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Measuring the Success of E-Cargo Implementation at One of Indonesian Airlines using DeLone and McLean Model

Measuring the Success of E-Cargo Implementation at One of Indonesian Airlines using DeLone and McLean Model

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Abstract. This research is aimed at measuring the success of e-cargo implementation in Indonesia. There are three analyzed districts: Tanjung Pandan (TJQ), Palembang (PLM), and Jakarta (CGK). The research uses information system's success model proposed by Delone and McLean. The research will analyze the factors that measure the success of using DeLone & McLean model of success information systems. Data from 53 respondents were collected through a survey, then the author created a path with the Partial Least Squares (PLS) path analysis using the software SmartPLS (v.3.2.6). The results of this study proved that the information quality variable did not significantly affect use variable, the information quality variable had no significant effect on the user satisfaction variable and the service quality variable had no significant effect on the use variable, while the other variables were tested significant in measuring the success of the use of information systems with R-square value that has a moderate effect of user satisfaction variable by 0.577, the use variable by 0.396, and a net benefit variable by 0.615.

1. Introduction

1.1. Background

Nowadays, information system has integrated and eventually becomes an integral part of company's running. Information system is used to support any operational process at the airline. Thus, almost all of working operational process of the airline is now depended on the information technology. In creating an integrated information system, it must be ensured that the information system already created and implemented benefits the company so that the company's operational processes work faster, more accurate. In addition, information systems can support the achievement of the company's strategy, so that said company can be competitive in the business competition.

In 2010, the airline had expanded its market reach by providing air cargo service, even though still done manually. Subsequently, the airline managed to utilize its information technology by expanding its limit from merely on e-commerce (reservation system or B2C) to air cargo by establishing e-cargo system. The implementation of e-cargo is triggered by the need for efficiency, effectiveness and economic reasons in cargo operations. But in fact, the implementation of e-cargo in the form of replacement from manual operation to automated operation encountered its own obstacles. One reason is because employees as users (end users) are less able to adapt to functioning e-cargo since they have long been accustomed to manage the system manually. To solve it, there needs to do the introduction of workflow for e-cargo systems, user acceptance test (UAT), training to the concerned division, then it is ready to perform the migration by way of conversion of pilots and when the pilot conversion is successful, then it has to deploy live implementation by conversion phases (phase-in conversion) [1] to 43 districts of the airline's routes in Indonesia.

Implementation stages of the pilot conversion and phase-in conversion of system e-cargo have been carried out in the Airport Ticketing Office (ATO) of Tanjung Pandan with a three-letter code TJQ, Palembang with three letter code PLM, Jakarta with a three letter code CGK which are some of cargo routes from districts owned by the airline. Therefore, there must be a measure of the success of this e-cargo system whether it is already in line or not with the needs of companies. To measure the success of an information system in a company, there are companies using measurement in financial terms, which is return of investment. The researchers [2] also have made a success measurement model information system that emphasizes the need for better and more consistent success metrics. One way of measuring the success of information systems model is DeLone and Mclean information system success model [3]. In this study [3], there are six variables: the system quality, information quality, service quality, use, user satisfaction and net benefit. DeLone and McLean Model is considered to measure the complexity of information systems because each of the variable is not independent but all depend on each other (interdependent) and interrelationship. The mutual connectedness between variable and this system means that the ultimate goal of net benefit will not increase if the five other variables are not perceived by the user, meaning that the five other variables must be developed to achieve improved net benefit perceived by the users.

1.2 Conversion System

Conversion system is a stage that is used to operate the new system in order to replace the old system or the process of changing from the old to the new system [4]. The level of difficulty and complexity of the conversion from the old system to the new system depends on a number of factors. If the new system is a software package wrapped (canned) that will run on the new computer, then the conversion will be relatively easier but if the conversion utilizing the new customized software, new databases, computers and new control software, the new network and a drastic change in the procedure, the conversion becomes rather difficult and challenging, such factors on activity data collection and new generated data implemented, and developing interface mechanism of the old system. This interface allows the old system operates with the new input data. Then the activities of the new database access, storage, and calling are implemented and another segment of the system being implemented. Hence, it has the advantages of speed changes in a particular company that can be minimized, and the sources of the data processing can be acquired gradually over a period of extensive time. Moreover, it also provide a challenge because it has the disadvantage that the purpose of the cost that must be established to develop a temporary interface with older systems, limited applied power, and setbacks in the spirit of the organization since people feel that they never be able to complete the system.

1. Direct Conversion
   The conversion is done by ending the old system and replace it with a new system [4].
2. Parallel Conversion
   In this conversion, the new system and the old system are equally run. After a certain period, if the new system has been acceptable to replace the old system, the old system is immediately terminated [4].
3. Phase-In Conversion
   Conversion is done by replacing a part of the old system with a new system [4].
4. Pilot Conversion
   This approach is done by implementing a new system only in specific locations that are treated as a pioneer [4].

1.3 DeLone and McLean Model

DeLone and McLean [3] defined six different variables of IS success: system quality, information quality, users, user satisfaction, the net benefit as in the Figure 1.

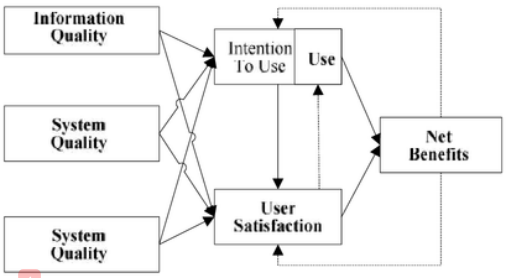

Figure 1. DeLone and McLean Success Model
Source: DeLone and McLean Model [3]

1.4 Research Questions

Seen from the success' perspective of information system with DeLone and McLean model as the basis, the determiner of the condition of the system and the behavior of the users of e-cargo can be identified their inter-variable relationships from six variables: system quality, information quality, service quality, use, user satisfaction, and net benefit. Thus, the problem of the research is:

1. Migration of manual cargo into e-cargo using a pilot conversion method and phase-in conversion. What does the result from the quality system, the information quality, service quality on the e-cargo affect the use and user satisfaction?
2. If the user behavior is the use and user satisfaction, do the use and user satisfaction affect the net benefit?

1.5 Research Goals

To measure the factors that affect the successful implementation of the airline e-cargo using six variables on DeLone and McLean model on information systems success.

2. Research Method

2.1. Data Collection Method

This research was conducted at the cargo division in the districts of Tanjung Pandan (TJQ), Palembang (PLM), and Jakarta (CGK). The process of distributing the questionnaire for data collection was conducted from September 3, 2016 to January 20, 2017. The population of the research is the users of e-cargo at the analyzed airline, particularly those of cargo division. The data collection of the research was conducted by circulating questionnaire.

2.2. Research Variables

2.2.1 Independent Variables (Exogenous Variabel)

The independent variables in this study are the quality system, the quality of information and the service quality. Further explanation of these three variables will be described below.

1. System quality
   This variable assesses whether the characteristics possessed by the system has been in accordance with the users. This variable is measured using the items of navigation, design, usability, functionality, responsiveness, and availability.
2. Information quality
   Items that need to be taken into account in calculating the information quality are understandable, accuracy, usability, attractiveness, reliability, completeness and timeliness.
3. Service quality
   Variable measurement of this variable uses the items of responsiveness, perceptive, empathy, assurance and training.

2.2.2 Intervening Variables

Intervening variables are ones that arise when the independent variables affect the dependent variable. Intervening variables in the IS Succes model [3] are as follows.

1. Use
   This research uses 'use variable; as an intervening variable. The objective of the use is the attainment use of e-information system capabilities cargo for cargo staff who use it while the measurement of variables using daily use, and the level of use of the features.
2. User satisfaction
   According to [3], user satisfaction is the users' response to the use of information system output. User satisfaction plays an important role to determine the responses of users of information systems toward applied information system. User satisfaction will increase if there is a match between the expected to the output of the information. Measurement of this variable applies adequacy, efficiency, effectiveness, and satisfaction.

2.2.3 Dependent Variables (Endogenous Variables)

1. Net benefit
   Net benefit is a measure of the contribution of information systems towards users of the system. Measurement of this variable applies performance, achievement, productivity, effectiveness, simplicity, usefulness or benefits.

2.3. Framework of thinking

Framework of thinking is a chart that illustrates the flow of thought in doing this research can be seen in the figure 2.

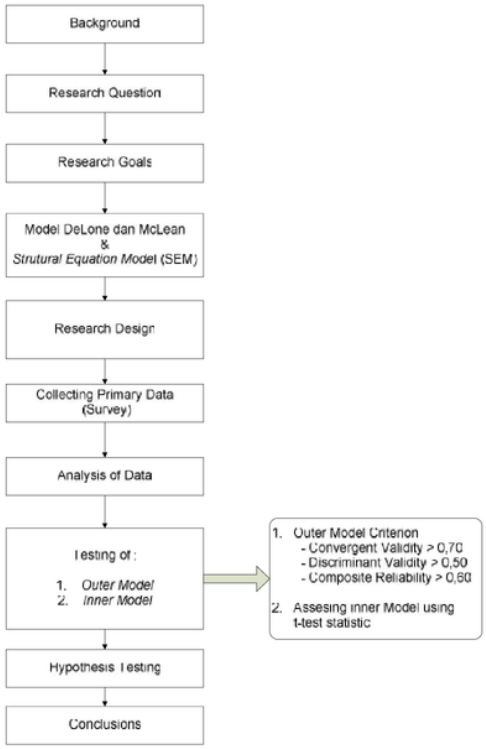

Figure 2. Framework of Thinking

2.4. Theoretical Framework and Hypothesis

2.4.1 Theoretical Framework

Theoretical framework model is based on the theory from DeLone and McLean model on information systems success [3] The relationship between these variables can be seen in figure 3.

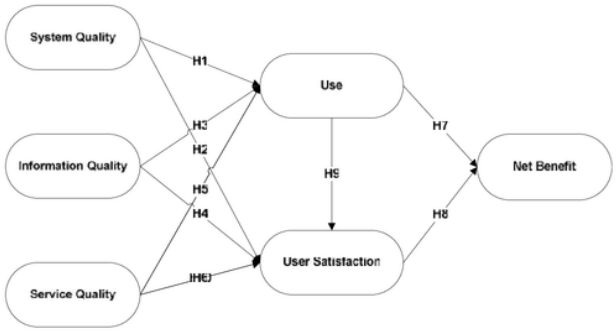

Figure 3. Theoretical Framework
Source: DeLone and McLean Model [3]

2.4.2 Hypothesis

From the DeLone and McLean model above, a proposed initial hypothesis is obtained and detailed as follows:

H1 : System quality (KS) affects the use (PE)
H2: System quality (KS) affects the use satisfaction (KP)
H3: Information quality (KI) affects the use (PE)
H4: Information quality (KI) affects the user satisfaction (KP)
H5 : Service quality (KL) affects the use (PE)
H6 : Service quality (KL) affects the user satisfaction (KP)
H7 : Use (PE) affects net benefits (MB)
H8: User satisfaction (KP) affect the net benefits (MB)
H9: Use (PE) affects user satisfaction (KP)

2.4.3 Conceptual Framework

The conceptual framework used in this study is explained in Figure 4.

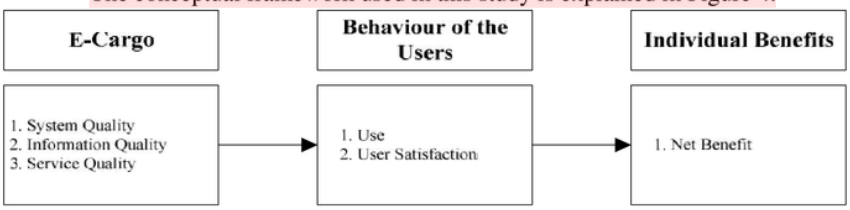

Figure 4. Conceptual Framework

The purpose of the model in figure 4 is to measure the successful implementation of e-cargo, and the first thing to do is to assess the condition of the e-cargo system. E-cargo condition assessment is determined by variables such as the quality of the system, information quality, and quality of service that it generates [5]. The existence of the e-cargo will affect the behavior of the user, and to study the behavior of users, it is examined from the use variable and user satisfaction variable, so that user behavior will affect the net benefit variable.

2.4.4 Data Analysis Technique

Analysis of the data used in this study is a measurement model test (validity and reliability) followed by Structural Equation Model (SEM) using software SmartPLS (v.3.2.6), which is testing the relationship between the variables and hypothesis testing. Structural equation model used in this study can be seen in table 1.

Table 1. Classification Variables and Indicators

No	Laten Variables Name	Symbol	Indicators
1	System Quality	KS1	Navigation
		KS2	Design
		KS3	Usability
		KS4	Functionality
		KS5	Responsiveness
		KS6	Availability
2	Information Quality	KI1	Understandable
		KI2	Accuracy
		KI3	Attractiveness
		KI4	Reliability
		KI5	Completeness
		KI6	Timeliness
3	Service Quality	KL1	Responsiveness
		KL2	Perceptive
		KL3	Empathy
		KL4	Assurance
		KL5	Training
4	Use	PE1	Daily use
		PE2	Level of use
5	User Satisfaction	KP1	Adequacy
		KP2	Efficiency
		KP3	Effectiveness
		KP4	Satisfaction
6	Net Benefit	MB1	Performance
		MB2	Achievement
		MB3	Productivity
		MB4	Effectiveness
		MB5	Simplicity
		MB6	Usefulness/benefits

3. Result and Discussion

3.1. The Description of Research Result

3.1.1 The Identity of Research Result

The identity of these respondents were observed by gender, age, education, districts they lived in, the duration of using the e-cargo.

• Gender

Respondents were most likely to be male, as many as 41 people (77%), and the rest of the respondent is sex women, as many as 12 people (23%). This indicates that most of the subjects of this study are male.

• Age

Most respondents are still in the productive age; as many as 37 people or 70% are in the range of age 21-30 years, as many as 14 people or 26% are the range of age 31-40 years, and followed by the age range of 41-50 years as many as 2 or 4 %.

• Education
Based on past levels of education, the average respondent, which is the 92% or 49 people, have had a bachelor's degree (S1), whereas for diploma (D3), there is only a small portion that is 8% or 4 people from the total respondents.
• Districts
For the district where the distribution of the questionnaire is done, the average respondents, at most, 91% or 48 people are in the district of Jakarta (CGK), then 5% or 3 people are in the district of Tanjung Pandan (TJQ), while for the district of Palembang (PLM), at least 4% or 2 of total respondents scored the lowest.
• The Duration of Using the E-Cargo
Most of the respondents who had known e-cargo are seen from the data respondents who had known e-cargo less than 1 year are 53 people or 100%, which is caused by the newly implemented e-cargo, run for only seven months in the airline.

3.2. Descriptive Statistics

In Table 2. constructs on descriptive statistics indicate that the system quality variable has the empirical range of 6 to 10 with an average score (mean) of 8.15 and a standard deviation of 1.16. The average score (mean) on the system quality when higher than 0.15 compared to the median value, 8, indicates that the user feels that the system has good quality. The value of standard deviation indicates a deviation above the average value of the respondents' answers to questions about the system quality by 1.16.

Table 2. Constructs At Descriptive Statistics

Constructs	N	Min.	Max.	Mean	Median	Standard Deviation
System Quality (KS)	53	6	10	8.15	8	1.16
Information Quality (KI)	53	9	15	12.04	12	1.98
Service Quality (KL)	53	9	20	15.11	16	2.75
Use (PE)	53	6	10	8.15	8	1.26
User Satisfaction (KP)	53	12	20	16.49	16	2.68
Net Benefit (MB)	53	14	25	21.04	20	2.92

Source: Processed Primary Data, 2017

Information quality has the empirical range of 9 to 15 with an average value (mean) of 12.04 and a standard deviation of 1.98. The average value (mean) of the information quality that is 0.04 higher than the median value, 12, indicates that the users feel that the information quality has been good. The value of the standard deviation indicates a deviation above the average value of the respondents' answers to questions about the information quality by 1.98.

The service quality has the empirical range of 9 to 20 with the average value (mean) of 15.11 and a standard deviation of 2.75. Respondents considered the service quality provided is inadequate. This can be seen in Table 2. that the difference between the median and the average value (mean) is 0.89 with the average value (mean) of 15.11 compared to the median magnitude which reached 16.

Use has a range of 6 to 10 with an average value (mean) of 8.15 and a standard deviation of 1.26, which indicates the deviation from the average (mean) respondents. The median value, 8, which approaches the average value (mean) of 8.15 indicates that the user considers the use of the system strongly supports the acquisition of the benefits of the used system.

User satisfaction has a data range of 12 to 20 with an average value (mean) of 16.49 and a standard deviation of 2.68. The 2.68 value of standard deviation illustrates the deviation from the average value (the mean). The average value of user satisfaction is quite high, 16.49 higher than the median value, 16, which shows the user satisfaction of the e-cargo.

The net benefit has the empirical range of 14 to 25 with an average value (mean) of 21.04 and the 2.92 standard deviation. The net benefits also has attained a positive opinion, it is seen from the 1.04 difference between the average value (mean) and the median. The 20 median value would be lower than the value of the 21.04 average value (mean).

3.3. The Evaluation of Measurement Model or Outer Model

3.3.1 Validity Costruct

a. *Convergent Validity*

Convergent validity test is done by looking at the score of average variance extracted (AVE) and loading factor. A factor or indicator is valid when the loading score value is > 0.7 and can be tolerated up to 0.5 on the theory that is being developed, at the moment.

Table 3. Cross Loading (Invalid Indicators)

	User Satisfaction	Information Quality	Service Quality	System Quality	Net Benefit	Use
KI1	0.475	**0.731**	0.510	0.509	0.485	0.467
KI2	0.497	**0.567**	0.410	0.559	0.336	0.219
KI3	0.400	**0.717**	0.602	0.457	0.534	0.496
KI4	0.533	**0.787**	0.645	0.599	0.674	0.519
KI5	0.375	**0.595**	0.726	0.337	0.414	0.320
KI6	0.566	**0.597**	0.281	0.640	0.570	0.431
KL1	0.528	0.627	**0.782**	0.427	0.566	0.408
KL2	0.478	0.617	**0.807**	0.469	0.535	0.380
KL3	0.414	0.543	**0.817**	0.381	0.594	0.368
KL4	0.569	0.752	**0.850**	0.536	0.671	0.554
KL5	0.296	0.437	**0.635**	0.521	0.625	0.438
KP1	**0.873**	0.708	0.577	0.642	0.651	0.485
KP2	**0.795**	0.549	0.476	0.497	0.575	0.502
KP3	**0.786**	0.454	0.400	0.560	0.544	0.411
KP4	**0.893**	0.654	0.535	0.586	0.682	0.541
KS1	0.372	0.689	0.508	**0.610**	0.587	0.432
KS2	0.462	0.532	0.406	**0.723**	0.609	0.198
KS3	0.371	0.506	0.410	**0.661**	0.499	0.347
KS4	0.345	0.530	0.448	**0.619**	0.489	0.476
KS5	0.512	0.418	0.238	**0.719**	0.472	0.285
KS6	0.610	0.469	0.388	**0.668**	0.462	0.418
MB1	0.552	0.585	0.492	0.519	**0.734**	0.730
MB2	0.639	0.627	0.612	0.687	**0.783**	0.368
MB3	0.502	0.530	0.488	0.561	**0.764**	0.469
MB4	0.371	0.506	0.551	0.554	**0.737**	0.407
MB5	0.464	0.574	0.689	0.468	**0.694**	0.498
MB6	0.726	0.637	0.651	0.703	**0.825**	0.491
PE1	0.511	0.549	0.533	0.453	0.618	**0.925**
PE2	0.566	0.613	0.502	0.565	0.618	**0.933**

Source : Data Processing using SmartPLS (v.3.2.6)

Based on table 3. there are nine indicators, which indicate it should be removed because it is invalid, it is because the nine indicators have no sufficient cross loading value i.e., KS1, KS3, KS4 and KS6 each only has valuse of loading factor 0.610, 0.661, 0.619 and 0.668 from the the construct of the quality system (KS). Furthermore, KI2, KI5 and KI6 from the constructs of the information quality (KI), which only has factor loading values of 0.567, 0.595, and 0.597, then KL5 from the construct of service quality (KL) whose loading factor is 0.635. Lastly, one indicator of net benefits is the MB6 indicator which is one of six indicators of net benefits (MB). It only has a loading factor of 0.694 thus these indicators should also be removed.

b. *Discriminant Validity*

The research's validity test, later, tested the discriminant validity of the measurement model (outer model) with reflexive indicators assessed by cross loading measurements with the constructs. If the correlation between the constructs and the measurement item is higher than the other constructs, then it indicates that the latent constructs predict that the size of said block is better than other block sizes. This study shows that the entire constructs (variables) has a better correlation with the items themselves (indicators) than the other constructs items.

Table 4. Cross Loading (Valid Indicators)

	User Satisfaction	Information Quality	Service Quality	System Quality	Net Benefit	Use
KI1	0.477	**0.804**	0.558	0.293	0.465	0.468
KI3	0.398	**0.743**	0.597	0.265	0.497	0.496
KI4	0.531	**0.834**	0.629	0.366	0.635	0.519
KL1	0.529	0.628	**0.819**	0.328	0.525	0.408
KL2	0.477	0.575	**0.803**	0.166	0.464	0.380
KL3	0.412	0.480	**0.799**	0.140	0.576	0.367
KL4	0.569	0.750	**0.881**	0.335	0.655	0.554
KP1	**0.873**	0.614	0.587	0.563	0.654	0.485
KP2	**0.791**	0.456	0.457	0.353	0.559	0.502
KP3	**0.789**	0.316	0.422	0.450	0.558	0.412
KP4	**0.893**	0.568	0.554	0.439	0.685	0.541
KS2	0.463	0.456	0.362	**0.886**	0.610	0.198
KS5	0.513	0.265	0.200	**0.917**	0.499	0.284
MB1	0.552	0.631	0.482	0.354	**0.723**	0.730
MB2	0.641	0.574	0.570	0.613	**0.789**	0.368
MB3	0.501	0.393	0.421	0.429	**0.809**	0.469
MB4	0.371	0.458	0.492	0.420	**0.748**	0.408
MB5	0.726	0.534	0.644	0.553	**0.834**	0.491
PE1	0.510	0.557	0.505	0.232	0.580	**0.924**
PE2	0.565	0.598	0.475	0.270	0.619	**0.934**

Source: Data Processing using SmartPLS (v.3.2.6)

The validity test can be seen in Table 4. for instance, item KI1 has a 0.804 loading value on the construct of information quality (KI) which is higher than the construct of user satisfaction (KP), which is 0.477, the construct of service quality (KL), which is 0.558, the construct of quality systems (KS), which is 0.293, the construct of the net benefit (MB), which 0.465, and the construct of the use (PE), which is 0.468.

This proves that the item KI1 predicted that the size of the block KI is better than the other constructs. Something similar happened to other constructs that have a correlation value between the items with the construct itself higher than the other constructs.

Table 5. Latent Correlation Variable

	User Satisfaction (KP)	Information Quality (KI)	Service Quality (KL)	System Quality (KS)	Net Benefit (MB)	Use (PE)
(KP)	1.000					
(KI)	0.593	1.000				
(KL)	0.608	0.749	1.000			
(KS)	0.543	0.391	0.305	1.000		
(MB)	0.736	0.675	0.676	0.610	1.000	
(PE)	0.580	0.622	0.527	0.271	0.646	1.000

Source: Data Processing using SmartPLS (v.3.2.6)

Table 6. AVE and AVE Roots

	Average Variance Extracted (AVE)	Akar Average Variance Extracted (AVE)
User Satisfaction (KP)	**0.702**	**0.837**
Information Quality (KI)	**0.631**	**0.794**
Service Quality (KL)	**0.683**	**0.826**
System Quality (KS)	**0.813**	**0.901**
Net Benefit (MB)	**0.611**	**0.781**
Use (PE)	**0.863**	**0.928**

Source: Data Processing using SmartPLS (v.3.2.6)

The assessment of the validity of a construct also can be done by looking at the value of Average Variance Extracted (AVE). It is done by comparing the root of AVE with the correlation between the constructs. Based on the research results, it can be concluded that the root value AVE is higher than the correlation between one another construct, meaning that the whole construct in the model estimated meets the criteria of discriminant validity. The service

quality (KL) variable has a root value AVE of 0.826. This value is higher than the correlation between the variables of user satisfaction (KP) with a value of 0.608 and the information quality variable (KI) with a value of 0749. The whole other variables also showed that the value of AVE root is higher than that of the correlations, such as the net benefit variable (MB), which has its AVE roots of 0.781. Meanwhile, the value of correlation with the other variable, information quality (KI) variable, only reached 0.675. From the two variables, it can be concluded that the value of AVE root is higher than the value of inter-constructs, which means the model used in the study has proven its validity. The comparison between the value of AVE roots with the correlation between constructs can be seen in Table 5. and Table 6.

3.3.2 Costructs' Reliability

Constructs' reliability of measurement model (outer model) with reflexive indicators can be measured by looking at the composite reliability value of the block indicators that measure the construct. A construct is said to be reliable if the composite value reliability is > 0.7 with a received minimum score of 0.5 [6]. The value of the composite reliability can be seen in appendix table 7.

Table 7. Reliability and Validity Constructs

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
User Satisfaction (KP)	0.858	0.869	0.904	0.702
Information Quality (KI)	0.707	0.714	0.837	0.631
Service Quality (KL)	0.845	0.862	0.896	0.683
System Quality (KS)	0.771	0.784	0.897	0.813
Net Benefit (MB)	0.842	0.852	0.887	0.611
Use (PE)	0.841	0.844	0.926	0.863

Source: Data Processing using SmartPLS (v.3.2.6)

The results showed that the whole construct has a relatively high composite reliability value, overall is > 0.7. The lowest composite reliability value is on the information quality (KI) variable of 0.837 value while the highest composite reliability value is on the use (PE) variable with a value of 0.926. Constructs' reliability test used Cronbach Alpha too. The results of data processing to see Cronbach Alpha used SmartPLS which can be seen in Table 8.

The suggested Cronbach Alpha value is more than 0.6. The results showed all variables used in this study had a Cronbach Alpha values above 0.6. User satisfaction (KP) variable has the highest value of Cronbach Alpha which is 0.858 while the variable that has the lowest reliability value is information quality (KI) variable with a value of 0.707.

3.4. The Evaluation of Sructural Model or Inner Model

Testing of the structural model or inner model aims to determine the causality relationship between latent variables, significance values, and R-squared values of the research model. The structural model can be determined based on the R-squared value of the endogenous construct that can be explained by the exogenous construct. The dependent construct employs a t-test as well as significance of the structural path parameter coefficient. Evaluation of the structural model using PLS begins with examining the R-squared value of each latent dependent variable. The R-squared values estimated using SmartPLS are presented in table 8.

Table 8. Structural Model R-Square

	R-Squared
KI	
KL	
KP	0.577
KS	
MB	0.615
PE	0.396

Source: Data Processing using SmartPLS (v.3.2.6)

According to [6], an R-squared value by 0.67 indicates a substantial effect, an R-squared value greater than 0.33 indicates a moderate effect, and an R-squared value greater than 0.19 indicates a little or insignificant effect. Findings of this research reveal that use (PE) by 0.396 belongs to the moderate category, meaning that information quality (KI), service quality (KL), and system quality (KS) have an effect on use (PE) by 39.6%, as for the remaining effect by 60.4%, it is generated by variables other than those studied. The r-squared value of the variable net benefit (MB) by 0.615 belongs to the moderate category, meaning that information quality (KI), service quality (KL), and system quality (KS) have an effect on net benefit (MB) by 61.5% and the remaining effect by 38.5% is generated by variables other than those studied. The R-squared value of the variable User Satisfaction (KP) by 0.577 belongs to the moderate category, meaning that information quality (KI), service quality (KL), and system quality (KS) have an effect on user satisfaction (KP) by 57.7% and the remaining effect by 42.3% is generated by variables other than those studied.

3.4.1 Hypothesis Testing

The marks in testing the hypothesis must be consistent with the theory that was hypothesized, it can be assessed from the t-test through bootstrapping procedure. If the value of t-test is higher than 1.96 (significant at 5%), then it is a significant relationship. The value of t-test in the output path coefficients can be seen in Table 9.

Table 9. Path Coefficient

	Hypo thesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (IO/STDEVI)	Signifikansi (α = 5%)
KS → PE	H1	0.031	0.031	0.136	0.227	Not significant, have a positive relationship
KS → KP	H2	0.352	0.343	0.100	3.514	Significant, have a positive relationship
KI → PE	H3	0.506	0.533	0.168	3.014	Significant, have a positive relationship
KI → KP	H4	0.030	0.022	0.163	0.184	Not significant, have a positive relationship
KL → PE	H5	0.138	0.120	0.160	0.862	Not significant, have a positive relationship
KL → KP	H6	0.322	0.334	0.160	2.015	Significant, have a positive relationship
PE → MB	H7	0.331	0.340	0.133	2.493	Significant, have a positive relationship
KP → MB	H8	0.544	0.539	0.117	4.650	Significant, have a positive relationship
PE→ KP	H9	0.296	0.304	0.130	2.277	Significant, have a positive relationship

Source: Data Processing using SmartPLS (v.3.2.6)

4. Conclusion

This research aims to measure the factors that affect the successful implementation of e-cargo using six variables of model of information system success created by DeLone and McLean [3]. Furthermore, it has been identified from a total of 9 hypothesis, there are six hypotheses that are empirically proven to achieve success.

From the results of the data with SmartPLS, there are two variables that will greatly affect the success of the implementation of e-cargo; quality system variable with a 3.514 value of t-statistic with the determinants of success that the system can display the route (from and to), date, price, the availability of lots of baggage on air cargo, the system can read the label cargo receipt (for the check-in process incoming and outgoing cargo), OR data (office receipt) financial statement on sales of cargo can be inspected and reported in realtime. Then the highest is user satisfaction variable with the value of t-statistic of 4.650 and the determinants of success is the satisfaction of users as they can easily make a reservation for the cargo, no need to write the manual for a cargo label, and when entering the goods

into cargo to the aircraft, by means of a barcode scanning on the label, it does not need to be checked manually anymore because all these activities are already recorded realtime on the system, so users find the labor more quickly and efficiently.

Satisfaction in using the system had a significant effect on the net benefits, because satisfaction is a feeling of significant use by one's feelings of like or dislike (user) of the e-cargo. Thus, it can be interpreted that the quality of the e-cargo system has been so successful that the user has been satisfied and it has the benefit in an individual level as they use the system. Thus, the general model of DeLone & Mclean on information system success is a framework that can measure the successful implementation of e-cargo in Tanjung Pandan (TJQ), Palembang (PLM), and Jakarta (CGK).

Based on the research that has been done, some suggestions that can be submitted for future works are as follows.

- Information is in conformity with the application of existing theory, but the science will continue to evolve so it is necessary to develop management activities for the maintenance of the information system for the long term.
- Hopefully, the results of this study can be beneficial for the company. For the three hypotheses are not significant and have positive relationships that should continually be improved by providing training on a regular basis, providing knowledge sharing for the division of cargo in order to determine what updates are the latest in e-cargo, so that the result of the output of e-cargo can provide real benefits for the users adn eventually ended up at users' satisfaction. Last, the company also gain benefit by the increasing profit and revenue on cargo selling.

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