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Audit of IT Governance in Communication and Informatics Office of Serang Using COBIT 5

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Abstract

IT Governance in Communication and Informatics Office (Dinas Komunikasi dan Informatika) of Serang City has obstacles. The obstacles are that the innovations have not entirely facilitated the process of governance and the daily operational and lack of human resources who have competencies in the field of information and communication technology. Communication and Informatics Office of Serang has never conducted an IT governance audit. Conducting an IT governance audit, the Communication and Informatics Office of Serang needed a standard framework that used as a measurement tool in overcoming the problem. COBIT 5 provides benefits through effective IT management. The target capability level of the Communication and Informatics Office of Serang is level 2 (Managed Process). The domain processes used in this study were APO07 and MEA01 processes obtained using the Analytic Hierarchy Process (AHP) methodology to determine the priority process domains. The capability level results for each process domain are level 1. It indicated that APO01, APO07, and MEA01 process domains have not yet reached the level expected so that the Communication and Informatics Office of Serang must implement the recommendations given in this study to achieve the capability level 2.

Keywords: IT Governance Audit, COBIT 5, Analytical Hierarchy Process.

Abstrak

Tata kelola TI Diskominfo Kota Serang memiliki kendala. Kendalanya adalah inovasi yang ada belum seluruhnya memfasilitasi proses tata kelola dan operasional sehari-hari dan masih kurangnya SDM yang memiliki kompetensi dibidang teknologi informasi dan komunikasi. Diskominfo Kota Serang belum pernah melakukan audit tata kelola TI. Dalam melakukan audit tata kelola TI dibutuhkan sebuah kerangka kerja atau *framework* yang dapat dijadikan sebagai standar yang dapat digunakan sebagai alat ukur dalam mengatasi permasalahan yang ada di Diskominfo Kota Serang, *framework* tersebut adalah COBIT 5. COBIT 5 memberikan keuntungan melalui pengelolaan dan manajemen TI yang efektif. Target *capability level* Diskominfo Kota Serang adalah *level* 2 (*Managed Process*). Domain yang digunakan pada penelitian kali ini adalah APO (*Align, Plan, and Organize* dan MEA(*Monitoring, Evaluate, Assess*) yang berfokus pada proses APO01, APO07, dan MEA01 yang didapatkan menggunakan metodologi *Analytic Hierarchy Process* (AHP) untuk menentukan domain proses prioritas. Hasil *capability level* dari masing-masing domain proses adalah *level* 1. Dapat disimpulkan bahwa domain proses APO01, APO07, dan MEA01 belum dapat mencapai *level* yang diharapkan sehingga Diskominfo Kota Serang harus menerapkan rekomendasi-rekomendasi yang telah diberikan pada penelitian ini untuk mencapai *capability level* 2.

Kata Kunci: Audit Tata Kelola TI, COBIT 5, *Analytical Hierarchy Process*.

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I. INTRODUCTION

The technological revolution in auditing began to develop in 1954. Nowadays, with the growing development of the use of Information Technology (IT), many companies use computer-based information systems to increase the efficiency of the company's operational activities, including the government [1].

The Communication and Information Office of Serang is one example of the government sectors that have used IT. In carrying out operational activities, some obstacles hamper the activities that exist. The obstacles are that the innovations have not entirely facilitated the process of governance and the daily operational and lack of competent human resources in the field of information and communication technology of Serang [2]. Therefore, the elected Regional Head and Deputy Regional Head have a mission to improve IT governance in The Communication and Information Office of Serang [3].

The proposed framework expected is to provide a guided, controlled, and supervised system to achieve goals. Conducting an IT governance audit, the Communication and Informatics Office of Serang needed a standard framework used as a measurement tool in overcoming the problems, such as COBIT 5 or ITIL [10]. COBIT 5 is more suitable for use because one of its advantages is the existence of support to audit and evaluate IT performance, which is not found in ITIL [4].

COBIT 5 provides benefits through effective IT management. It offers detailed IT Governance and controls an objective framework for management because it manages IT holistically. So the value provided by IT can be achieved optimally by taking into account all aspects of IT governance starting from the people, skills, competencies, services, infrastructure, and applications. COBIT 5 has 5 domains and 37 processes used to conduct audits. Therefore COBIT 5 is appropriate and can assist in the IT governance audit process in this study.

Research conducted at PT DEF using the COBIT 5 framework discusses that PT DEF had not yet had specific rules in IT governance. Moreover, it tends to do spontaneous and unfocused activities in handling IT, which causes organizational performance to be less efficient and effective. The domain used in the study is DSS (Deliver, Service, and Support) with the process domain of DSS03 (Managing Problems). This research has resulted in recommendations for improving IT governance problems in COBIT 5, which PT DEF can apply and associate with the DSS03 process domain in COBIT 5 [5].

Based on the problem above, the purpose of this study was to audit IT governance in the Communication and Information Office of Serang using the COBIT 5 framework with the domains used in this study are APO (Align, Plan, and Organize), and MEA (Monitoring, Evaluate, Assess)

The domain processes observed were APO01 (Manage the IT Management Framework) process, MEA01 (Monitor, Evaluate, and Assess Performance and Conformance), and APO07 (Manage Human Resources). Obtained using the AHP methodology, the goal was also to determine the current maturity of IT governance and to improve IT governance at The Communication and Information Office of Serang.

II. LITERATURE REVIEW

A. Information Technology Audit

An Information Technology audit is the examination and evaluation of an organization's information technology infrastructure, applications, data use and management, policies, procedures, and operational processes against recognized standards or established policies. The audit can provide information related to the level of asset security, maintaining data integrity, encouraging the achievement of organizational goals effectively, using resources efficiently, knowing the level of information technology maturity, and producing recommendations for achieving optimal maturity levels [6].

B. COBIT 5

COBIT 5 is a set of a set best practice (framework) for IT management that consists entirely: an executive summary, framework, control objectives, audit guidelines, implementation toolsets, and management

guidelines that are very useful for the strategic information system process [7]. COBIT 5 consists of a set of process performance indicators and process capability. The indicators used as a basis for gathering objective evidence that allows assessors to determine ratings such as rating scaled and capability levels and process attributes [8].

Each process attribute assessed by using the standard rating scale defined in the ISO/IEC 15504 standard. Further explanations of the rating scale are in the following in Table I.

TABLE I
RATING SCALE

Abbreviation	Description	%Achieved
N	Not achieved	0-15% achievement
P	Partially achieved	>15%-50% achievement
L	Largely achieved	>50%-85% achievement
F	Fully Achieved	>85%-100% achievement

Table II explains the capability levels and process attributes in COBIT 5. Capability levels and process attributes in the process assessment model include six capability levels and nine process attributes based on achieving process attributes.

TABLE II
CAPABILITY LEVELS AND PROCESS ATTRIBUTE

ID	Capability Levels and Process Attribute
Level 0	Level 0: Incomplete Process
Level 1	Level 1: Performed Process
PA 1.1	Process Performance
Level2	Level 2: Managed Process
PA 2.1	Performance Management
PA 2.2	Work Product Management
Level 3	Level 3: Established Process
PA 3.1	Process Definition
PA 3.2	Process Deployment
Level 4	Level 4: Predictable Process
PA 4.1	Process Measurement
PA 4.2	Process Control
Level 5	Level 5: Optimizing Process
PA 5.1	Process Innovation
PA 52.	Process Optimization

C. Analytical Hierarchy Process

Analytic hierarchy process is a method for solving a compliated situation that is not structured into several components in a hierarchical arrangement, by giving a subjective value about the relative importance of each variable, and determining which variable has the highest priority to influence the outcome of the situation.

III. RESEARCH METHOD

The method used in this research at Communication and Informatics Office of Serang based on COBIT 5 framework is as follows:

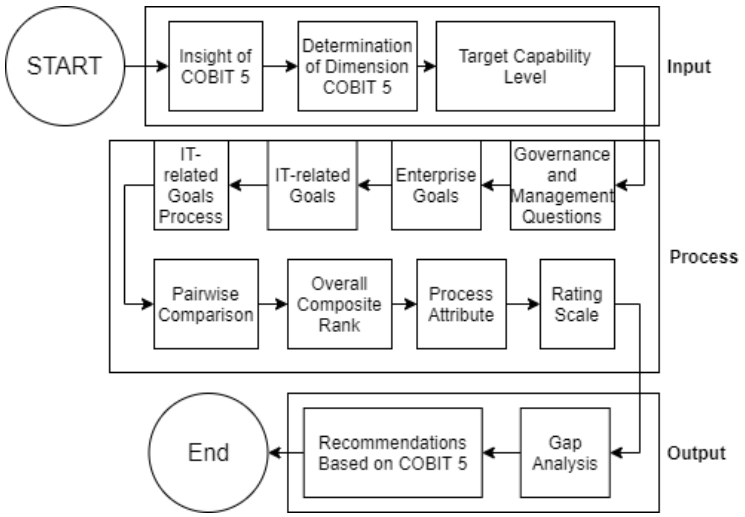

Fig. 1. Conceptual Model

A. Input

This research was started by conducting a Focus Group Discussion (FGD) with parties from the Communication and Informatics Office of Serang. The FGD was to equalize the perception of COBIT 5, followed by explaining the BSC Dimension that used for the cascading goals process. BSC Dimension emphasized in this research was the internal dimension, and the target capability level that the Communication and Informatics Office of Serang wanted to achieve was level 2.

B. Process

After determining the BSC Dimension, the next process was mapping the needs of the Communication and Informatics Office of Serang by Governance and Management Questions. The question provided by COBIT 5 was, "Am I enough people for IT? How do I develop and maintain their skills? How do I manage their performance?". These are questions mapped to Enterprise Goals (EG) on the internal dimension, selected enterprise goals 12 and 14, which are in Table III.

TABLE III
ENTERPRISE GOALS

Enterprise Goals	Description of Enterprise Goals
12	Optimization of business process cost
14	Operational and staff productivity

After getting the selected EG, the next process was to map the EG to IT-Related Goals (ITRG), which had an intense connection between the purpose of the Communication and Informatics Office of Serang with marked Primary (P). From the 17 existing ITRG, the ITRG selected in internal dimensions is in Table IV below.

TABLE IV
ITRG

ITRG	Description of ITRG
11	Optimization of IT assets, resources, and capabilities

After setting ITRG number 11, proceed with mapping the ITRG to the process domain. The selected process domains are APO01, APO03, APO04, APO07, BAI04, BAI09, APO07, EDM04, DSS01, DSS03, and MEA01. All selected process domains are in the internal dimension.

The next process was determining the value for the internal and three other dimension criteria. The criteria are financial, customer, and learning and growth dimensions. The two criteria determined to find out the comparison between the criteria support for internal dimensions and 3-dimensions criteria. The comparison of these criteria used the L. Saaty rating scale. A value of 3 is for the internal dimension, and a value of 1 is for the three dimensions. Here is a comparison table between the internal dimensions and 3-dimensions criteria.

TABLE V
PRIORITY VALUE

Internal Dimension	3-Dimension
3	1

Then, the next was to proceed with the pairwise comparison by comparing each criterion in Table V. The following are the results of the pairwise comparison between the internal dimension and 3-dimensions criteria.

TABLE VI
PAIRWISE COMPARISON RESULTS

Criteria	Internal Dimension	3-Dimensions
Internal Dimension	3/3 = 1	3/1 = 3
3-Dimensions	1/3 = 0.33	1/1 = 1
Total	1.33	4

After getting the pairwise comparison results, normalization of Table VI done by dividing the value in each cell by the value of the number of columns. The sum of each column is 1. Then, there is a determination of the Priority Vector value, Principal Eigen Value (λmax) of each criterion, Consistency Index (CI), and Consistency Ratio (CR) to find out the consistency of the AHP process in the first hierarchy. Last, the placement of the results is in the following table.

TABLE VII
CAPABILITY LEVELS AND PROCESS ATTRIBUTE

Criteria	Internal Dimension	3-Dimensions	Priority Vector	λmax	CI	CR
Internal Dimension	0.75	0.75	0.75	2	0	0
3-Dimensions	0.25	0.25	0.25			
Total	1	1	1			

After getting the results from Table VII, the next step was to determine the value of each equation criteria using the equation (formula above) by calculating the Primary predicate (P) with a value of 1. Then, the secondary (S) with a value of 0.5 [9] of each process selected from ITRG went through the cascading goals stages of COBIT 5. The following are the results of the equation criteria values in the chosen process domain.

TABLE VIII
VALUE OF PROCESS DOMAIN CRITERIA

No	COBIT 5 Process	Internal Dimension	3-Dimensions
1	APO01	0.71	0.55
2	APO03	0.71	0.55
3	APO04	0.5	0.45
4	APO07	0.428571	0.4
5	BAI04	0.5	0.5
6	BAI09	0.428571	0.3
7	EDM04	0.5	0.25

No	COBIT 5 Process	Internal Dimension	3-Dimensions
8	DSS01	0.357143	0.5
9	DSS03	0.428571	0.45
10	MEA01	0.5	0.4

After getting the results of each process domain criteria values, the next step was to proceed with finding the compose weight value of each selected process domain. The following are the compose weight results for each selected process domain.

TABLE IX
COMPOSE WEIGHT RESULTS

Criteria	Internal Dimension	3-Dimensions	Compose Weight
APO01	0,13	0,12	0,1295699
APO03	0,09	0,10	0,0941935
APO04	0,08	0,09	0,0815054
APO07	0,09	0,11	0,0968817
BAI04	0,08	0,06	0,076129
BAI09	0,08	0,05	0,0734409
BAI10	0,09	0,05	0,0834409
EDM04	0,07	0,11	0,0768817
DSS01	0,08	0,10	0,0841935
DSS03	0,09	0,09	0,0915054
MEA01	0,11	0,13	0,1122581
Total	1,0	1,0	1,0

Besides, obtained the results of ranking in Table IX, the top 3 ranking process domains used for research were the domain processes of APO01, APO07, and MEA01. Moreover, its use is to audit against IT governance in The Communication and Information Office of Serang [11].

C. Output

After obtaining the selected process domain using the AHP method, the next process proceeded with the audit process by collecting evidence or artifacts in the Communication and Information Office of Serang then comparing it with those in COBIT 5. After that, the next step was to compare the current capability level with the target capability level of IT governance Communication and Information Office of Serang to find whether there were gaps or not. If there were gaps, there would be recommendations given based on COBIT 5.

IV. RESULTS AND DISCUSSION

A. Capability Measurement

The following are the audit process assessment results from Table X, Table XI, and Table XII. APO01, MEA01, and APO07 domains conducted at the Communication and Information Office of Serang based on the evidence or artifacts in the Communication and Information Office of Serang

TABLE X
APO01 Test Result

Process Attribute (PA)	Base Practices (%BPs)								Outcomes (%Os)	Percentage	Rating	Level
1.1	BP 01 = 100 %	BP 02 = 66,67%	BP 03 = 50%	BP 04 = 100 %	BP 05 = 75%	BP 06 = 100 %	BP 07 = 50%	BP-08 = 66.67%	OS-01 = (BP01+BP02+ BP03+BP04)/4 OS-01 = (100%+66.67% +100%+100%)/4 = 91.67% OS-02 = (BP05+BP06+ BP07+BP08)/4 OS-02 = (50%+75%+ 50%+66.67%)/4 = 60.42%	(91.67% +60.42%)/2 = 76.05%	L	2
2.1	Base Practices (%BPs)								Percentage		Rating	
	GP 2.1.1 = 100%	GP 2.1.2 = 100%	GP 2.1.3 = 100%	GP 2.1.4 = 50%	GP 2.1.5 = 100%	GP 2.1.6 = 0%			(100%+100%+100%+50%+100%+0%)/ 6 = 75%		L	
2.2	Base Practices (%BPs)								Percentage		Rating	
	GP 2.2.1 = 100%		GP 2.2.2 = 50%		GP 2.2.3 = 100%		GP 2.2.4 = 100%		(100%+50%+100%+100%)/4 = 87.5%		F	

TABLE XI
MEA01 Test Result

Process Attribute (PA)	Base Practices (%BPs)						Outcomes (%Os)	Percentage	Rating	Level
1.1	BP01 = 75%	BP02 = 100%	BP03 = 66.667%	BP04 = 100%	BP05 = 50%		OS-01 = (BP01)/1 OS-01 = 75% OS-02 = (BP02)/1 OS-02 = 62.5% OS-03 = (BP03)/1 OS-03 =66.67% OS-04 = (BP04)/1 OS-4 = 100% OS-05 = (BP05)/1 OS-05 = 50%	(75%+62.5%+ 66.67%+ 100%+ 50%)/5 = 70.83%	L	1
2.1	Base Practices (%BPs)						Percentage		Rating	
	GP 2.1.1 = 50%	GP 2.1.2 = 50%	GP 2.1.3 = 0%	GP 2.1.4 = 100%	GP 2.1.5 = 50%	GP 2.1.6 = 0%	(50%+50%+0%+ 100%+50%+0%) /6 = 41.7%		P	
2.2	Base Practices (%BPs)						Percentage		Rating	
	-						-		-	

TABLE XII
APO07 Test Result

Process Attribute (PA)	Base Practices (%BPs)						Outcomes (%Os)	Percentage	Rating	Level
1.1	BP01 = 50%	BP02 = 33.33%	BP03 = 100%	BP04 = 100%	BP05 = 50%	BP 06 = 100%	OS-01 = (BP01+BP05+BP06)/3 OS-1 = (50+50+100)/3 = 66.67% OS-02 = (BP02+BP03+BP04)/3 OS-2 = (33.33%+100%+100%)/3 = 77.78%)/	(66.67 + 77.78%)/2 = 72.23%	L	1
2.1	Base Practices (%BPs)						Percentage		Rating	
	GP 2.1.1 = 0%	GP 2.1.2 = 0%	GP 2.1.3 = 0%	GP 2.1.4 = 50%	GP 2.1.5 = 100%	GP 2.1.6 = 0%	(0%+0%+0%+ 50%+100%+0%) /6 = 25%		P	
2.2	Base Practices (%BPs)						Percentage		Rating	
	-						-		-	

Based on the results in Table X, Table XI, and Table XII, from the three audited process domains, the percentage in PA 1.1 gets a percentage value> 50%, which means that the three process domains have a rating scale largely achieved (L). Each process domain gets a percentage value for APO01 76.05%, MEA01 70.83%, and APO07 72.23%. According to the process attribute ratings, for level 1, if the Attribute Process 1.1 gets the rating mostly (> 50% -85%) or fully (> 85% -100%), it can continue to the next PA. According to PA 2.1 APO01 75%, MEA01 41.7%, and APO07 25%, the APO01 process domain can proceed to PA 2.2 because it has received the rating largely achieved (L). On the other hand, the MEA01 and APO07 process domains cannot be continued because they do not qualify for PA 2.2.

B. Gap Analysis

After analysis, there was a gap between the current capability level and the target capability level in the audited domain. It was in the MEA01 and APO07 domains. The following are the gaps found in Table XIII.

TABLE XIII
Analysis Gap

Domain	Current Capability Level	Target Capability Level	Gap
APO01	2	2	0
MEA01	1	2	1
APO07	1	2	1

C. Recommendation

The recommendations are given to all domains to get more optimal IT benefits and maximum value. The given recommendations based on COBIT 5 of the Work Product (WP) and Generic Work Product (GWP) of each domain audited in Table XIV for APO01, Table XV for MEA01 and Table XVI for APO07.

TABLE XIV
RECOMMENDATION FOR APO01

Process Attribute (PA)	Work Product (WP) /Generic Work Product (GWP)	Description
1.1	APO01-WP2	Create a document about Non-compliance remedial actions.
	APO01-WP4	Create a document about the operational placement of IT function.
	APO01-WP9	Create a document about the supervisory practices.
	APO01-WP11	Create a document about Process improvement opportunities.
2.1	APO01-GWP1.4	Create a document about The process roles in detailing and the roles of suppliers and inputs, outcomes, and customers relating to the IT Management Framework.
	APO01-GWP1.6	Create a document about RACI graphics relating to the IT Management Framework.
2.2	APO01-GWP1.7	Create a document about the internal control matrix relating to the IT Management Framework.

TABLE XV
RECOMMENDATION FOR MEA01

Process Attribute (PA)	Work Product (WP) / Generic Work Product (GWP)	Description
1.1	MEA01-WP1	Create a document about monitoring requirements.
	MEA01-WP5	Create a document about performance reports relating to monitor, evaluate, and assess performance and conformance.
2.1	MEA01-GWP1.4	Create a document about the process roles of input and outcome relating to monitor, evaluate, and assess performance and conformance.
	MEA01-GWP1.6	Create a document about RACI graphics relating to monitor, evaluate, and assess performance and conformance.
	MEA01-GWP2.1	Create a document about process performance objectives related to monitor, evaluate, and assess performance and conformance.
	MEA01-GWP4.1	Create a document about records of the review of the requirements and actions taken to provide evidence during the required quality control and inspection relating to monitor, evaluate, and assess performance and conformance.
2.2	MEA01-GWP3.2	Create a document about work product content related to monitor, evaluate, and assess performance and conformance.
	MEA01-GWP3.3	Create a document about the identification of all work products, the structure and the expected content relating to monitor, evaluate, and assess performance and conformance.
	MEA01-GWP2.4	Create a document about the documentation of work products relating to monitor, evaluate, and assess performance and conformance
	MEA01-GWP3.5	Create a document about the work product changes the control, version, and configuration management requirements relating to monitor, evaluate, and assess performance and conformance

TABLE XVI
RECOMMENDATION FOR APO07

Process Attribute (PA)	Work Product (WP) / Generic Work Product (GWP)	Description
1.1	APO07-WP1	Create a document about staffing requirement evaluations.
	APO07-WP3	Create a document about personnel sourcing plans.
	APO07-WP4	Create a document about skills and competencies matrix.
	APO07-WP10	Create a document about the inventory of business and IT human resources.
	APO07-WP12	Create a document about resource utilization records.
2.1	APO07-GWP1.3	Create a document about a clear statement of where the process begins and ends relating to managing human resources.
	APO07-GWP1.4	Create a document about detailed input-output processes relating to managing human resources.
	APO07-GWP1.6	Create a document about RACI graphics relating to manage human resources.
	APO07-GWP2.1	Create a document about process performance objectives relating to manage human resources.
	APO07-GWP9.1	Create a document about records of the review of the requirements and actions taken to provide evidence during the required quality control and inspection relating to manage human resources.
	APO07-GWP4.1	Create a document about records of reviews of requirements and actions taken to provide evidence during the required quality control and inspection relating to human resource management.

Process Attribute (PA)	Work Product (WP) / Generic Work Product (GWP)	Description
2.2	APO07-GWP3.2	Create a document about work product content relating to manage human resources.
	APO07-GWP3.3	Create a document about the identification of all work products, the structure and the expected content relating to manage human resources.
	APO07-GWP3.5	Create a document about the work product changes the control, version, and configuration management requirements relating to manage human resources.
	APO07-GWP4.1	Create a document about the internal control matrix relating to manage human resources.

V. CONCLUSION

The Communication and Information Office of Serang has not been able to achieve the targeted level that is level 2 in the MEA01 process domain and APO07 because the domain has only achieved level 1. MEA01 and APO07 process domains are only able to make PA 2.1 with a rating scale partially achieved (P) so that it cannot continue the process to PA 2.2 while the APO01 process domain has reached PA 2.2 with rating fully achieved (F).

In the implementation of the APO01 process domain, there is evidence of a systematic approach and significant achievements of the process. However, there are still insignificant weaknesses, proof of a systematic and complete procedure, as well as the full achievement of the process.

For the MEA01 and APO07 implementation, there is evidence of a systematic approach and significant achievements of the process. Although there are still insignificant weaknesses and the evidence regarding the procedure and progress of the process partially achieved.

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