

# The Impact of System Quality, Information, and Payment Service (E-Payment) of QR Code Authentication and Mobile Token Towards User Satisfaction

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## ABSTRACT

Mandiri Cash Management is an application or an information system which gives users ease of uses for doing monitoring and full control for all of their accounts activity in all channels owned by Bank Mandiri. This application helps to lower the expenses and fasten the time process of every payment, while the confirmation is easily done by confirming the id via QR Code and Mobile Token by the users who holds these ids. This research conducted to find out how big the impact of system quality, information quality, are and service quality on Mandiri Cash Management Payment system. The research methodology used is by survey which is using questionnaire tools to 150 active users and have been confirmed its validity and reliability, also helped by coefficient determination test, and model compatibility test inline with Structural Equation Model (SEM) method. The calculation is done by using AMOS 22 and SPSS tools. From this research, it is found that system quality, information quality, and service quality have positive impacts towards user's satisfaction.

**Keywords :** QR Code, corporate banking, mobile token, software token, bill payment.

## 1 INTRODUCTION

Globalization these days are affecting the competition, turning it into a very competitive among service provider, it is included the banking services, which requirements are much more complex for its product quality, price, and services. Rating from the user is very important for a corporate to succeed. [1]. Banking services have a lot of features for payment transactions, one of its services is information system with the application called as Cash Management System. Cash Management is one the deciding factor in achieveing success in one's company financial report, Cash Management help to optimalize funds operation and maximize its return from the available funds.

The research method is using information system success model, many of the previous researches are using Structural Equation Modeling (SEM) analysis, either by using Generalized Structured Component analysis, Slovin, or even Partial Least Square (PLS), Customer E-Commerce Satisfaction, the aim of the research is to analyze the effect of exogenous variable, endogenous variable, and indicators towards the success factor. In this research, using Delone & Mclean model with the support of Structural Equation Modeling (SEM) analysis, furthermore testing its relation between the indicator and its construct, validity test and reliability test, model-fit test, compatibility test, and hypotheses model test.

## 2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### 2.1 E-Banking

E-banking is a new strategy facility on the global sector to attract customers and increasing customer's satisfaction in financial services provide sector [2]. E-Banking ease transactions and decreasing banking workloads as well as increasing is services quality based on information technology. E-Banking also gives challenges to all banking industry practitioner with providing new arena of competition in banking industry.

Easiness and powerful technologies used, and the comfort in transacting, become the new competitive variable in the world of banking, to gain the preferences of customer on choosing which bank to be used as their based for daily financial transactions. The main challenges in E-Banking is how a bank to market E-Banking and persuade customer to transform and use E-Banking. At the early time, customer is using the conventional channel of branch delivery to transaction [3]. E-Banking concluded as a system that ables bank's customer, individual or business corporate, to access accounts, doing business transactions, or finding informations regarding products and services of a bank using their private or public network, such as internet.

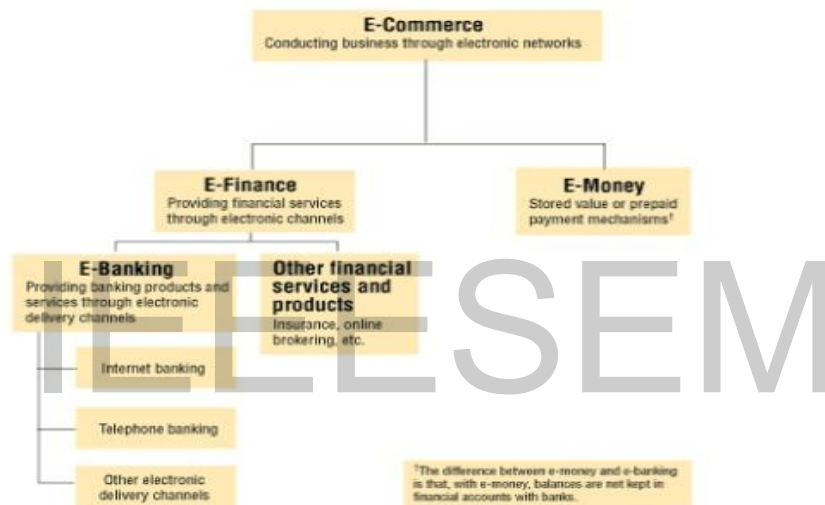


Figure 2.1 Product scheme e-Banking

### 2.2 Delone and Mc Lean Model Information System Success

The model suggested by Delon and Mclean is based on the process and causal relation from the dimensions in a model. This model doesn't measure each of the elements independently, but as a whole affecting the others. As the research keep developing and the implementation of information system, causing many critics and suggestion for the developing model by Delone and Mclean in the year of 1992. Thus, to answer and respond for all the critics and suggestion subjected to this model, in the year of 2003, this model have a change. The previous model tells about the information quality, system quality, and one additional service quality will have a positif impact towards uses and user's satisfaction and also have positive impacts on net benefit or final result [4]. The research was supported by the research done by J.Iivari who tested empirically the model by DeLone and McLean. The results proved that the success of an information system is affected by the system information quality, and information quality which are produced from the related system [5].

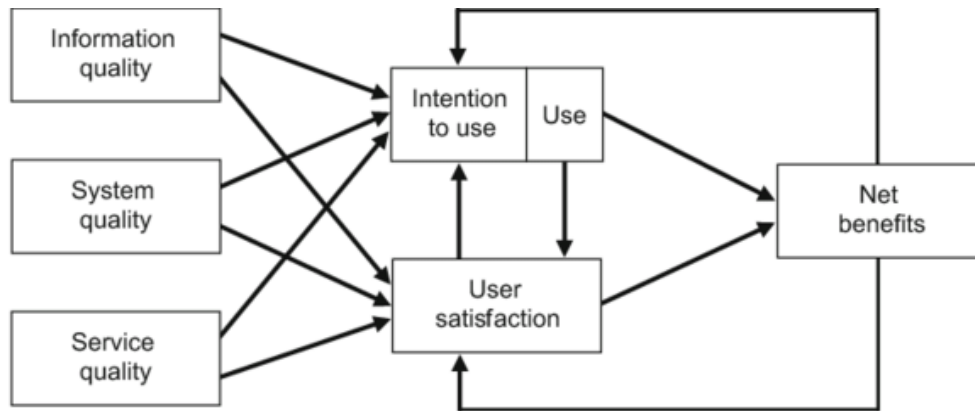


Figure 2.2 IS-success-model-Source-DeLone-McLean

### 2.3 Mandiri Cash Management

Mandiri cash management is an internet business service (E-Banking) to give access for corporate financial transactions, including payment, collection, and transactions settings or liquidity to help ease customer transaction [6]. Internet business service offers some banking and financial services inline for business expansion, customer loyalty, revenue, cost improvement, and new business models.

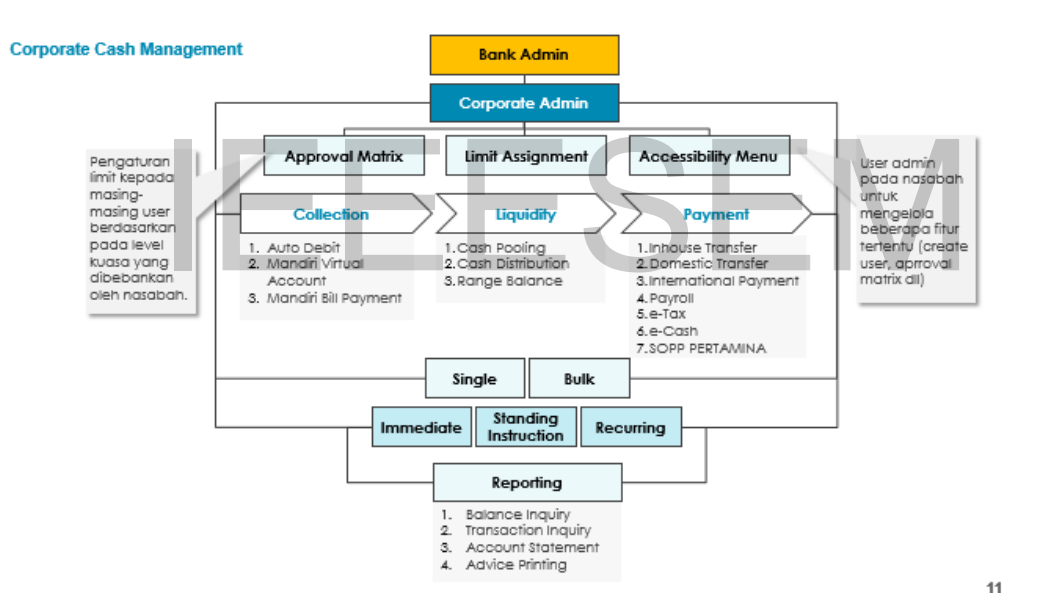


Figure 2.3 Feature Mandiri Cash Management

Mandiri Cash Management is using authentication system. Using multi-factors such as validation to confirm the system users is the rightful user for the transaction, using QR code and mobile token on its transactions.

### 2.4 Structural Equation Model

Structural Equation Model (SEM) as a multi-varied method used to estimate a line of relation dependences which are related to each other altogether with the combination of aspects, doubled regression, and factor analysis [7]. Structural Equation Model (SEM) is a statistic analysis tools which become popular nowadays, if seen by its structure models also its ways of work, in fact SEM is the combination of factor analysis and regression. Some of the phases are using SEM analysis in a research [8].

#### **2.4.1. Creating SEM Model (Model Specification)**

On this step, is related to creating the model from the hypotheses (theory) development, as the based of connecting latent variable with the other latent variable, and indicators. Creating the path diagram or flow diagram to simplify on looking the causal relations which is put to test.

#### **2.4.2. Preparing research design and data collection**

After the model and the flow diagram are completed, it will also need assumptions to fill the SEM, as for it will be converted into the structural impressions and measurement impressions.

#### **2.4.3. Model Identification**

On this step, it will conduct identification test of whether the model can be analyzed further with better and bigger calculation for the degree of freedom.

#### **2.4.4. Model Testing**

After the model is stated and accepted, then researched could modified the model to fix the theory and the goodness-of-fit, model measurement is conducted by modificating indices. Indices modified value is the same as the down turn of Chi-Square if the coefficient is estimated.

### **3 METHODOLOGY**

#### **3.1 Research Approach**

The research approach is using quantitative analysis, whereas the analyzed data is a range of questions given to the respondents in a form of questionnaires. Questions are arraged to get the reliable and valid data, with the uses to measure system quality, information quality, and services quality of Mandiri Cash Management system, especialty payment system service (e-payment) using QR code and Mobile Token. And then, in the analysis, or the processing of the data, is using the software or application AMOS 22 and SPSS 22.

#### **3.2 Sampling Method**

On selecting the sample, it is necessary to pay attention to the aim of the research, where the main aim is to produce system information that can support payment system service in Mandiri Cash Management application. Corporate user who uses Mandiri Cash Management application in total of 250 users. From 250 users are given questions in total of 25 questions about system quality rating, information quality, payment service quality (e-payment) on Mandiri Cash Management system.

#### **3.3 Data questionnaire**

Data collection in this research is by spreading 25 questions to the 250 respondents, via Google Docs with collection periods around September to October 2019.

#### **3.4 Data Analyst**

Structural Analysis process is using AMOS software. This research instruments will be used after the validity test and reliability test been done using the SPSS tools. Then the data will be processed using application with one assumption type which is linear, tested variable in this research is the endogenous variable and exogenous variable, referring from the theory of Structural Equation Modelling (SEM) analysis method.

### **4 RESEARCH RESULT**

#### **4.1 Data Tabulation Information**

This section is a tabulation of data from the questionnaire results from 250 respondents only 150 who answered questions that have been

given which is an indicator of endogenous and exogenous variables of research.

#### 4.1.1 System Quality

This section explains 25 questions from the questionnaire given regarding the measurement of the quality of the Mandiri Cash Management system. Table 4.1 below explains the entire answer quality Mandiri Cash management system using Likert Scale.

Value Likert	X1.1	X1.2	X1.3	X1.4	X1.5
2	15	15	15	15	15
3	55	55	55	55	55
4	44	44	44	44	44
5	36	36	36	36	36
<b>Total</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>

Table 4.1 Variable System Quality (X1)

#### 4.1.2 Quality Information

This section explains 25 questions from the questionnaire given regarding the measurement of the quality of Mandiri Cash Management information. Table 4.2 below explains the entire answer quality Mandiri Cash management information using Likert Scale.

Value Likert	X2.1	X2.2	X2.3	X2.4	X2.5
2	8	8	8	8	8
3	73	73	73	73	73
4	39	39	39	39	39
5	30	30	30	30	30
<b>Total</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>

Table 4.1 Variable Information Quality (X2)

#### 4.1.3 Service Quality

This section explains 25 questions from the questionnaire given regarding the measurement of the quality of Mandiri Cash Management services. Table 4.3 below explains the entire answer quality Mandiri Cash management Service using Likert Scale.

Value Likert	X3.1	X3.2	X3.3	X3.4	X3.5
2	10	10	10	10	10
3	67	67	67	67	67
4	40	40	40	40	40
5	33	33	33	33	33
<b>Grand Total</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>

Table 4.3 Variable Service Quality (X3)

#### 4.1.4 Use

This section explains 25 questions from the questionnaire given regarding the measurement of the use of Mandiri Cash Management. Table 4.4 below explains the entire answer quality Mandiri Cash management Service using Likert Scale.

Value Likert	Y.1	Y.2	Y.3	Y.4	Y.5
2	15	15	15	15	15
3	66	66	66	66	66
4	43	43	43	43	43
5	26	26	26	26	26
<b>Grand Total</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>

Table 4.4 Variable Use (Y)

#### 4.1.5 Net Benefit

This section explains 25 questions from the questionnaire given about measuring the net benefits of Mandiri Cash Management. Table 4.5 below explains the entire answer quality Mandiri Cash management Service using Likert Scale.

Value Likert	Z.1	Z.2	Z.3	Z.4	Z.5
2	20	27	23	26	25
3	204	232	231	236	230
4	184	171	175	179	169
5	130	108	113	107	108
<b>Grand Total</b>	<b>538</b>	<b>538</b>	<b>542</b>	<b>548</b>	<b>532</b>

Table 4.5 Variable Net Benefit (Z)

#### 4.2 Validity and Realibility test

Validity test shows the extent to which a measuring instrument measures the construct to be measured. Following are the results of the validity test of each variable using the standard regression weight from the calculation estimates results. Validity and Realibility test quality system explained in the table 4.6 which contain the estimate, Variance Extracted (AVE) dan Construct Reliability (CR) system quality of the Mandiri Cash Management system.

Table 4.6 Standardized Regression Weights System Quality

Standardized Regression Weights: (Group number 1 - Default model)					
Factor Coefficient		Estimate	Esimate Square	1 - Estimate Square	
X1.5	<--- X1	0.523	0.273529	0.726471	
X1.4	<--- X1	0.595	0.354025	0.645975	
X1.3	<--- X1	0.634	0.401956	0.598044	
X1.2	<--- X1	0.603	0.363609	0.636391	
X1.1	<--- X1	0.714	0.509796	0.490204	
Total construct		3.069			
Number of Measurement Errors				3.097085	
<b>Contract Reliability</b>		$3.069^2 / (3.069^2 + 3.097085)$		<b>0.752546891</b>	
Total Square Construct			1.902915		
<b>AVE</b>		$1.902915^2 / (1.902915^2 + 3.097085)$		<b>0.53899875</b>	

Based on the results of the validity and reliability test, it is known that the Variance Extracted (AVE) value of 0,53899875 > 0,5 is valid and the construct reliability value is 0,752546891 > 0,7 is reliability. Then the conclusion of all questions that represent the system quality variables are in accordance with the criteria and declared valid and reliable.

Information Quality validity and reliability test results described in table 4.7 contain estimated values, Variance Extracted (AVE) and Construct Reliability (CR) Quality Information.

**Table 4.7 Standardized Regression Weights Quality Information**

Standardized Regression Weights: (Group number 1 - Default model)				
Factor Coefficient		Estimate	Estimate Square	1 - Estimate Square
X2.5	<--- X2	0.62	0.3844	0.6156
X2.4	<--- X2	0.614	0.376996	0.623004
X2.3	<--- X2	0.633	0.400689	0.599311
X2.2	<--- X2	0.533	0.284089	0.715911
X2.1	<--- X2	0.695	0.483025	0.516975
Total construct		3.095		
Number of Measurement Errors				3.070801
<b>Construct Reliability</b>		$3.095^2 / (3.095^2 + 3.070801)$		<b>0.757245594</b>
Total Square Construct			1.929199	
<b>AVE</b>		$1.929199^2 / (1.929199^2 + 3.070801)$		<b>0.547920299</b>

Based on the results of the validity and reliability test, it is known that the Variance Extracted (AVE) value of 0,547920299 > 0,5 is valid and the construct reliability value is 0,757245594 > 0,7 is reliability. Then the conclusion of all questions that represent the information quality variables are in accordance with the criteria and declared valid and reliable.

Information Quality validity and reliability test results described in table 4.8 contain estimated values, Variance Extracted (AVE) and Construct Reliability (CR) Quality Service.

**Table 4.8 Standardized Regression Weights Quality Service**

Standardized Regression Weights: (Group number 1 - Default model)				
Factor Coefisient		Estimate	Estimate Square	1 - Estimate Square
X3.5	<--- X3	0.592	0.350464	0.649536
X3.4	<--- X3	0.696	0.484416	0.515584
X3.3	<--- X3	0.598	0.357604	0.642396
X3.2	<--- X3	0.635	0.403225	0.596775
X3.1	<--- X3	0.553	0.305809	0.694191
Total construct		3.074		
Number of Measurement Errors				3.098482
<b>Construct Reliability</b>		$3.074^2 / (3.074^2 + 3.098482)$		<b>0.753068826</b>
Total Square Construct			1.901518	
<b>AVE</b>		$1.901518^2 / (1.901518^2 + 3.098482)$		<b>0.538521689</b>

Based on the results of the validity and reliability test, it is known that the Variance Extracted (AVE) value of 0,538521689 > 0, 5 is valid and the construct reliability value is 0,753068826 > 0.7 is reliability. Then the conclusion of all questions that represent the quality service variables are in accordance with the criteria and declared valid and reliable.

Information Quality validity and reliability test results described in table 4.9 contain estimated values, Variance Extracted (AVE) and Construct Reliability (CR) Use.

**Table 4.9 Standardized Regression Weights Use**

<b>Standardized Regression Weights: (Group number 1 - Default model)</b>					
Factor Coefisient			Estimate	Estimate Square	1 - Estimate Square
Y.1	<---	Y	0.627	0.393129	0.606871
Y.2	<---	Y	0.494	0.244036	0.755964
Y.3	<---	Y	0.604	0.364816	0.635184
Y.4	<---	Y	0.584	0.341056	0.658944
Y.5	<---	Y	0.683	0.466489	0.533511
Total construct			2.992		
Number of Measurement Errors					3.190474
<b>Contract Reliability</b>			$2.992^2 / (2.992^2 + 3.190474)$		<b>0.737248177</b>
Total Square Contract				1.809526	
<b>AVE</b>			$1.809526^2 / (1.809526^2 + 3.190474)$		<b>0.506489728</b>

Based on the results of the validity and reliability test, it is known that the Variance Extracted (AVE) value of 0,506489728 > 0, 5 is valid and the construct reliability value is 0,737248177 > 0.7 is reliability. Then the conclusion of all questions that represent the use variables are in accordance with the criteria and declared valid and reliable.

Net Benefit validity and reliability test results described in table 4.10 contain estimated values, Variance Extracted (AVE) and Construct Reliability (CR) Ner Benefit.

**Table 4.10 Standardized Regression Weights Net Benefit**

**Standardized Regression Weights: (Group number 1 - Default model)**

Factor Coefisient			Estimate	Estimate Square	1 - Estimate Square
Z.1	<---	Z	0.605	0.366025	0.633975
Z.2	<---	Z	0.595	0.354025	0.645975
Z.3	<---	Z	0.663	0.439569	0.560431
Z.4	<---	Z	0.647	0.418609	0.581391
Z.5	<---	Z	0.61	0.3721	0.6279
Total Contract			3.12		
Number of Measurement Errors					3.049672
<b>Reliabilitas konstruk</b>			$3.12^2 / (3.12^2 + 3.049672)$		<b>0.761447526</b>
Total Square Contract				1.950328	
<b>AVE</b>			$1.950328^2 / (1.950328^2 + 3.049672)$		<b>0.555016609</b>

Based on the results of the validity and reliability test, it is known that the Variance Extracted (AVE) value of 0,555016609 > 0, 5 is valid and the construct reliability value is 0,761447526 > 0.7 is reliability. Then the conclusion of all questions that represent the Net Benefit variables are in accordance with the criteria and declared valid and reliable.



### 4.3 Goodness of Fit test

After measurement models researched is valid, the next process is by analyzing the relationship of indicators with their constructs. There are several model test tools, namely: absolute fit measure, incremental fit measure, and parsimonious fit measure. Following is a model compatibility test each variable is explained by the size, category, and results of the study, and the description of the study on table 4.11

**Table 4.11 Uji Goodness of Fit**

Size type	Size	Category	Reasearch Result	Description
<i>Absolut Fit Measure</i>	Chi-Square	$\geq 0,05$	0,56	Fit result
	Goodness Of Fit Index (GFI)	$> 0,90$	0,870	Marginal Fit
	Root Mean Square Error Of Approximation (RMSEA)	$< 0,08$	0,031	Fit result
	Root Mean Square Residual (RMR)	$< 0,04$	0,045	Fit result
<i>Incremental Fit Measure</i>	<i>Adjusted Goodness Of Fit Index (AGFI)</i>	$> 0,90$	0,841	Marginal Fit
	<i>Tucker Lewis Index (TLI)</i>	$> 0,95$	0,961	Fit result
	<i>Comparative Fit Index (CFI)</i>	$> 0,95$	0,966	Fit result
	<i>Incremental Fit Index (IFI)</i>	$> 0,95$	0,967	Fit result
	<i>Relative Fit Index (RFI)</i>	$\geq 0,95$	0,754	Marginal Fit
<i>Parsimonious Normed Fit Index (PNFI)</i>	Semakin Besar, Semakin Baik		0,692	Fit result
	<i>Akaike Information Criterion (AIC)</i>	Positif dan Lebih Kecil	422,604	Fit result
	<i>Consistent Akaike Information Criterion (CAIC)</i>	Positif dan Lebih Kecil	663,242	Fit result

### 4.4 Hypothesis Testing

This study aims to analyze the effect of system quality, information quality, and service quality on the use of applications to get benefits using Structural Equation Modeling (SEM) analysis techniques. With reference to the structural equation model of figure 4.1, the following is the hypothesis test from the research described in Table 4.12

**Tabel 4.12 Hypothesis Testing**

Hypothesis	Estimates	t Value - CR	Signifikansi - P	Conclusion
Use <--- System Quality	0,331	2,053	0,04	<b>Hypothesis Accepted</b>
Use<--- Information Quality	0,351	2,265	0,024	<b>Hypothesis Accepted</b>
Use <---Service Quality	0,354	2,2	0,028	<b>Hypothesis Accepted</b>
Net Benefit <--- Use	0,241	2,685	0,000	<b>Hypothesis Accepted</b>

**H.1 Relationship between System Quality (X1) and Use (Y)**

H0 =there is no relationship between the quality of the system with use

H1 = there is relationship between the quality of the system with use

$\alpha = 0, 05$

Test statistic or Significations P = 0,04

From the result above that the quality system is very significant effect use, this proven with t value > t table or 2.053 > 1.696 and significant <  $\alpha$  or 0.04 < 0. 05.

**H.2 Relationship between Information Quality (X2) and Use (Y)**

H0 =there is no relationship between the information quality with use

H1 = there is relationship between the information quality with use

$\alpha = 0, 05$

Test statistic or Significations P = 0,024

From the result above that the information quality is very significant effect use, this proven with t value > t table or 2,263 > 1,696 and significant <  $\alpha$  or 0,024 < 0, 05.

**H.3 Relationship between Service Quality (X3) and Use (Y)**

H0 = there is no relationship between the service quality with use

H1 = there is relationship between the service quality with use

$\alpha = 0, 05$

Test statistic or Significations P = 0,028

From the result above that the service quality is very significant effect use, this proven with t value > t table or 2.2 > 1,696 and significant <  $\alpha$  or 0,028 < 0, 05.

**H.4 Relationship between Use (Y) and Net Benefit (Z)**

H0 = there is no relationship between User Satisfaction and Net Benefit

H1 = there is relationship between User Satisfaction and Net Benefit

$\alpha = 0, 05$

Test statistic or Significations P = 0,000

From the result above that the use is very significant net benefit, this proven with t value > t table or 2,685 > 1,696 and significant <  $\alpha$  or 0,000 < 0, 05.

**5 CONCLUSION**

This research analyzes customer satisfaction, the user of Mandiri Cash Management, with analyzing the exogenous and endogenous variable. Where quality system, information system, and service system as endogenous variable and net function as exogenous variable. The results are, system quality variable have a positive impact towards user's satisfaction, information quality variable have a positive impact towards user's satisfaction, and service quality variable have a positive impact towards user's satisfaction.

In this research there is limitation, which is focusing the rating on payment system of Mandiri cash Management, and the counts of data sample which are used for the analysis. For future researches, it is best to add more rating variables to gain a better result which can support the decision making to take better step in developing the system.

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