Analysis of Information Technology Governance in the Transportation Agency using the Cobit 4.1 Framework

Edo Septiawan*, Silfia Andini, Sri Rahmawati

Universitas Putra Indonesia YPTK Padang, Jl. Raya Lubuk Begalung Padang, Sumatera Barat – 25221, Indonesia.

* edoseptwn@gmail.com

Abstract

Information technology plays a role in supporting the goals of companies and government agencies by providing a fast, easy and accurate information and communication platform, increasing the effectiveness and efficiency of the planning process, and supporting innovation in companies and government agencies to develop. The existence of Information Technology has experienced development and the relationship between its operational roles in running an organization, where it is not only as a support for operations. Research was conducted at the Transportation Agency which concluded that the old system used was ineffective because the process carried out took time and space, making employee performance less efficient. After searching for data at the Transportation Agency by collecting data, it can be concluded that the information system used is still not optimal. Therefore, a system design was carried out. The results of the analysis were applied to a cobit system application program. After the research was conducted, the results of the calculation of the maturity model level obtained an average index of 3.16 (Level 3). This means that the system. The new information system designed is expected to improve the quality of information and performance in the future .

Keywords : Information Technology, Framework, Governance, Cobit 4.1, Maturity Level.

1. Introduction

Information technology has become a significant part for companies and government agencies. Information technology plays a role in supporting the goals of companies and government agencies by providing a fast, easy, and accurate information and communication platform, increasing the effectiveness and efficiency of the planning process, and supporting innovation for companies and government agencies to develop [1][2]. In addition, the existence of Information Technology has experienced development and interconnectedness of its operational roles in running an organization, where it is not only a supporter of operations that function strategically in decision making, but the concept of supporting operations (internal business processes) makes it one of the important components in supporting the success of strategic operations [3].

Information Technology Governance (IT Governance) means the development and implementation of various applications or systems to solve problems faced by humans in everyday life [4]. Information technology governance is a combination of computer technology and communication technology used to process data, including processing, obtaining , compiling , storing, manipulating data in depth[5][6].

The Transportation Agency (Dishub) of West Pasaman Regency as a non-departmental State-owned Government Institution/Agency that provides facilities and infrastructure for the government and the community. This data is obtained from a census or survey conducted by itself and also from other government departments or institutions as secondary data. The system can also be said to be a collection of elements that interact with each other to achieve certain goals [7][8].

COBIT 4.1 is the latest edition of COBIT published in 2007. Basically, COBIT contains a collection of best practices documentation for Information Technology Governance that can help auditors, management and other users in bridging the gap between business risks, control needs, and technical issues. COBIT then developed into an enterprise control model to meet IT governance needs and ensure the integrity of information and information systems [9].

COBIT 4.1 was chosen because the COBIT framework provides the most detailed description of the strategy and control in the management of information technology processes. The COBIT standard also contains a calculation of the Muturity Level value which presents the level of alignment of information technology objectives and the organization's business objectives [10].

The level of IT management capability on the maturity scale is divided into 6 levels, namely [11]:

completely unaware of the information technology process in its company.

2. Level 1 (Initial Level); at this level, the organization generally does not provide a stable environment for developing a new product.

3. Level 2 (Repeatable Level); at this level, policies to regulate the development of a project and procedures for implementing these policies are established.

4. Level 3 (Defined Level); at this level, the standard process in developing a new product is documented, this process is based on the integrated product development process.

5. Level 4 (Managed Level); At this level, the organization creates a matrix for a product, process and measurement of results.

6. Level 5 (Optimized Level); At this level, the entire organization is focused on the process of continuous improvement. The maturity scale is as presented in Table 1.

T a b l e 1. Maturity Level Assessment Scale

No	Scale	Level
1	0-0.50	Non-Existent
2	0.51-1.50	Initial/Ad Hoc
3	1.51-2.50	Repeatable but Intuitive
4	2.51-3.50	Defective Process
5	3.51-4.50	Manageable and Meansurable
6	4.51-5.00	Optimized

2. Research methodology

Research Methodology is a research stage carried out in solving a problem. In collecting data and information for this study, the author applies several research methods including the research framework of this study is shown in Figure 1 .
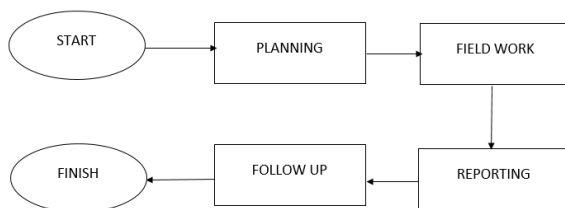
Figure 1. Research Framework

1. *Planning*
At this stage, we determine the scope of the audit, the object to be audited, and the standards used to evaluate the audit results. We also coordinate with the authorities in the company to be audited to understand and analyze the vision, mission, goals, objectives of the audit object, and related policies.

2. *Field Work (Field Inspection)*
Auditors make various efforts to obtain the necessary information by collecting data from related parties. This process is carried out through several methods, such as direct interviews, distributing questionnaires, and field surveys at the research location. These methods help auditors in collecting relevant and in-depth information about the audit object .

3. *Reporting*
After the data is collected, the next step is to process the data to calculate the maturity level of the organization. At this stage, the auditor will convey the audit results obtained during the evaluation process, providing an overview of the condition and progress of the organization based on the data that has been analyzed. Maturity Level Formula

Formula : $\frac{\Sigma\ (Jumlah\ Nilai\ Jawaban)}{\Sigma\ (Jumlah\ Pertanyaan\ Kuesioner)}$

4. *Follow-Up*
After completing the reporting, the auditor then provides the audit results to the organization in the form of a report containing a number of recommendations for corrective actions. The recommendations are addressed to the management of the object being studied to help improve performance or correct deficiencies found during the audit process.

3. Results and Discussion

The assessment criteria given for each questionnaire can be seen in Table 2.

Table 2. Maturity Level Assessment Scale

No.	C r i t e ria	Information	S kor
1.	SS	Strongly agree	5
2.	S	Agree	4
3.	KS	Not enough Agree	3
4.	TS	No Agree	2
5.	S TS	I do n't agree	1

The PO 9 Assess and Manage IT Risks from the maturity level scale can be explained in Table 3.

Table 3. Assess and Manage IT Risks

No.	Question	SCALE				
		SS	S	KS	TS	STS
1.	Has creating a systematic risk assessment framework helped in achieving business goals?					
2.	Has a general approach to risk assessment been implemented in assessing application system risks that determines the scope and limitations, as well as the methodology to be used?					
3.	Has the testing of basic elements in the application system explained the risks and their cause and effect relationships?					
4.	Have the risks of the application system being tested been generated from a quantitative or qualitative measurement through risk analysis?					
5.	Do the provisions of the application system risk management work plan ensure effective cost control?					
6.	Does the application system risk management work plan measure security and reduce the emergence of other risks ?					
7.	Have the remaining risks of the application system been accepted by considering the effect factors of the risks, academic policy factors, uncertainty factors and cost-effectiveness factors of implementing system security and internal controls?					
8.	Has risk assessment as an important tool in designing and implementing internal control been carried out through the process of determining the IS strategic plan and in the IS monitoring and evaluation mechanism ?					
Amount		0	0	0	0	0
Number of Questions			8		Index =	0
Total Answer Value			0			

The AI 2 Acquire and Maintain Application Software maturity scale can be explained in Table 4.

Table 4. Acquire and Maintain Application Software

No.	Question	SCALE				
		SS	S	KS	TS	STS
1.	Can the system process large amounts of data?					
2.	In operating the PPDB application system used, are there no disruptions or errors experienced by users?					
3.	Is the design and implementation of application systems based on user requests in accordance with management policies?					
4.	Has the application system been implemented in accordance with existing instructions?					
5.	Does the implemented application system not cause problems and losses to management?					
6.	Is the information in the application system the information that management needs according to existing business processes?					
7.	User understanding in operating the implemented application system?					
Amount		0	0	0	0	0
Number of Questions			7		Index =	0
Total Answer Value			0			

The DS 5 Ensure Systems Security from the maturity level scale can be explained in Table 5.

Table 5. Ensure Systems Security

No.	Question	SCALE				
		SS	S	KS	TS	STS
1.	Does every user who uses a computer have to log in first?					
2.	Is every employee registered in advance for computer use?					
3.	Is server maintenance supervision carried out by the information systems unit?					
4.	Is there a definition of access rights for each user to facilitate accountability control?					
5.	Are user requests for computer repairs carried out based on safety standards?					
6.	Are there standards for prevention and detection of virus intrusions?					
7.	Is there protection for access rights on information system networks?					

8.	Is there a repair procedure reference provided for every problem with the computer for the user?					
9.	Is Internet security regulated by the information systems unit?					
10.	Is the document data on the server stored based on classification?					
Amount		0	0	0	0	0
Number of Questions			10	In	0	
Total Answer Value			0	de x =		

The following is an analysis of the COBIT method in calculating the maturity scale questionnaire in the implementation of the West Pasaman Transportation Agency (DISHUB) Website information system.

Bakarudin, SH: PO9 (98.02/29 = 3.38) + AI2 (111.94/29 = 3.86) + DS5 (81.2/29 = 2.80) = 3.35 (Maturity Level is 3)

Sukarni, AP, M.Si : PO9 (112.52/29 = 3.88) + AI2 (99.47/29 = 3.43) + DS5 (113.1/29 = 3.90) = 3.74 (Maturity Level is 4)

Khairul, B.SH : PO9 (98.02/29 = 3.38) + AI2 (95.41/29 = 3.29) + DS5 (98.6/29 = 3.40) = 3.36 (Maturity Level is 3)

Ade Putra, SE : PO9 (90.48/29 = 3.12) + AI2 (91.06/29 = 3.14) + DS5 (107.3/29 = 3.70) = 3.32 (Maturity Level is 3)

Manuel Sembiring, SH : PO9 (75.98/29 = 2.62) + AI2 (91.06/29 = 3.14) + DS5 (87/29 = 3.00) = 2.92 (Maturity Level is 3)

Gusdiana Candra, S. Sos, MM : PO9 (90.48/29 = 3.12) + AI2 (103.53/29 = 3.57) + DS5(113.1/29 = 3.90) = 3.53 (MaturityLevel is 4)

Khairil, SH : PO9 (83.52/29 = 2.88) + AI2 (91.06/29 = 3.14) + DS5 (92.8/29 = 3.20) = 3.07 (Maturity Level is 3)

Yoni Syah Putra, SH: PO9 (116/29 = 4.00) + AI2 (116/29 = 4.00) + DS5 (139.2/29 = 4.80) = 4.27 (Maturity Level is 4)

Surya Balinda : PO9 (141.52/29 = 4.88) + AI2 (136.59/29 = 4.71) + DS5 (116/29 = 4.00) = 4.53 (Maturity Level is 5)

Heri Setiawan, A.Md: PO9 (123.25/29 = 4.25) + AI2 (124.41/29 = 4.29) + DS5 (133.4/29 = 4.60) = 4.38 (Maturity Level is 4)

Ari Surya Putra, A.Md: PO9 (130.5/29 = 4.50) + AI2 (132.53/29 = 4.57) + DS5 (133.4/29 = 4.60) = 4.56

(Maturity Level is 5)

Arman Putra, S.Pd, M.Si : PO9 (79.75/29 = 2.75) + AI2 (53.94/29 =

1.86) + DS5 (49.3/29 = 1.70) = 2.10 (Maturity Level is 2)

Eva Wardi Putra, SH: PO9 (83.52/29 = 2.88) + AI2 (49.59/29 = 1.71) + DS5 (58/29 = 2.00) = 2.20 (Maturity Level is 2)

Hendri Hasibuan, S.Sos : PO9 (65.25/29 = 2.25) + AI2 (62.06/29 = 2.14) + DS5 (78.3/29 = 2.70) = 2.36 (Maturity Level is 2)

Roza Wirna, SKM : PO9 (61.48/29 = 2.12) + AI2 (66.41/29 = 2.29) + DS5 (78.3/29 = 2.70) = 2.37 (Maturity Level is 2)

Tedi Bakharah, SKM : PO9 (87/29 = 3.00) + AI2 (120.06/29 = 4.14) +

DS5 (110.2/29 = 3.80) = 3.65 (Maturity Level is 4)

Aswandi, A.Md : PO9 (112.52/29 = 3.88) + AI2 (103.53/29 = 3.57) + DS5 (110.2/29 = 3.80) = 3.75 (Maturity Level is 4)

Khairi Ihwan, SE: PO9 (75.98/29 = 2.62) + AI2 (45.53/29 = 1.57) + DS5 (72.5/29 = 2.50) = 2.23 (Maturity Level are 2)

Rizaldi, SH : PO9 (75.98/29 = 2.62) + AI2 (70.47/29 = 2.43) + DS5 (66.7/29 = 2.30) = 2.45 (Maturity Level is at 2)

Simar S.Pd : PO9 (83.52/29 = 2.88) + AI2 (74.53/29 = 2.57) + DS5 (89.9/29 = 3.10) = 2.85 (Maturity Level are 3)

Nastia,SE : PO9 (87/29 = 3.00) + AI2 (82.94/29 = 2.86) + DS5 (75.4/29 = 2.60) = 2.82 (Maturity Level is 3)

Roni Suryanto : PO9 (83.52/29 = 2.88) + AI2 (66.41/29 = 2.29) + DS5 (139.2/29 = 4.80) = 3.32 (Maturity Level is 3)

Bagus Ananda Aryadi: PO9 (112.52/29 = 3.88) + AI2 (107.59/29 = 3.71) + DS5 (95.7/29 = 3.30) = 3.63 (Maturity Level is 4)

Dani Nasrul Hadi Pranata: PO9 (87/29 = 3.00) + AI2 (74.53/29 = 2.57) + DS5 (75.4/29 = 2.60) = 2.72 (Maturity Level is 3)

Sanara Muda, A.Md, L.LASDP : PO9 (69.02/29 = 2.38) + AI2 (33.06/29 = 1.14) + DS5 (66.7/29 = 2.30) = 1.94 (Maturity Level is 2)

Yudi Candara : PO9 (75.98/29 = 2.62) + AI2 (70.47/29 = 2.43) + DS5 (63.8/29 = 2.20) = 2.42 (Maturity Level is 2)

Desi Oktaviani, A.Ma, PKB: PO9 (61.48/29 = 2.12) + AI2 (95.41/29 = 3.29) + DS5 (89.9/29 = 3.10) = 2.84 (Maturity Level is 3)

Rahmi Lidya, A. Ma, PKB: PO9 (79.75/29 = 2.75) + AI2 (82.94/29 = 2.86) + DS5 (81.2/29 = 2.80) = 2.80 (Maturity Level is 3)

Yogi Febriandi, A. Ma, PKB: PO9 (123.25/29 = 4.25) + AI2 (111.94/29 = 3.86) + DS5 (127.6/29 = 4.40) = 4.17 (Maturity Level is 4)

Average Index Sum:

PO9 : 3.38 + 3.88 + 3.38 + 3.12 + 2.62 + 3.12 + 2.88 + 4.00 + 4.88 + 4.25 + 4.50 + 2.75 + 2.88+ 2.25 + 2.12 + 3.00 + 3.88 + 2.62 + 2.62 + 2.88 + 3.00 + 2.88 + 3.88 + 3.00 + 2.38 + 2.62 + 2.12 + 2.75 + 4.25 = 91.89/29 = 3.17 (Maturity Level is 3)

AI2 : 3.86 + 3.43 + 3.29 + 3.14 + 3.14 + 3.57 + 3.14 + 4.00 + 4.71 + 4.29 + 4.57 + 1.86 + 1.71 + 2.14 + 2.29 + 4.14 + 3.57 + 1.57 + 2.43 + 2.57 + 2.86 + 2.29 + 3.71 + 2.57 + 1.14 + 2.43 + 3.29 + 2.86 + 3.86 = 88.43/29 = 3.05 (Maturity Level is 3)

DS5 : 2.80 + 3.90 + 3.40 + 3.70 + 3.00 + 3.90 + 3.20 + 4.80 + 4.00 + 4.60 + 4.60 + 1.70 + 2.00 + 2.70 + 2.70 + 3.80 + 3.80 + 2.50 + 2.30 + 3.10 + 2.60 + 4.80 + 3.30 + 2.60 + 2.30 + 2.20 + 3.10 + 2.80 + 4.40 = 94.60/29 = 3.26 (Maturity Level is 3)

Total: 3.17 + 3.05 + 3.26 = 9.48/3 = 3.16 (Average Index) (Maturity Level 3)

For the PO9 process, the index value is 3.17. For the AI2 process, the index value is 3.05. For the DS5 process, the index value is 3.26.

Conclusion u for the position of the online website system maturity level at the Department of Transportation (DISHUB) is at level 3. This means that the website system at the Department of Transportation is at the third level, namely Defined Process

System Implementation

The governance analysis process page in the PO9 domain shows the display of the analysis calculation process system, which can be seen in Figure 2.

Figure 2. Governance Analysis P09

The governance analysis process page in the AI2 domain shows the display of the analysis calculation process system, which can be seen in Figure 3.

Figure 3. AI2 Governance Analysis

The governance analysis process page in the DS5 domain shows the system display of the analysis calculation process, which can be seen in Figure 4.

Figure 4. DS5 Governance Analysis

The governance analysis results page on the PO9, AI2, DS5 domains shows the system display of the analysis calculation process, which can be seen in Figure 5.

Figure 5. Results of Governance Analysis PO9, AI2, DS5

This report page shows the system display of the results of the governance analysis that participated in filling out the collected data questionnaire, which can be seen in Figure 6.

Edo Septiawan et al.

Figure 6. Governance Analysis Report

This report page shows the display of the system results of the Respondent Data that participated in filling out the collected data questionnaire, which can be seen in Figure 7.

Figure 7 . Analysis Report

4. Conclusion

Based on the calculation of the maturity model level, the average index is 3.16 (Level 3). This means that the website system at the West Pasaman Transportation Agency (DISHUB) is at the third level, namely the defined process. And it also determines that the website system at the West Pasaman

Transportation Agency (DISHUB) has quite good quality .

Reference List

[1] Damayanti, A., Delima, ID, & Suseno, A. (2023). Utilization of Social Media as Information and Publication Media (Qualitative Descriptive Study on Instagram Account @rumahkimkotatangerang). PIKMA Journal: Publication of Media and Cinema Communication Science, 6(1), 173-190. https://doi.org/10.24076/pikma.v6i1.1308

[2] Gioh, A. (2021). E-Government Public Services at the Minahasa Regency Communication and Informatics Service. POLITICO: Journal of Political Science, 10(1).

[3] Putri, EH (2017). Effectiveness of implementation of micro, small and medium enterprises (MSMEs) development program in Samarinda City (study on Samarinda City Cooperative and MSME Service). EJournal of Public Administration, 5(1), 5431-5445.

[4] Kamal, A. (2022). Information Technology and Professional Skepticism towards Fraud Detection Skills of Government Internal Auditors. YUME: Journal of Management, 5(2), 295-313. https://doi.org/10.37531/yum.v5i2.1639

[5] Naibaho, RS (2017). The role and planning of information technology in companies. Warta Dharmawangsa, (52). https://doi.org/10.46576/wdw.v0i52.253

[6] Suprapto, HA (2018). Information Technology (IT)-based entrepreneurship learning strategies to increase students' interest in becoming entrepreneurs. Didactics: Journal of Education and Science, 18(1). https://doi.org/10.30651/didaktis.v18i1.755

[7] Febriani, OM, Putra, AS, & Prayogie, RP (2020, December). Design and Construction of a Web-Based Drug Circulation Monitoring System at Pharmaceutical Wholesalers (PBF) in Bandar Lampung City. In Proceedings of the Darmajaya National Seminar (Vol. 1, pp. 122-132).

[8] Sudjiman, PE, & Sudjiman, LS (2018). Analysis of computer-based management information systems in the decision-making process. TeIKa, 8(2), 55-66. https://doi.org/10.36342/teika.v8i2.2327

[9] Bali, PDSS (2017). Audit of the Influence of Perceived Organizational Support and Organizational Commitment on Organizational Citizenship Behavior of Lecturers at STMIK STIKOM Bali Using Cobit 4.1. SPEED-Sentra Penelitian Engineering dan Edukasi, 9(3). http://dx.doi.org/10.55181/speed.v9i3.60

[10] Dhogo, AMS, Neno, FE, & Ege, ED (2023). AUDIT OF ACADEMIC INFORMATION SYSTEM OF STIMIKOM STELLA MARIS SUMBA USING COBIT 4.1 FRAMEWORK METHOD. JATI (Journal of Informatics Engineering Students), 7(6), 3217-3222. https://doi.org/10.36040/jati.v7i6.8124

[11] Sofa, K., Suryanto, TLM, & Suryono, RR (2020). Information Technology Governance Audit Using COBIT 5 Framework at Public Works Department of Tanggamus Regency. Journal of Technology and Information Systems, 1(1), 39-46. https://doi.org/10.33365/jtsi.v1i1.50