSE and MAE values for each indicator in the PLS model are lower than those in the regression model. This indicates that the model has high predictive power.

- 4) Evaluation of the Relationship between Exogenous and Endogenous Latent Variables in Model 2
Collinearity in Model 2 will be assessed using the Variance Inflation Factor (VIF) values.

Table 12 VIF Model 2

	<i>Intention to Use</i>	<i>User Satisfaction</i>
<i>Net Benefits</i>	1.000	1.000

VIF values for Model 2, which are the effects of the Net Benefits variable on both Intention to Use and User Satisfaction, are below 5. Therefore, no multicollinearity exists in Model 2.

The structural model evaluation also includes testing with the bootstrap method. Bootstrap sampling was performed 10000 times at a 5% significance level.

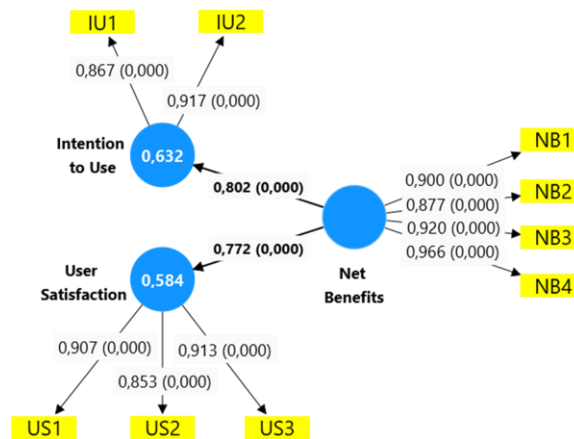


Figure 9: Bootstrap Result Model 2

The results show that Net Benefits significantly influence both Intention to Use ($T = 13.592$, $p = 0.000$) and User Satisfaction ($T = 10.355$, $p = 0.000$).

The evaluation of the structural model continues by examining the R^2 (coefficient of determination) values. Based on the R^2 values presented in Figure 9, the Net Benefits variable explains 63.2% of the variance in Intention to Use. Meanwhile, the User Satisfaction variable is explained by the Net Benefits variable to the extent of 58.4%. Next, the PLSpredict analysis for Model 2 was conducted.

Table 13 PLSpredict Model 2

	$Q^2_{predict}$	PLS-SEM RMSE	PLS-SEM MAE	LM RMSE	LM MAE
IU1	0.358	0.498	0.426	0.536	0.481
IU2	0.594	0.510	0.334	0.530	0.354
US1	0.449	0.389	0.319	0.450	0.354
US2	0.375	0.456	0.319	0.512	0.362
US3	0.492	0.485	0.378	0.479	0.366

Based on Table 12, all $Q^2_{predict}$ values are greater than zero, indicating that the PLS-SEM model has predictive relevance compared with the naïve benchmark. For most indicators, the PLS-SEM model produces lower prediction errors than the linear model (LM) benchmark. However, for indicator US3, the RMSE value of the PLS-SEM model is slightly higher than that of the LM benchmark. Therefore, Model 2 can be concluded to have medium predictive power.

V. CONCLUSIONS AND SUGGESTIONS

Based on the results of this research and the discussions presented, the following conclusions are drawn to address the formulated objectives. The relationships among the variables in the DeLone & McLean Information System Success Model (ISSM)—namely Information Quality, System Quality, Service Quality, Intention to Use, User Satisfaction, and Net Benefits—and their influence on the success of *My Pelindo* application were examined. Of the eleven hypotheses tested, the variables found to have significant influences include Information Quality's impact on Intention to Use and User Satisfaction, User Satisfaction's effect on Net Benefits, Intention to Use's effect on Net Benefits, and Net Benefits' reciprocal effects on Intention to Use and User Satisfaction. Conversely, System Quality and Service Quality did not significantly influence Intention to Use or User Satisfaction, and User Satisfaction did not significantly impact Intention to Use.

These findings suggest that the success of *My Pelindo* application is primarily determined by the quality of information provided by the system. Improving information quality enhances user satisfaction and motivates employees' intention to use the application. Furthermore, increased motivation and satisfaction contribute to greater net benefits, while perceived net benefits positively influence both intentions to use and user satisfaction.

Referring to the analysis based on the DeLone and McLean (ISSM) framework, to enhance the motivation to use the application and user satisfaction, efforts should be made to improve the Information Quality of *My Pelindo*. Additionally, further research is needed regarding the lack of impact from system quality and service quality on the motivation to use *My Pelindo* and user satisfaction.

Based on current research and relevant sources discussing reciprocal effects between Net Benefits, Intention to Use, and User Satisfaction, simultaneous measurement of these reciprocal relationships is common but has limitations. For more reliable and valid results, it is advisable in future research to apply longitudinal or time-separated measurements to capture the dynamic interplay between these variables accurately. This approach reduces bias and allows stronger causal inference.

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