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## Evaluating Academic Information Systems Through Dual Models



**Abstract:** - Evaluation of a system is needed to determine whether the system is still following organizational goals. For maximum results, evaluation should be done regularly. An academic information system is a system that aims to perform data processing so that it can provide convenient information that is used by users in academic administrative activities. This study proposes to determine the level of governance maturity in the monitoring and Evaluation domain of academic information systems at University 'X' a private in Indonesia and determine factors of the success of the information system. The results of the measurement process show that the maturity level of the system is at level 2.1 and the factors that affect the success of the system are System Quality, Quality of Service, User Satisfaction, and Net Benefits. The comparison specifically on System Quality and User Satisfaction relation has a less significant impact (0.2) while the IT Performance of the Monitor and Evaluate process is at the initial/ad hoc stage (level 1). In this study, the Quality of Information does not affect the success of the system. The results of this study provide recommendations for organizations to improve governance according to organizational goals to level 3 and to improve the Quality of Information in information systems.

**Keywords:** Information System, Academic, Measurement, Maturity Level, Delone Mclean.

### INTRODUCTION

The academic information system is a system that aims to perform data processing so that it can provide convenience for users in academic administrative activities. The use of academic information systems can also be used as a benchmark for the progress or development of an education provider. Academic information systems can also support the performance of academic managers or as a reference for the institution in making improvements to performance that has not been optimal so that it can improve services to students (Kesuma & Kholifah, 2019).

On the other hand, the development of a system needs to be evaluated. Based on research, system assessment aims to decrease data loss within the system, which could lead to losses, and enhance system control to minimize errors. (Budi Setya Nusa, 2020). The significance of assessment for the organization lies in guaranteeing that the system can generate precise information to support operational activities and serve as a development milestone. (Salsabila & Iriyadi, 2020).

The achievement of an information system can be deemed successful when it attains the advantages it aims to deliver. According to DeLone and McLean (2003), the Net Benefits received from information systems are affected by User Satisfaction, System Use, Information Quality, Service Quality, and System Quality. Until now, many studies have been conducted to determine the success factors of information systems using the DeLone and McLean models. In the research conducted by Nani Agustina and Entin Sutinah (2019), the DeLone and McLean model is intended to test the success of the new student admissions mobile application. In other research conducted by Yakubu and Dasuki (2018) on the success of the e-learning system in Nigeria using the DeLone and McLean models, it is known that behavioral intention and user satisfaction affect actual usage. While in the systematic review of DeLone and McLean's success model in an e-learning context shows that the identified 92 primary studies are conducted in the education field (Sabeh et al., 2021). Meanwhile, apart from the benefits obtained from the information system, system governance also needs to be considered. This can be an indication for the organization to know the progress is following the organization's vision and mission (Pawan et al., 2018). COBIT serves as a valuable guide, presenting a set of steps, indicators, processes, and best practices. Its purpose is to optimize the advantages derived from information technology utilization and foster effective information technology governance within the organization. The implementation of the COBIT framework has grown quite rapidly along with technological advances. Unfortunately, not all companies can adopt technology as a support for the company's main activities. As a result, the adaptation of the COBIT framework version aligns with the specific attributes of the company, encompassing the utilization of information technology. Several previous studies have shown that COBIT 5.0 is more principle-oriented and focuses on enablers rather than processes. This

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shows that a comprehensive COBIT 4 survey is needed to see how technology is applied in various institutions before there are new principles and processes in COBIT 5 (Wabiser & Singgalen, 2022). In practice, Cobit research is widely used to measure the maturity level of information systems (Dazki et al., 2020; Lestariningsih et al., 2019; Marzuki & Zazuli Azhar Mardedi, 2019; Setiyowati et al., 2019). The maturity level is a description of the information system processes that take place within the organization. The maturity model can be used as a benchmarking and self-assessment tool by stakeholders in the organization to assess the maturity of the implemented information system (Dazki et al., 2020). Therefore, the importance of measuring from two points of view, namely the success of information systems and the maturity of information system governance, can be a recommendation for institutions to improve the implementation of information systems and the policies they make. Based on the explanation above, this study aims to measure the determining factors of the academic information system successful model at University 'X' as well as the maturity level of the implemented system where the results can be compared and used to support recommendations for stakeholders in the organization to improve the utilization of the system used.

## THEORIES AND METHODS

### I. DeLone and Mclean Model

According to DeLone and McLean(2003) the revised model, The effectiveness of an information system can be deemed successful when the organization acquires the net benefits of the system. The Net Benefits obtained the affected by User Satisfaction from System Usage. User Satisfaction from System Usage is affected by System Quality, Information Quality, and Service Quality. The DeLone and McLean models are shown in the image below :

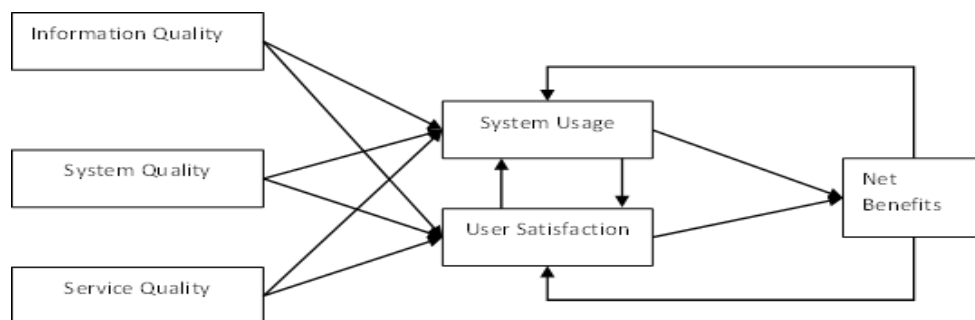


Figure 1: Delone and McLean model

### II. Cobit Maturity Model

Cobit 4.1 has a maturity model that can be used to control all information technology processes by using a scoring method so that organizations can assess their information technology processes starting from a maturity scale of 0-non existent, 1- Initial/Ad-hoc, 2-Repeatable but Intuitive, 3-Defined Process, 4-Manage and Measureable and 5-Optimised (Pawan et al., 2018). COBIT framework has defined information technology activities in four domains: planning and Organizing, acquiring and Implementing, Delivering and Support, and Monitoring and Evaluating. The IT Governance Institute highlights that the maturity model approach offers an advantage in that it allows management to easily position itself on the scale and understand the requirements for performance improvement if necessary. In this study, the applied assessment is on the Monitor and Evaluate domain based on organization IT master plan analysis.

### III. Proposed Model

The Model Proposed in this study to measure the success of the Academic Information System uses the DeLone and McLean Model where the variables used are Service Quality, Information Quality, System Quality, User Satisfaction, and Net Benefits, and the Cobit Maturity Model to Measure the maturity level of Information Systems. In the empirical research conducted by Iivari [11] on the DeLone and McLean model, it is known that the use of the system does not affect the success of an information system if its use is mandatory.

Based on the theory described previously, this research used the following model :

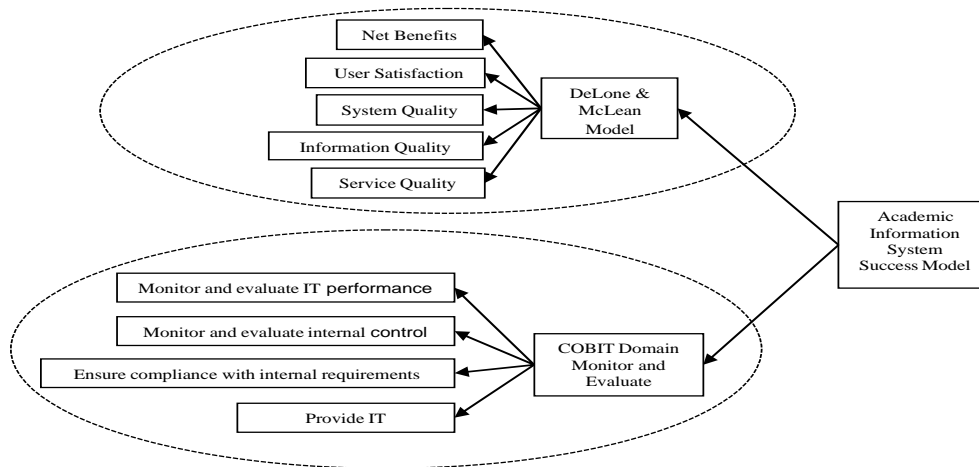


Figure 2: Proposed model

**RESULTS AND DISCUSSION**

After defining the Delone and McLean variables model into its indicators where net benefits use six indicators, user satisfaction uses five indicators, system quality uses twelve indicators, information quality uses eight indicators and service quality uses five indicators respectively (Nusantara et al., 2018). The data collection is done using 102 questionnaires where the calculation result came from Amos software. since this study is aimed to determine affected factors in the information system success model the structural equation modeling is a fit tool to analyze the relationship between variables (widyaningtyas et al., 2016). One of the steps in this process is to ensure that all indicators all valid constructor of their variables. the validity criteria must be greater than 0.5 where this research found that two indicators belonging to system quality are below than validity criteria. in this case, the invalid indicators must be removed from the model. The next step after confirmation of the validity of variable indicators and clean up from invalid indicators is to analyze the structural of the proposed model. The result of the amos calculation found that information quality has  $p = 0.808$  (table 1) which is above the cut-off of 0.05 and has an estimation of negative relation to user satisfaction (table 2).

TABLE 1. REGRESSION WEIGHTS OF PROPOSED MODEL

			Estimate	S.E.C.R.	P
User Satisfaction	<---	Information Quality	-,014	,058-,243	,808
User Satisfaction	<---	Service Quality	,674	,0739,168	***
User Satisfaction	<---	System Quality	,124	,0422,937	,003
Net benefits	<---	User Satisfaction	,831	,1018,228	***

TABLE 2. STANDARDIZED REGRESSION WEIGHTS OF THE PROPOSED MODEL

			Estimate
User Satisfaction	<---	Information Quality	-,022
User Satisfaction	<---	Service Quality	,717
User Satisfaction	<---	System Quality	,234
Net Benefits	<---	User Satisfaction	,633

Based on this analysis result Information Quality can be considered to not affect this proposed model. With this result, the research resumes to the next step to modify by excluding Information Quality from the proposed model. After modifying the proposed model by eliminating Information Quality from the model the process continues to re-calculate (table 3).

TABLE 3. STANDARDIZED REGRESSION WEIGHTS OF MODIFY PROPOSED MODEL

			Estimate
User Satisfaction	<---	System Quality	,223
User Satisfaction	<---	Service Quality	,708
Net Benefits	<---	User Satisfaction	,633

From the table 3 estimation above this study shown that System Quality and Service Quality have positive relation to User Satisfaction while Net Benefits have positive relation by User Satisfaction.

Comparing to previous study this research is align research conducted by Nusantara (2018) and Angelina (2019) that use DeLone and McLean Information System Success Model for measuring successful of information system with results that only partially proven.

TABLE 4. MATURITY LEVEL OF MONITOR AND EVALUATE DOMAIN

Domain	Level					Total	Maturity level	
	0	1	2	3	4			5
ME1.1.1		4	4		2		20	2.0
ME1.1.2		4	5		1		18	1.8
ME1.1.3		1	8		1		21	2.1
ME1.2.1		7	2		1		15	1.5
ME1.2.2		3	6		1		16	1.6
ME1.2.3		4	4	1	1		19	1.9
ME1.3.1	3	2	3	1	1		15	1.5
ME1.3.2		3	4	2	1		21	2.1
ME1.4.1	2	2	5		1		16	1.6
ME1.5.1	2	2	4	1	1		17	1.7
ME1.5.2		2	5		3		24	2.4
ME1.5.3		3	5	1		1	21	2.1
ME1.6.1	1	2	4	2		1	21	2.1
ME1.6.2	1	4	4		1		16	1.6
ME2.1.1		4	3	1	2		21	2.1
ME2.2.1	2	2	4	1	1		17	1.7
ME2.3.1	1	4	1	2	2		20	2.0
ME2.3.2		3	3	2	2		23	2.3
ME2.4.1	2	2	2	2	1	1	21	2.1
ME3.1.1	1	1	5	3			20	2.0
ME3.2.1		2	4	3	1		23	2.3
ME3.3.1		2	6	1	1		21	2.1
ME3.4.1		2	5	2	1		22	2.2
ME3.5.1	1	3	3	1	2		20	2.0
ME4.1.1		3	3	1	2	1	25	2.5
ME4.1.2		1	5	2	2		25	2.5
ME4.2.1		1	6	1	2		24	2.4
ME4.2.2		1	4	3	2		26	2.6
ME4.2.3			5	3	1	1	28	2.8
ME4.2.4			6	2	1	1	27	2.7
ME4.3.1			6	3		1	26	2.6
ME4.3.2			8	1		1	24	2.4
ME4.3.3	3		3	2	2		23	2.3
ME4.4.1	3		4	1	1	1	23	2.3
							Average	2.1

Based on table 4 above the result of this maturity level measurement shown the highest score of 2.8 is ME4.2.3 while the lowest score of 1.5 belongs to ME1.2.1 and ME1.3.1. In average that the current level of University 'X' of its academic information system is on 2.1 level. Illustration of gap between current maturity level and expected maturity level depicted below :

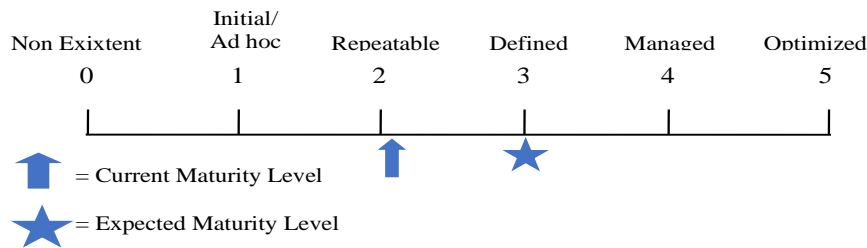


Figure 3: Maturity level gap of university “X” academic information system

TABLE 5. MATURITY LEVEL OF MONITOR AND EVALUATE BY PROCESS RECAP

Domain	Process	Maturity Level
ME1	Monitor and evaluate IT performance	1.86
ME2	Monitor and evaluate internal control	2.04
ME3	Monitor and evaluate ensure regulatory compliance	2.12
ME4	Monitor and evaluate provide IT Governance	2.51

By overall process ME1 have the lowest score of 1.86 and ME4 have the highest score of 2.51 (table 5). This study result showed that the current level is under 3 of all Monitor and Evaluate domain processes consist of ME1, ME2, ME3 and ME4. Therefore the organization can take action to improve the current level of 2 to expected level of 3.

Based on the results of the calculations shown in table 3 and table 5, the comparison between the effect of system quality on user satisfaction even though has a positive impact but less significant (0.2) and the value of ME1 (Monitor and Evaluate IT Performance) has not reached level 2 which means it is still in the initial/ad hoc stage. Successively significant influence between service quality on user satisfaction (0.7) and user satisfaction on net benefits (0.6) where the process of monitoring and evaluating of internal control, ensure regulatory compliance and provide IT governance is at a repeatable stage (FIGURE 4).

	Estimate	Domain	Maturity Level
User Satisfaction <--- System Quality	,223	ME1	1.86
User Satisfaction <--- Service Quality	,708	ME2	2.04
Net Benefits <--- User Satisfaction	,633	ME3	2.12
		ME4	2.51

Figure 4 : Comparison academic information system success model and maturity level

**CONCLUSION AND FURTHER WORKS**

The result of this study shown that System Quality and Service Quality have positive relation to User Satisfaction as much as 0,223 and 0,708 respectively while User Satisfaction to Net Benefits as much as 0,633. On the other hand Information Quality has no relation to User Satisfaction based on negative results. The numbers of 0,223 of System Quality relation to User Satisfaction can be a recommendation to organization to improve system quality of Academic Information System of University ‘X’. While the governance that applied on Monitor and Evaluate domain need the concern of organization stakeholder. The concern came from the result of Cobit Maturity Level measurement where the expected maturity level far from the current maturity level. The expected maturity level is level 3 while the current maturity level is level 2.1.

The relation between DeLone and McLean Success Model and Maturity Level of information system will be interesting topic for the next research.

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