JURNAL ILMIAH FIFO **P-ISSN 2085-4315 / E-ISSN 2502-8332**
DOI: http://dx.doi.org/10.22441/fifo.2022.v14i2.007

Academic Information System Success Model and Maturity Level Comparison for Improvement Recommendation

Sukarno Bahat Nauli[*1], Pualam Dipa Nusantara[2], Agung Priambodo[3]

[1]*Teknik Informatika, Fakultas Teknik, Universitas Satya Negara Indonesia*
Jln. Arteri Pondok Indah No. 11, Jakarta Selatan 12240, Indonesia
[2]*Teknik Informatika, Fakultas Ilmu Komputer, Universitas Bina Nusantara*
Jln. K.H. Syahdan No. 9, Jakarta Barat 11480, Indonesia
[3]*Sistem Informasi, Fakultas Teknik, Universitas Satya Negara Indonesia*
Jln. Arteri Pondok Indah No. 11, Jakarta Selatan 12240, Indonesia
email : [1]sukarnobahat@usni.ac.id, [2] pualamdipa@binus.ac.id, [3] agung.priyambodo@usni.ac.id*

*) Corresponding author

(received: 08-12-22, revised: 29-12-22, accepted:04-01-23)

Abstract

Evaluation of a system is needed to determine whether the system is still in accordance with organizational goals. For maximum results evaluation should be done regularly. Academic information system is a system that aims to perform data processing so that it can provide convenience information that used by users in academic administrative activities. This study purposes to determine the level of governance maturity in the Monitor and Evaluate domain of academic information systems at Satya Negara Indonesia University and determined factors of the success of the information system. 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 where Information Quality has no relation to User Satisfaction based on negative results. While overall results of the Monitor and Evaluation domain measurement process shown that the maturity level of the system is at level 2.1. The comparison specifically on System Quality and User Satisfaction relation has less significant impact (0.2) while IT Performance of Monitor and Evaluate process is at initial/ad hoc stage (level 1). This study provides recommendations for organizations to improve governance gradually according to 5 levels of COBIT maturity measurement from level of 2 to level 3 and to improve the Quality of Information of information systems.

Keywords**:** *academic, information system, measurement, maturity level, delone cLean*

I. INTRODUCTION

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. According a study the purpose of system evaluation is to reduce data loss in the system that can cause losses and improve control in the system to minimize errors [2]. While the importance of evaluation for the organization is to ensure that the system is able to produce accurate information that is able to support operational activities and become a milestone of a development [3].
The success of an information system can be considered successful if the benefits of the system are obtained. According to DeLone and McLean [4] 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 [5], 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 [6] 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 success model in an e-learning context shows that on the identified 92 primary studies are conducted in the education field [7]. 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 in accordance with the organization's vision and mission [8]. COBIT is a best practice tool in the form of a series of steps, indicators, processes and best practices that help maximize the benefits obtained through the use of information technology and the development of appropriate information technology governance within the company. 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. This causes the COBIT framework version to be adapted to the characteristics of the company, including the use of information technology. Several previous studies have shown that COBIT 5.0 is more principle oriented and focus on enablers than process. This 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 [9]. In practice, COBIT research is widely used to measure the maturity level of information systems [10,11,12,13]. 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 [10].

Based on the explanation above, this study aims to measure determining factors of the academic information system successful model at Satya Negara Indonesia University 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.

II. THEORIES AND METHODS

1. DeLone and Mclean Model

According to DeLone and McLean [4] the revised model, the success of an information system can be said to be successful if the organization gets the Net Benefits of the information system. The Net Benefits obtained is the affected by User Satisfaction from System Usage. While 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 :

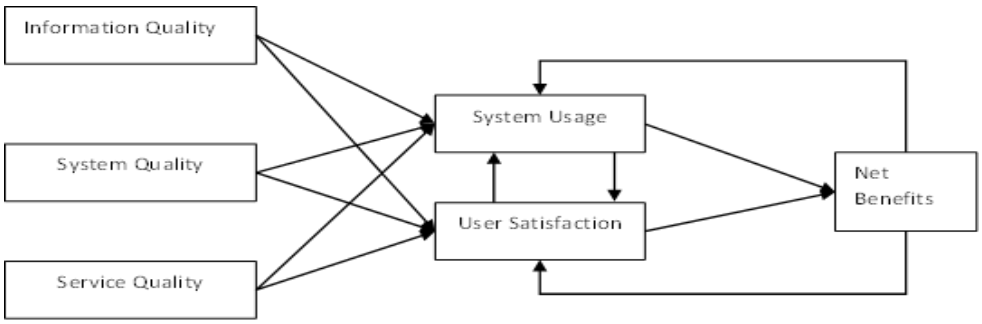

Figure 1. Delone and mclean model

2. 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 [8]. COBIT framework has defined information technology activities in four domain that is Plan and Organize, Acquire and Implement, Deliver and Support, Monitor and Evaluate. According to the IT Governance Institute the advantage of the maturity model approach is that it is relatively easy for management to put itself on the scale and appreciate what is involved if performance improvement is needed.

3. Proposed Model

Since the academic of information system of Universitas Satya Negara Indonesia has been running more than 5 years the organization expect to do an audit of the applied system. Thus, in this study the proposed model in order to measure the success of the Academic Information System is using the DeLone and McLean Model where the variables used are Service Quality, Information Quality, System Quality, User Satisfaction, and Net Benefits. Where Monitor and Evaluate domain of COBIT maturity model has been choosen to measure academic

information system performance to detect problems and improve control in place for information security. In the empirical research conducted by Iivari [14] 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 :

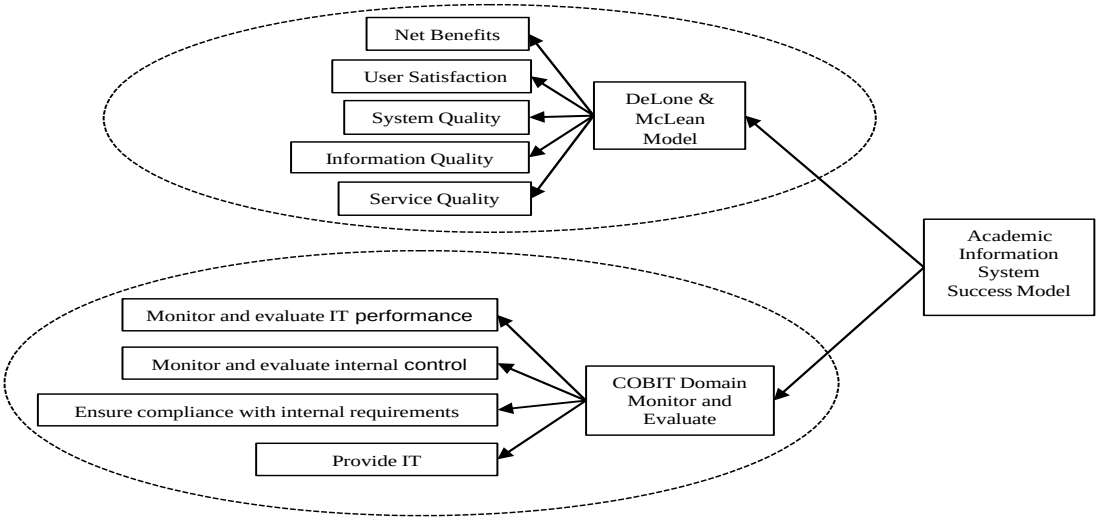

Figure 2. Proposed model

III. RESULTS AND DISCUSSION

After defining DeLone and McLean variables model into its indicators where Net Benefits use six indicators, User Satisfaction use five indicators, System Quality use twelve indicators, Information Quality use eight indicators and Service Quality use five indicators respectively [15]. 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 information system success model the Structural Equation Modelling is a fit tool to analyze relationship between variables [16]. One of the step in this process is to ensure that all indicators all valid constructor to its varible. The validity criteria must be greater than 0.5 where in this research found that two indicators belongs to System Quality are below than validity criteria. In this case the unvalid indicators must be remove from the model. Next step after confirmation of the validity variable indicators and clean up from unvalid indicators is to analyze structural of the proposed model. The result of AMOS calculation found that Information Quality have P = 0.808 (table 1) which is above the cut off of 0.05 and have 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	<---	Service Quality	,674	,073 9,168	***
User Satisfaction	<---	System Quality	,124	,042 2,937	,003
Net benefits	<---	User Satisfaction	,831	,101 8,228	***

Table 2. Standardized Regression Weights Of 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 analyze result Information Quality can be considered has no affect in this proposed model. By this result the research resume to the next step to modify by excluding Information Quality from the proposed model. After modifying the proposed model by eliminate Information Quality from the model the process continue 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 [15] and Angelina [17] that use DeLone and McLean Information System Success Model for measuring successful of information system with results that only partially proven.
The measurement of maturity level of academic information system of Satya Negara Indonesia University was conducted by spreading questionnaires to respondent that qualified by RACI chart. RACI stands for Responsible, Accountable, Consulted, Informed that COBIT defines as duties that in the organization [8]. The maturity level attribute is obtained from the calculation of the total interview answers multiplied by the weight and divided by the number of respondents [12].The measurement applied on Monitor and Evaluate domain where questions of the questionnaire are taken from the domain control objectives.

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 Satya Negara Indonesia University of its academic information system is on 2.1 level. Illustration of gap between current maturity level and expected maturity level depicted below:

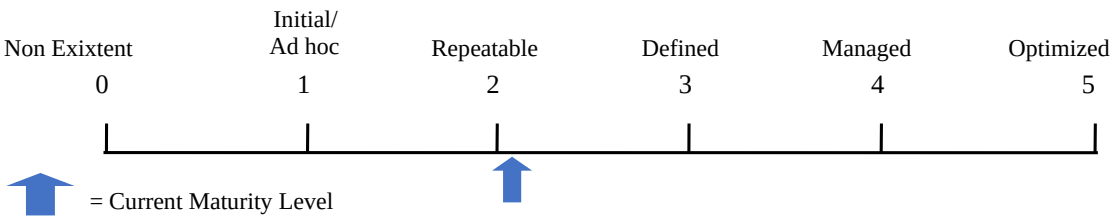

Figure 3. Maturity level gap of university of satya negara Indonesia academic information system

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). While in average that the current level of Satya Negara Indonesia University of its academic information system is on 2.1 level (table 4). Level 2 is define as Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore, errors are likely.

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 (ME2), ensure regulatory compliance (ME3) and provide IT governance (ME4) is at a repeatable stage.

IV. 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 Satya Negara Indonesia University. On COBIT maturity measurement 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 gradually the current level of 2 to level of 3 of 5 level of COBIT maturity measurement.
The relation between DeLone and McLean Success Model and Maturity Level of information system will be interesting topic for the next research.

REFERENCES

[1] Kesuma, C., & Kholifah, D. N. (2019). Sistem Informasi Akademik Berbasis Web padaLKP Rejeki Cilacap (Vol. 7).

[2] Budi Setya Nusa, I. (2020). Quality of Audit System Information for Internal Control Effectiveness. Advances in Economics, Business and Management Research, 112.

[3] Salsabila, H. A., & Iriyadi, I. (2020). Evaluasi Atas Penerapan Sistem Informasi Akademik Dan Keuangan Terhadap Tingkat Kepuasan Mahasiswa. JAS-PT (Jurnal Analisis Sistem Pendidikan Tinggi Indonesia), 4(2), 137. https://doi.org/10.36339/jaspt.v4i2.348

[4] William H. DeLone and Ephraim R. McLean, The DeLone and McLean Model of Information Systems Success : A Ten Year Update, Journal Of Management Information Systems, vol.19, no.4, pp.9-30, 2003.

[5] Agustina, N., & Sutinah, E. (2019). Model Delone dan McLean Untuk Menguji Kesuksesan Aplikasi Mobile Penerimaan Mahasiswa Baru. InfoTekJar (Jurnal Nasional Informatika Dan Teknologi Jaringan), 3(2), 76–82. https://doi.org/10.30743/infotekjar.v3i2.1008

[6] Yakubu, M. N., & Dasuki, S. I. (2018). Assessing eLearning systems success In Nigeria: An application of the Delone And Mclean information systems success model. Journal of Information Technology Education: Research, 17, 183–203. https://doi.org/10.28945/4077

[7] Sabeh, H. N., Husin, M. H., Kee, D. M. H., Baharudin, A. S., & Abdullah, R. (2021). A Systematic Review of the DeLone and McLean Model of Information Systems Success in an E-Learning Context (2010-2020). In IEEE Access (Vol. 9, pp. 81210–81235). Institute of Electrical and Electronics Engineers Inc. https://doi.org/10.1109/ACCESS.2021.3084815

[8] Pawan, E., Utami, E., & Nasiri, A. (2018). Mengukur Tingkat Kematangan Tata Kelola Sistem Informasi Akademik Menggunakan COBIT 4.1 dan Balanced Scorecard Measuring the Maturity Level of Academic Information System Governance Using COBIT 4.1 and the Balanced Scorecard. Citec Journal, 5(2).

[9] Wabiser, Y. D., & Singgalen, Y. A. (2022). An Evaluation of Control Objective for Information Related Technology (COBIT) 4.0 or 4.1: Systematic Literature Review. Journal of Information Systems and Informatics, 4(2). http://journal-isi.org/index.php/isi

[10] Dazki, E., Kom, S., Kom, M., Islami, Z., & Atmojo, W. T. (2020). PENGUKURAN MATURITY LEVEL TATA KELOLA TEKNOLOGI INFORMASI MENGGUNAKAN FRAMEWORK COBIT 4.1 PADA PT. DINAMIKA MITRA SUKSES MAKMUR. In Maret (Vol. 2020, Issue 1).

[11] Lestariningsih, T., Afandi, Y., Setia, L. D., Qimyatuss'Aadah, Q., Echsony, M. E., Prihatinta, T., Taali, M., & Srimiatun, S. (2019). Maturity Level Enterprise Academic Information System Based on COBIT. Journal of Physics: Conference Series, 1381(1). https://doi.org/10.1088/1742-6596/1381/1/012024

[12] Marzuki, K., & Zazuli Azhar Mardedi, L. (2019). Desember) 2019, Hal 161-166 BITe. In JOURNAL BUMIGORA INFORMATION AND TECHNOLOGY (Vol. 1, Issue 2).

[13] Setiyowati, S., Siswanti, S., Kusumaningrum, A., & Sandradewi, K. (2019). Peningkatan Kematangan Proses TI: Penilaian, Rekomendasi dan Validasi (Studi Kasus Sistem Informasi IPOS). Jurnal Ilmiah SINUS, 17(2), 71. https://doi.org/10.30646/sinus.v17i2.424

[14] Juhani Iivari, An Empirical Test of the DeLone-McLean Model of Information System Success, The Database for Advances in Information Systems, vol.36, no.2, pp.8-27, 2005.

[15] Nusantara, P. D., Gayatri, N. A. G., & Suhartana, M. (2018). Combining two models of successful information system measurement. Telkomnika (Telecommunication Computing Electronics and Control), 16(4), 1793–1800. https://doi.org/10.12928/TELKOMNIKA.v16i4.7737

[16] Widyaningtyas, S., Wuryandari, T., Mukid, M. A., Jurusan, M., Fsm, S., Diponegoro, U., Pengajar, S., & Statistika, J. (2016). PENGARUH MARKETING MIX TERHADAP KEPUASAN DAN LOYALITAS KONSUMEN MENGGUNAKAN METODE STRUCTURAL EQUATION MODELLING (SEM) (Studi Kasus Toserba Toko Tembalang "Totem"). JURNAL GAUSSIAN, 5(3), 553–562. http://ejournal-s1.undip.ac.id/index.php/gaussian

[17} Angelina, R. J., Hermawan, A., & Suroso, A. I. (2019). Analyzing E-Commerce Success using DeLone and McLean Model. Journal of Information Systems Engineering and Business Intelligence, 5(2), 156. https://doi.org/10.20473/jisebi.5.2.156-162,