

Analysis of ServiceDesk Information System Success using Update DeLone and McLean Model Approaches

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Abstract

This research aims to analyze the success of the ServiceDesk Information System at Institut Teknologi Sepuluh Nopember (ITS) using An updated DeLone and McLean model approach. Data collection techniques are using questionnaires. The object of this research is the ITS ServiceDesk Information System. The subjects of this study are ITS Stakeholders, namely Lecturers, Students, Employees, and General Public, with a population of 1463 users, with 93 samples obtained from the Slovin technique. Analysis using Structural Equation Modeling (SEM) and Amos as a tool. The results showed that there was an influence between System Quality, Service Quality, and Information Quality on Use. Similarly, there are significant effects in System Quality, Service Quality, and Information Quality on User Satisfaction. Use is not affected by User Satisfaction because the System is Mandatory, this means the system is the only complaint system that exists without any other alternative. The significant influence is also shown by the Use and User Satisfaction with the greatest value on Net Benefits, this means that in an information system, User Satisfaction is proven to greatly affect the work of users, as well as the performance of the organization.

Keywords: SEM, Amos, ServiceDesk Information Systems

INTRODUCTION*

The government first issued a policy on information technology in Indonesia, to improve the quality of public services effectively and efficiently, this is contained in [1], which contains the Development and Utilization of Telematics (Telecommunications, Media, and Information) in Indonesia. Government officials must use telematics technology to support good governance and accelerate the democratic process. Besides, in [2] concerning Electronic-Based Government Systems, also stated that to realize clean, effective, transparent and accountable governance as well as quality and reliable public services, an electronic-based government system is needed, as well as to improve the integration and efficiency of government-based systems electronics, it is needed governance and management of electronic-based government systems nationally.

Institut Teknologi Sepuluh Nopember (ITS) as one of the state tertiary institutions engaged in education services, has an important role to play in providing excellent service based on the principles of good governance. Improving the quality of services to the community

(stakeholders) will be able to improve the welfare of people's lives and at the same time increase public trust in government administrators [3]. To achieve this goal, a bureaucratic reform road map document was drawn up containing various steps and ITS strategies in applying the principles of good governance in providing services to the community. Improving service quality is an important goal in the development of ITS institutions, both at the local, regional, national and international levels.

Quality assurance of higher education is needed as a process of determining and meeting the quality standards of education in a consistently and sustainably manner, it is intended that customers get satisfaction and produce sustainable development in higher education. So that repairs and development can be done quickly and continuously and customer satisfaction is always met, complaints submitted by customers are very valuable input and must be followed up. Customer complaints are also an instrument for conducting evaluations and early detection of system weaknesses or deviations in the implementation of quality manuals. It is also very necessary to achieve World Class University standards.

ServiceDesk is a web-based Information System that aims to connect users in order to submit complaints and suggestions online to the

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services provided by the work unit of the Institut Teknologi Sepuluh Nopember, both academic and non-academic. These goals are certainly in line with the basic concept of public services bridging service users in utilizing the services provided. ServiceDesk is done through web interface calls, or infrastructure events that are automatically reported by a system. ServiceDesk is also a single point of contact for all Information Technology service users, handling all incidents, queries, and requests. Some ServiceDesk activities are receiving and recording automatically through the system all complaints from users, recording and tracing incidents, making service requests, informing the status and progress of service interruption reports, making requests to users, monitoring and escalating reports of interruptions or requests to related teams, and others.

[4] This research was conducted to analyze the comparison of the quality of the online student admission system Universitas Kristen Duta Wacana (UKDW) and STMIK AMIKOM Yogyakarta, besides that it also measures the effect of system quality, information quality, and service quality on user satisfaction, both together or individually, in analyzing the dominant variables on user satisfaction. The results obtained in the evaluation of each variable affect user satisfaction and the information quality variable is the most dominant influence on user satisfaction.

[5] Confirming the influence of top management supporting variables, system quality, information quality, actual users and user satisfaction on the application of regional financial information systems is the aim of this study. The data used in this study are quantitative and qualitative data sourced from primary and secondary data of 9 (nine) SKPD in Denpasar City, the sampling technique used was purposive sampling technique. The results of this study can be seen that, the application of regional financial information systems is influenced by top management support, information quality and user satisfaction. The implementation of regional financial information systems is significantly not affected by the quality of the system and actual users.

[6] Information system success is strongly influenced by several factors, where these factors are highly dependent on the conditions and environment in which the system is implemented. The results of data processing show that 3 of 5 hypotheses are considered to be

proven, namely that user satisfaction is strongly influenced by three main factors namely quality information, system quality, and system usability from the user's perspective

Based on the description above regarding previous research, there are differences in this study, in which the researcher uses all the variables in [7], namely system quality, information quality, service quality, usage, user satisfaction and net benefits.

MATERIAL AND METHOD

This research uses quantitative methods with the type of survey research. Researchers use variables in research [5] about the analysis of the successful use of information systems, namely: system quality, information quality, service quality, usage, user satisfaction, and net benefits.

Data Collection

Data collection techniques used in this study is to use a questionnaire. The object of this research is ITS ServiceDesk Information System, and the subjects of this study are ITS Stakeholders, namely Lecturers, Students, Employees and the General Public with a population of 1463 users, with the Slovin technique obtained a sample of 100 respondents from a minimum number of 93 samples. Data collection was conducted during July 2019-December 2019 at Institut Teknologi Sepuluh Nopember.

Data analysis in this study used SEM by involving composite variables on the indicators, validity and reliability testing using Product Moment and Cronbach Alpha. Whereas the second order which is a latent variable is tested for validity and reliability through CFA and Construction Reliability using the AMOS program. The instrument is valid if the loading value is greater than 0.5, and the reliability test uses composite (construct) reliability with a cut-off value of at least 0.7.

After all latent variables that have valid and reliable results are tested for validity and reliability, then multivariate data is normal, there are no outliers and no singularity occurs.

RESULT AND DISCUSSION

In the Validity and Reliability Test each indicator is declared valid if the loading value is greater than 0.5, and the reliability test on the variable tested using composite (construct) reliability has a cut-off value above 0.7. The following is a table of results of testing the validity and reliability of each indicator.

Table 1 Validity an Reliability Test

Variable	Indicator	Loading (λ)	CR
System Quality (SQ)	SQ1	0.784	0.903
	SQ2	0.866	
	SQ3	0.696	
	SQ4	0.844	
	SQ5	0.835	
Information Quality (IQ)	IQ1	0.791	0.911
	IQ2	0.805	
	IQ3	0.834	
	IQ4	0.811	
	IQ5	0.853	
Service Quality (SERQ)	SERQ1	0.805	0.851
	SERQ2	0.740	
	SERQ3	0.880	
Use (U)	U1	0.830	0.826
	U2	0.731	
	U3	0.785	
User Satisfaction (US)	US1	0.885	0.700
	US2	0.771	
	US3	0.774	
Net Benefit (NB)	NB1	0.888	0.806
	NB2	0.647	
	NB3	0.741	

Sources: Primary data is processed, 2020

In **Table 1** above shows the Loading (λ) value of all indicators above 0.5 and the CR value of all Variables above the cut-off value of 0.7. This means that all instruments are considered valid and reliable.

After all latent variables that have valid and reliable results are tested for validity and reliability, then multivariate data is normal, there are no outliers and no singularity occurs. The results obtained in each test are the normality test, multivariate data distribution is normal, the outlier test also does not occur outlier, in the singularity test there is no problem of singularity in the analyzed data and so in the multicollinearity test it is said that multicollinearity does not occur, this it means that the Testing of Structural Equation Modeling (SEM) can be continued.

Structural Equation Modeling Net Benefit

The following table is the result of testing the complete model above with the complete AMOS program.

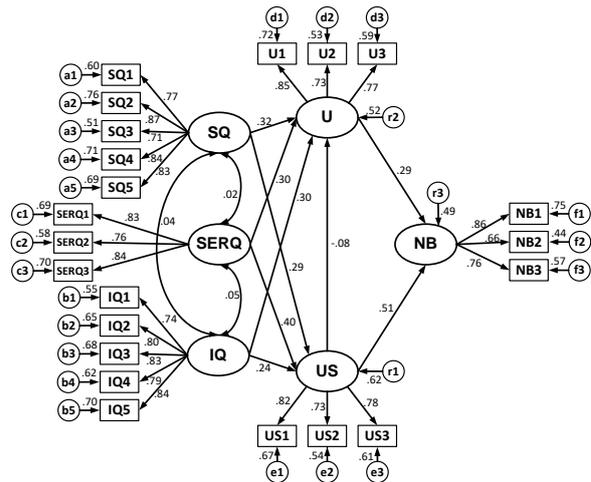


Figure 1 The Effect of System Quality, Information Quality, Service Quality On Net Benefit Through Use and User Satisfaction

Table 2 Testing Results of System Quality, Information Quality, Service Quality Model on Net Benefit through Use and User Satisfaction

Criteria	Cut-off value	calculation results	Information
Chi-Square	Expected to be small	219,309	χ^2 with df= 197 is 230.746
			Good
Probability of Significance	$\geq 0,05$	0,132	Good
RMSEA	$\leq 0,08$	0,034	Good
GFI	$\geq 0,90$	0,843	Pretty Good
AGFI	$\geq 0,90$	0,799	Pretty Good
CMIN/DF	$\leq 2,00$	1,113	Good
TLI	$\geq 0,90$	0,979	Good
CFI	$\geq 0,90$	0,982	Good

Sources: Primary data is processed, 2020

Based on **Table 2**, it shows that the eight criteria used for the feasibility of a model are stated to be Good and Pretty Good. The suitability of the model with the data above proves that the model is acceptable.

From the suitability of the model and the data above, the hypothesis in this study can be explain from each coefficient of path. The following equation is an explanation of the coefficient of path:

$$\begin{aligned}
 U &= 0.295 SQ + 0.280 IQ + 0.270 SERQ \\
 US &= 0.289 SQ + 0.237 IQ + 0.400 SERQ \\
 U &= -0.081 US \\
 NB &= 0.286 U + 0.485 US
 \end{aligned}$$

- SQ : System Quality
- SERQ: Service Quality
- IQ : Information Quality
- U : Use
- US : User Satisfaction
- NB : Net Benefit

Research Hypothesis Test Results

Detailed explanation of the test path coefficients above can be seen in the following table 3 below:

Table 3 Test Results for the Net Benefit Model Line Coefficient

Variable	Coefficient	C.R.	Prob.	Info
System Quality (SQ)→Use (U)	0.295	2.086	0.037	Sig
Service Quality (SERQ)→Use (U)	0.270	2.006	0.045	Sig
Service Quality (SERQ) →User Satisfaction (US)	0.400	3.256	0.001	Sig
Information Quality (IQ) →Use (U)	0.280	2.206	0.027	Sig
Information Quality (IQ)→User Satisfaction (US)	0.237	1.976	0.048	Sig
System Quality (SQ)→User Satisfaction (US)	0.289	2.131	0.033	Sig
User Satisfaction (US)→Use (U)	-0.081	-0.459	0.646	Non Sig
Use (U)→Net Benefit (NB)	0.286	2.293	0.022	Sig
User Satisfaction (US)→Net Benefit (NB)	0.485	3.916	0.000	Sig

Sources: Primary data is processed, 2020
 *Sig = Significant; Non Sig = Non Significant

Explanation of each path coefficient in **Table 3** is as follows:

Information Quality (IQ) has a significant and positive effect on Use (U). This can be seen in probability of significance value (p) of 0.027 which is not bigger than level of significance (α) determined at 0.05 and a coefficient of positive path of 0.280 is obtained with C.R. value amounting to 2,206. Thus the Quality of Information or Information Quality (IQ) directly affects the Usage or Use (U) of 0.280, which means that every time there is an increase in the Quality of Information or Information Quality (IQ) it will affect the increase in the Use or Use (U) of 0.280.

The positive and significant results above prove that the user needs an information system that contains up to date information, is easy to understand, complete and right on target or in

accordance with user needs, in other words the quality of information affects the intensity of the user. This is in line with the research [8] and [9]. In their research proved that an effective information system will produce information that is accurate, timely and trustworthy and can improve employee performance. Improving employee performance can improve overall organizational performance.

Information Quality (IQ) has a significant and positive effect on User Satisfaction (US). This can be seen in the value of probability of significance (p) of 0.048 which is not bigger than level of significance (α) determined at 0.05 and the path coefficient that is positive is 0.237 with a C.R. value. amounting to 1976. Thus Information Quality (IQ) affects User Satisfaction (US), which means that every time there is an increase in Information Quality (IQ) of 0.237, it will affect an increase in User Satisfaction (US) of 0.237

According to Delone and Mclean in [10], to measure the success of an information system, the quality of the information system must meet several indicators. Delone and Mclean revealed that an information system must have a complete and quality information quality, relevant or in accordance with user needs, accurate, clear purpose of the information and come from a trusted source, timely and in accordance with the format so it is easy to understand by user. The results of this study are also in line with research [9] which proves that the quality of information has a positive effect on user satisfaction.

System Quality (SQ) has a significant and positive effect on Use (U). This can be seen in the value of probability of significance (p) of 0.037 which is not bigger than level of significance (α) determined at 0.05 and a coefficient of positive path of 0.295 is obtained with C.R. value amounting to 2,086. Thus the System Quality (System Quality (SQ) directly affects the Use (U) of 0.295, which means that every time there is an increase in the Quality of the System or System Quality (SQ), it will increase the Uses or Uses (U) of 0.295.

The positive and significant results above prove that the information system that is easy to use or user friendly and in accordance with existing standards affects the use of this information system. Similarly, the ease of accessing this information system also affects the use of this information system. The results of this study support the information system success

model developed by Delone and Mclean (2003) which states that the quality of the system is one indicator to measure the success of the information system. The results of this study indicate that good system quality can be seen from the ease of use, data security, fast response times, ease and convenience of access, recovery, and ease of study. If the user has felt all of these things, the user will not hesitate to do the re-use so that the intensity of the use of the system will increase.

System Quality (SQ) has a significant and positive effect on User Satisfaction (US). This can be seen in the value of probability of significance (p) of 0.033 which is not bigger than level of significance (α) determined at 0.05 and a coefficient of positive path is 0.289 with C.R. value of 2,131. Thus the Quality of the System or System Quality (SQ) affects the User Satisfaction (US), which means that every time there is an increase in the Quality of the System or System Quality (SQ) by 0.289 it will affect the increase in User Satisfaction (US) by 0.289.

A good information system is easy to use and in accordance with existing standards, this is an important influence on user satisfaction, this is evident in the positive and significant results above. The ease of accessing information systems in various operating systems and browsers also affects the satisfaction of information system users. This is in line with [11] which states that the accuracy of the data, the data format that is easily understood and the updating of existing data causes user satisfaction, this makes time savings for users of the information system.

Service Quality (SERQ) has a significant and positive effect on Use (U). This can be seen in the significance value of probability (p) of 0.045 which is not bigger than level of significance (α) determined at 0.05 and a coefficient of positive path of 0.270 is obtained with C.R. value amounting to 2006. Therefore Service Quality or Service Quality (SERQ) has a direct effect on the Usage or Use (U) of 0.270, which means that every time there is an increase in Service Quality (SERQ), it will increase the Use or Use (U) of 0.270.

The positive and significant results above show that it is important to maintain an information system in accordance with what is needed by the user by always maintaining the quality of service. With a good quality of service, fast and on target and always follow-up in

handling complaints affects the use of the information system. The results of this study support the success of the information system model developed by Delone and Mclean (2003) which states that the Use or Use is influenced by Service Quality. This is also in line with several previous studies, according to [12], Service quality variables have a positive and significant relation with usage variables and user satisfaction variables. In relation to user satisfaction variables, there is a strong correlation level, which means that any change in the form of an increase or decrease in service quality variables will have a direct or strong impact on user satisfaction variables. This implies that by increasing the quality of service it will increase user satisfaction and system usage.

Service Quality (SERQ) has no effect on User Satisfaction (US). This can be seen in probability of significance (p) of 0.001 which is not bigger than level of significance (α) which is determined at 0.05 and the path coefficient value is positive at 0.400 with the value of C.R. amounting to 3,256. Thus Service Quality (SERQ) has a significant effect on User Satisfaction (US), which means that every time there is an increase in Service Quality (SERQ) of 0.400, it will increase User Satisfaction (US) of 0.400.

In addition to positive and significant results, the effect of Service Quality as an exogenous variable on User Satisfaction as an endogenous variable gives the greatest total effect reaching 0.400, this means that the service quality variable is a very important variable in this information system, where service quality is good, fast and right on target and always follow-up in handling complaints greatly affects the Delone and Mclean Information System (2003), and ultimately User Satisfaction will also greatly affect Net Benefits for the organization. The same thing was also conveyed by [13], as well as the quality of the system and the quality of information, service quality has an influence on user satisfaction. When the information system user is dissatisfied with the quality of services provided by the service provider, this means the information system is not good. Likewise, he will feel that the quality of the service provided by the information system provider is good, so he will tend to feel satisfied using the system.

User Satisfaction (US) is negative and has no significant effect on Use (U). This can be seen in probability of significance (p) of 0.646 which is greater than level of significance (α) which is set

at 0.05 and the path coefficient value which is negative is -0.081 with C.R. amounting to -0,459. Thus User Satisfaction (US) does not directly affect the Use (U), which means that any increase in User Satisfaction (US) will not increase or decrease the Use or Use (U).

The negative and significant results above prove that the Usage is not influenced by User Satisfaction, this is because the ServiceDesk information system is mandatory where users are required to use the information system. This was also mentioned by [14] in his study where the object in his research is mandatory, meaning that there is a requirement for system users to use the system. Also according to [15] the overall benefits of the system are influenced by user satisfaction, but not by use. where the use or use variable cannot be applied to the mandatory environment, because users have an obligation to use the system. To see the success of the information system in a mandatory environment the right measurement is user satisfaction. In a mandatory environment, users are required to use the system so that the intensity of use does not affect the successful implementation according to [16].

Significant and positive effect of User Satisfaction (US) on Net Benefit (NB). This can be seen in the significance value of probability (p) of 0.000 which is not bigger than level of significance (α) determined at 0.05 and a coefficient of positive path is 0.485 with C.R. amounted to 3,916. Thus User Satisfaction (US) has a direct effect on the Net Benefit (NB) of 0.485, which means that every time there is an increase in User Satisfaction (US), it will increase the Net Benefit (NB) by 0.485.

Positive and significant results of User Satisfaction of the Net Benefit above with the greatest value can be explained that in a User Satisfaction system proved to greatly affect the work of users, as well as the performance of the organization. This is in line with previous research conducted by [11] where the quality of the system, the quality of information and the quality of service as a whole can improve the job performance of users of financial systems researchers. It can also accelerate the preparation of the budget so that the determination of the Regional Budget (APBD) is no longer delayed. Suitability of programs and activities is also achieved. The results of this study support the success model of DeLone and McLean's information system (2003) which has

proven that user satisfaction affects the net benefits for the organization. When users are satisfied with the information system and integrate the information system into their routines, the information system becomes effective and influences the performance of the organization [17].

Use (U) has a significant and positive effect on Net Benefits (NB). This can be seen in the value of probability of significancy (p) of 0.022 which is not bigger than level of significancy (yang) determined at 0.05 and a coefficient of positive path is 0.286 with C.R. value of 2,293. Thus the Use (Use) directly affects the Net Benefit (NB) of 0.286. which means that every time there is an increase in Uses, the Net Benefit (NB) will increase by 0.286.

Positive and significant results of Use on Net Benefits show that Users can feel better changes to their work, this means with the convenience provided by the system that results in increased intensity of use. This is in line [18]. According to him the net benefits are the benefits felt by individuals in the use of the system and also the benefits felt by the organization. This individual benefit can be seen from the increased intensity of the use of the system and the sense of satisfaction that arises from the use of the system, so this can provide added value in the form of increased performance of individuals and even organizations. The net benefit in [18] research is the benefit of using an information system for individual users and organizations. The net benefit construct indicator is taken from [19] and [20] research, which is providing benefits to users, increasing user productivity, increasing user performance, increasing organizational productivity, and improving organizational performance.

Influence Between Research Variables

In structural equations involving many variables and the path between variables there are influences between variables which include direct influence, indirect effect and total effect.

Direct Influence Between Research Variables

The direct relationship occurs between exogenous latent variables (System Quality (SQ), Service Quality (SERQ), Information Quality (IQ) with intermediate or intervening endogenous variables (Use (U), User Satisfaction (US) and endogenous latent variables Net Benefit (US) NB).

the results of a direct relationship that occurs between latent variables of exogenous and latent

variables of endogenous can be seen in the following table 4:

Table 4 Direct Effect of Research Variables

Direct Influence	Intervening Variable		Endogenous Variables
	Use (U)	User Satisfaction (US)	Net Benefit (NB)
Exogenous Variables	System Quality (SQ)	0.295	0.289
	Service Quality (SERQ)	0.27	0.4
	Information Quality (IQ)	0.28	0.237
Intervening Variable	Use (U)		0.286
	User Satisfaction (US)	0.081	0.485

Sources: Primary data is processed, 2020

From the table above, we can explain the direct effect of exogenous latent variables on endogenous latent variables. User Satisfaction (US) gave the biggest direct effect on Net Benefit (NB) of 0.485, and subsequently Service Quality (SERQ) on User Satisfaction (US) of 0.400.

Indirect Effects Between Research Variables

Table 5 Indirect Effects of Research Variables

Indirect Influence	Intervening Variable	Endogenous Variables	
		Use (U)	Net Benefit (NB)
Exogenous Variables	System Quality (SQ)	Use (U)	0.08
		User Satisfaction (US)	0.14
	Service Quality (SERQ)	Use (U)	0.08
		User Satisfaction (US)	0.19
			0.224
			0.271
			0.195

Sources: Primary data is processed, 2020

Indirect relationships occur between exogenous latent variables System Quality (SQ), Information Quality (IQ), Service Quality (SERQ) with endogenous intermediate latent variables or intervening Use (U) and endogenous latent variables Net Benefit (NB).

Indirect results regarding the direct relationship that occur between latent variables

of exogenous and latent variables of endogenous can be seen in the following explanation:

The table above is explained in detail as follows.

- $SQ \rightarrow U \rightarrow NB$
 $(0.295 * 0.286) = 0.084$
 $SQ \rightarrow US \rightarrow NB$
 $(0.289 * 0.485) = 0.140$
- $SERQ \rightarrow U \rightarrow NB$
 $(0.270 * 0.286) = 0.077$
 $SERQ \rightarrow US \rightarrow NB$
 $(0.400 * 0.485) = 0.194$
- $IQ \rightarrow U \rightarrow NB$
 $(0.280 * 0.286) = 0.080$
 $IQ \rightarrow US \rightarrow NB$
 $(0.237 * 0.485) = 0.115$

From explanation above, it can be explained the large indirect effects of the exogenous latent variables on the latent variables of endogenous. Use (U) and User Satisfaction (US) have the greatest indirect effect on Service Quality (SERQ) on Net Benefit (NB) in the amount of 0.271, and User Satisfaction (US) has a greater intervening effect than Use (U).

Total Influence Between Research Variables

Table 6 Effect of Total Research Variables

Total Influence	Intervening Variable		Endogenous Variables
	Use (U)	User Satisfaction (US)	Net Benefit (NB)
Exogenous Variables	System Quality (SQ)	0.295	0.289
	Service Quality (SERQ)	0.270	0.4
	Information Quality (IQ)	0.280	0.237
Intervening Variable	Use (U)		0.286
	User Satisfaction (US)	-0.08	0.485

Sources: Primary data is processed, 2020

The total effect is the sum of direct and indirect effects between the exogenous latent variable System Quality (SQ), Service Quality (SERQ), Information Quality (IQ) with the intermediate endogenous latent variable or intervening Use (U) and the endogenous latent variable Net Benefit (NB).

The table 6 above is presents the total results regarding the direct and indirect relationships

that occur between exogenous and endogenous latent variables.

From the table 6 above, we can explain the total effect of the total exogenous latent variables on the endogenous latent variables. User Satisfaction (US) gave the biggest total effect on Net Benefit (NB) of 0.485, and subsequently Service Quality (SERQ) on User Satisfaction (US) of 0.400.

CONCLUSION

Based on this research, it can be concluded from the three of Exogenous Variables namely system quality, information quality, and service quality significantly and positively affect the use as an intervening variable, this is in line with the 2003 DeLone and McLean Research which says a good information system needs to be supported by system quality, information quality, and good service quality too.

Similar to use, User Satisfaction is also influenced by the three Exogenous Variables above, but the results of the Net Benefit Model Coefficient test show that the greatest value is the effect of Service Quality on User Satisfaction, this means that the User considers Service Response, Information Accuracy and information continuity as important. towards users as the main indicator of the success of the Service Quality of an Information system.

The effect of User Satisfaction on use is negative and insignificant, this means that User Satisfaction (US) has no direct effect on Use (U), in other words every time there is an increase in User Satisfaction (US) then it will not increase or decrease Uses. This is because the ServiceDesk information system is mandatory where the ServiceDesk Information System is the only Information System in ITS so that the User is indirectly obliged to use the Information System as a Complaint Service facility.

Use and User Satisfaction have a positive and significant effect on Net Benefits, in other words Users can feel a better change to their work, wherewith the convenience provided by the system, resulting in increased intensity of use. It also indirectly provides benefits to the organization, with increasing user productivity and user performance, will indirectly increase organizational productivity, and improve organizational performance.

ACKNOWLEDGEMENT

Thanks to Allah almighty. The supervisor who has been guiding during the research so that the research can run smoothly. Beasiswa PASTI that

provide financial assistance during lectures. My wife and children who always provide support and encouragement.

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