IT Governance Improvement at Communication and Information Office using COBIT 5

Evita Negara Putri, I Made Sukarsa, Anak Agung Ngurah Hary Susila

Abstract*: Application of information technology in government institution, including the departments where this case study was conducted, is an attempt to improve the transparency and quality of internal and external services. The employment of information technology aims to support the vision, mission and goals of the organization with good governance. Good governance management requires an audit to determine if the organization's performance is in accordance with the designated goals, vision and mission. The audit procedure performed by COBIT 5 which starts with identifying the work indicators listed in the Regional Medium-Term Development Plan (RMDP), identification of business objectives, identification of IT objectives, IT processes, data collection through questionnaires. Results of audit, showed that the capability level of five IT processes were within low value level, namely APO04 at level 1, APO07 at level 1, BAI01 at level 2, APO08 at level 2, and EDM05 at level 1. These results were indicating a presence of GAPs between expected organizational achievements and the current situation. By employing several best practice standards, this audit established several recommendations to improve maturity level including alignment between business objectives and IT objectives as well as IT processes.

***Keywords*: Audit, IT Governance, Information Technology, COBIT 5**

I. INTRODUCTION

The advancement of information technology is currently growing rapidly and affects all aspects of today's lifestyle. The use of technology is also applied in companies or organizations as one of the assets that can be relied upon to achieve the vision, mission and goals of the organization [1]. The Office of Communication, Information and Statistics is one of the institutions that employ information technology to improve government performance towards *good governance* with good IT governance. IT governance is a process that links structures and processes within organizations [2] ,[3]. IT governance includes leader responsibility to control IT implementation [4]. The objective of IT governance is to ensure that IT supports the organizational goals and strategies [5], [6].

Management of an Office of Communications, Informatics and Statistics in Indonesian municipalities towards *good governance* is supported by effective governance. Moreover, effective governance will then help the organization to achieve its mission and vision, and able to gives better public services by implementing e-government. Effective IT governance includes the conformity between IT investment and bussines priority to encourage transparency, accountability, dan timely decision making [7], [8], therefore IT governance audit is required to objectify good governance in Department of Communications, Informatics and Statistics in Indonesian municipalities. Evaluation includes ogranizational objectives and listed on the work plan. The work plan consists of organizational programs to achieve objectives. Governance audit aims to determine the suitability levels between the designed information technology and the efficieny and efficacy of its implementation [9]. The framework employed in audit process was COBIT 5.

COBIT is published by ISACA to manage companies and organizations IT governance [10], [11], [12]. COBIT is a useful tool in addressing gaps in bussiness processes in companies of various size [13], [14], and assist auditor in idetifiying control issues [15], [16]. COBIT 5 consists of five IT processes that support the achievement of organizational goals [17], [18]. COBIT 5 determines the gap between current and expected maturity [19], [20], [21]. Therefore the presence of governance audits may be employed as a benchmark for service achievement by understanding the capability level and providing governance improvement recommendations that may be employed as a starting point of improvement efforts and actualize Communication, Informatics and Statistics Office's good and quality governance.

II. METHODOLOGY

Research methodology is a predetermined step in conducting research. The stages of the audit process conducted at the Office of Communication, Informatics and Statistics framework are presented in Fig.1.

Revised Manuscript Received on May 06, 2020.
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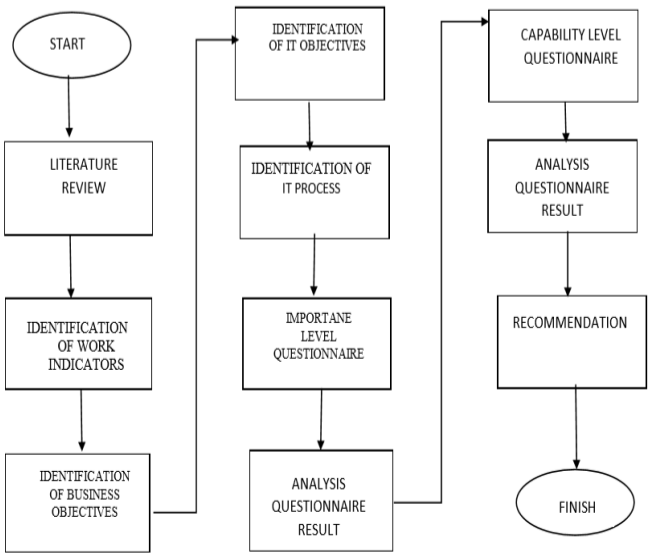

Fig. 1. Stage of Audit Process

Fig.1 is a *flowchart* of the audit research phase aims to determine the capability level of a Communication, Informatics and Statistics Office in Indonesian municipality. The initial audit process was literature study through scientific journals and literatures. The second step was work indicators identification. Work indicators are the scope of evaluation investigated in audit research. Work indicators were derived from organizational vision and mission. Vision and missions define long term comprehensive company purpose. Audit research employed a vision and mission derivative namely the Regional Medium-Term Development Plan (RMDP) as an audit process. This was decided by considering that medium-term development plan depict organizational goals based on priority scale in five-years timeline, therefore the audit scope of certain vision and mission could be narrowed down.

The subsequent step was domain determination including the mapping of business objectives identification, IT objectives identification, dan IT processes identification based on COBIT 5 guideline. Business objectives identification was a mapping of the working indicators with the business objectives owned by the COBIT 5. IT objectives identification was a mapping of the business objectives with IT objectives. IT processes was a mapping of the IT objectives with IT processes that are in line with work indicators. The last step was importance level determination by importance level questionairre. The importance level questionairre analysis results were employed as maturity level determination process to determine capability level and GAP, as a reference to establish.

III. RESULT AND ANALYSIS

Results and Discussion are detailed descriptions of study results conducted at a Municipal Communication, Informatics and Statistics Office in Indonesia.

A. Identification of Work Indicators

Work indicators were evaluation scope evaluated in the audit research. Work indicators are derived from organizational vision and missions. The organizational vision and missions were established as a company guideline to achieve goals. The current study obtained work indicators through vision and missions implementation documentation as listed on Regional Medium-Term Development Plan (RPMDP). Work indicators evaluated in the current study are presented on Table 1.

Table- 1: Work Indicators

No	Work Indicators
1	Percentage of Office Administration Service compliance
2	Percentage staffs' facilities and infrastructure requirement compliancet
3	Percentage of staffs attending technical leadership program
4	Percentage of public opinion on public services performance on official websites.
5	Percentage of online public complaints followed up by regional organizations in timely manner
6	Percentage of integrated Public Service Applications or Information Systems
7	Percentage of Communication, Informatics Technology service coverage escalation
8	Number of Information Systems Innovations in public services
9	Percentage of public informatics services through media collaboration escalation
10	Availability of regional data and information within the Government body.

Table 1 presents a description of the work indicators listed in the 2016-2021 RMDP. The table contains 10 work indicators. Work indicators are mapped with business objectives therefore IT processes were in accordance with the current organizational condition.

B. Identification of Business Objectives

The identification of business objectives was an audit stage conducted through Communication, Informatics and Statistics Office work indicators mapping with business objectives listed on *the* COBIT 5 *framework*. The results of the mapping between work indicators and business objectives according to COBIT 5 are presented on on Table 2.

Table- 2: Business Goals Mapping Result

No	**Work Indicators**	**Business Objectives**	
1	Percentage of Office Administration Service compliance	11	Optimisation of business process functionality
2	Percentage staffs' facilities and infrastructure requirement compliance	11	Optimisation of business process functionality
3	Percentage of staffs attending technical leadership program	16	Skilled and motivated people
4	Percentage of public opinion on public services performance on official websites	6	Customer oriented service culture
5	Percentage of online public complaints followed up by regional organizations in timely manner	6	Customer oriented service culture
6	Percentage of integrated Public Service Applications or Information Systems	13	Managed business change programmes
7	Percentage of Communication, Informatics Technology service coverage escalation	17	Product and business innovation culture

8	Number of Information Systems Innovations in public services	17	Product and business innovation culture
9	Percentage of public informatics services through media collaboration escalation	11	Optimisation of business process functionality
10	Availability of regional data and information within the Government body.	11	Optimisation of business process functionality

Table 2 presents the results of work indicators to business objectives mapping. The mapping results were based on 10 work indicators with 17 business objectives mapping which were divided into four perspectives and selected based on its compatibility with work indicators on business processes. The results of work indicators with business objectives mapping produce 5 business objectives based on COBIT 5.

C. Identification of IT Objectives

The identification of IT objectives was a stage in the IT process by implementing the business objectives mapping results obtained with IT objectives. The process of business objectives with IT objectives mapping aims to determine the business requirements of IT availability.

Table- 3: Business Goals Mapping Result

No.	Business Objectives	No.	IT objectives
6	Customer oriented service culture	1	Adjustment between IT and business strategy
		7	Give IT services based on the business' needs
11	Optimisation of business process functionality	1	Adjustment between IT and business strategy
		7	Give IT services based on the business' needs
		8	A satisfaction in using an application, information, and technology solution.
13	Managed business change programmes	1	Adjustment between IT and business strategy
		13	Promote a program that gives advantages, on the right time, based on the budget allotment, and accordance with the requirements and quality standard
16	Skilled and motivated people	16	Promote IT staffs who are competence and have motivation in business
17	Product and business innovation culture	9	Dexterity in IT
		17	Have knowledge, skills, and initiative to be innovated in running a business to create an opportunity

Table 3 presents the results of business objectives mapping to IT objectives. The results of work indicators with business objectives mapping produced four business objectives, namely business objectives number 6, number 11, number 13, number 16 and number 17. The obtained business objectives were subsequently mapped with IT objectives, therefore establish IT objectives related to organizational requirements. Business goal number 6 equivalent with IT objectives 1 and 7. Business objective number 11 equivalent to IT objectives 1, 7, and 8. Business objective number 13 equivalent to IT objectives 1 and 13. Business objective number 16 equivalent to IT objectives 16 and business objective number 17 equivalent to IT objectives 9 and 17.

D. IT Processes Identification

The identification of IT processes was a step performed after establishing the organizational IT objectives. This identification includes a mapping of IT objectives with IT processes that are in line with work indicators. The COBIT 5 Framework is equipped by mapping between IT objectives and interrelated IT processes.

Table- 4: IT Process Mapping Result

No	Domain	IT objectives	Work Indicators
1	EDM 02	Ensure Risk Optimisation	Percentage of Office Administration Service compliance
2	BAI 04	Manage availability and capacity	Percentage staffs' facilities and infrastructure requirement compliance
3	APO 07	Manage human resource	Percentage of staffs attending technical leadership program
4	DSS 03	Manage problems	Percentage of public opinion on public services performance on official websites.
5	APO 11	Manage quality	Percentage of online public complaints followed up by regional organizations in timely manner
6	BAI 01	Manage programmers and projects	Percentage of integrated Public Service Applications or Information Systems
7	APO 09	Manage service agreements	Percentage of increase in coverage of Information Technology infrastructure services capacity.
8	APO 04	Manage innovation	Percentage of Communication, Informatics Technology service coverage escalation
9	APO 08	Manage relationship	Percentage of public informatics services through media collaboration escalation
10	EDM 05	Ensure Stakeholder transparency	Availability of regional data and information within the Government body.

Table 4 is a description of IT process re-mapping with work indicators at the Office of Communication, Informatics and Statistics. The mapping process aims to limit and produce IT processes that are correlated with work indicators.

E. Determination of Importance Level

Determination of Importance level was the stage of audit process conducted by distributing questionnaires to respondents who hold responsibility for certain work indicators in a Communication, Informatics Office of Denpasar, Indonesia.

No	Question	VI	I	IE	U	VU
1	The fulfilment of office administration services in the Office, so it can run effectively and efficiently.					
2	The fulfilment of employee infrastructure facilities in the Office.					
3	Most employees have attended training so that they have received certification, such as staffing training.					
4	Public opinion on the performance of government public services on the website					
5	Online complaints service process that is followed up on time through web or mobile services with 2x 24 hours.					
6	Improvement of public informatics services through media collaboration in order to realize the ease of accessing public information.					
7	Availability of regional data and information that can be accessed by the general public through the Bank Data					
8	Availability of an integrated public service application or information system.					
9	Increased coverage of IT infrastructure service capacity that supports public services such as the existence of fibre optic in the area of public services.					
10	An increasing number of public service information systems innovation in order to provide convenience in society.					

Fig. 2. Stage of Audit Process

Fig.2 is an importance questionnaire design consists of 10 questions. The importance level questionnaire has 5 levels including very unimportant, unimportant, important enough, important, and very important. The questionnaire produced the 5 highest IT process domains. The results of determining the highest IT process domain are presented in Table 5.

Table- 5: Domain Calculation

Domain		
APO 04	Manage innovation	Number of Information Systems Innovations in public services
APO 07	Manage human resource	Percentage of staffs attending technical leadership program
BAI 01	Manage programmers and projects	Percentage of integrated Public Service Applications or Information Systems
APO 08	Manage relationship	Percentage of public informatics services through media collaboration escalation
EDM 05	Ensure Stakeholder transparency	Availability of regional data and information within the Government body.

The domains were 5 domains with the highest value based on the calculation of impotance. The domains were obtained based on the alignment of critical points with business objectives, business objectives with IT objectives, IT objectives with IT processes and the results of the questionnaire of importance so as to produce a domain that will be employed at the later stage.

F. Determination of Capability Level

Determination of capability level is conducted by delivering questionnaires based on 5 selected domains in the level of importance process. The questionnaire was designed and adjusted with the constitutions' condition.

Table- 6: Capability Level Determination

No	Level	**APO 07** *Manage human resource.* Technical training is necessary for staffs in order to improve skills and competance *Provide structured approach to ensure optimal organization including communicating the designated role and responsibility, learning and growth plan, performance expectation, supported by competentand motivated staffs	Value (0-100)
1	1.1	a. Staffs role and responsibility in accordance with organizational structure of Communicaton, Informatics and Statistics Office b. Staffs possess the required skills and competence to achieve Communicaton, Informatics and Statistics Office objectives c. Staffs performance reviewed and evaluated periodically to achieve company obejectives	

Table 6 is a model of APO07 capability level questionnaire referring to the PAM document using COBIT 5 Toolkit. The questionnaire consists of 5 levels, namely level 1 to level 5. Each level on the questionnaire contains explanations and characteristics so as to facilitate respondents in determining the appropriate answer to each level.

G. GAP

GAP is discrepancy value, defined as the difference between the curent capability and expected capability. The GAP results are presented in table 7.

Table- 7: GAP Capability Level

Domain	Curent Capability	Expected Capability	GAP
APO 04	1	5	4
APO 07	1	5	4
BAI 01	2	5	3
APO 08	2	5	3
EDM 05	1	5	4

Table 7 shows the target capability at the Office of Communications, Informatics, and Statistics. Curent Capability is the current maturity value which is assessed based on a maturity questionnaire with COBIT 5 guidelines. Expected capability is a target capability levels expected by the related Office and GAP is the discrepancy value is of curent capability and expected capability. Spider chart gap capability level of an Office of Communications, Informatics and Statistics at a municipality in Indonesia as follows.

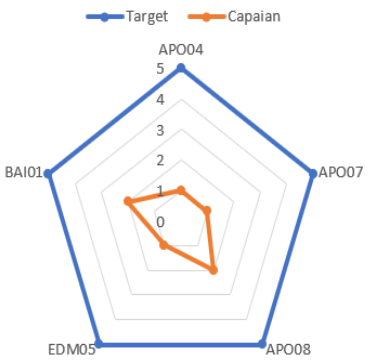

Fig. 3. Stage of Audit Process

The *spider chart* that addresses the *gap capability level* at the Communication, Informatics and Statistics Office. Evaluation of the measurement of IT governance capabilities using the COBIT 5 framework with domains APO04, APO07, BAI01, APO08 and EDM05. The blue line on the chart refers to the target to be achieved by the Communication, Informatics and Statistics Office, while the orange line shows the measured current performance conditions. The evaluation results showed that the APO 04 domain that is processing innovation, currently at level 1 with GAP *capability* of 4. APO07 that is processing resources was at level 1 with GAP capability of 4. The BAI01 domain related to managing programs was at level 2. The APO08 process was at level 2 with GAP of 3 and the EDM05 process was at level 1 with GAP 4. Based on the results, recommendations for resolving GAP discrepancy were adjusted to the PAM standard using COBIT 5 Toolkit-COBIT 5 Self Assessment Templates and recommendations from COSO Internal Control Framework and ITIL as additional recommendation and improvements. Improving the level of each process is performed per stage to achieve structured achievements. The following are recommendations for improving each process.

Table- 8: Recommendation for BAI02

No	Level BAI01 Existing Condition Achievements	
a	Explanation	The Communication, Informatics and Statistics Office has not perform an identification of integrated public services application performance objectives
	Management Recommendations	Develop a roadmap for each integrated public service application so that the results of development employ targeted technology. (COBIT 5 Enabling Process)
		Document the definition and description of services for each service with all relevant parties so that objectives are clearly defined. (ITIL-Service Design, p.103)
b	Explanation	The resources and information needed to carry out the process of managing integrated public service applications have not yet been identified, available, and employed optimally.
	Management Recommendations	Establish IT skills matrix to identify the roles of staff based on skills and roles so that they support the management of integrated public service applications. (COBIT 5 Enabling Process)
		It is necessary to apply the Skills Framework for the Information Age as a reference for managing the skills and competencies of staff and planning for future skills needs related to IT. (ITIL-Service Design, p.270)
	Operational Recommendations	Conducting scheduled training related to IT for staff to improve competence and professionalism. (ITIL-Service Design, p.270)

Table 8 is an improvement recommendation for level 2 performance improvement from BAI01 to meet the target and level up to level 3.

Table- 9: Recommendation for APO07

No	Existing Level 1 APO07 Conditions Achievements	
a	Explanation	The skills and abilities possessed by employees are not yet optimal in accordance with the roles and tasks required to achieve the objectives of the Communication, Informatics and Statistics Office.
	Operational Recommendations	A meeting is needed to evaluate the requirements regarding the recruitment of employees in order to achieve adequate human resources to support the goals of the organization based on applicable policies. (COBIT 5 Enabling Process)
		Develop a training program that is technical training that is scheduled, directed and evenly based on the requirements of the organization in each field to improve the quality of human resources. (COBIT 5 Enabling Process)
	Management Recommendations	It is necessary to determine work size based on the goals and targets of the organization. (COSO Internal Control Framework, Establishes performance measures, incentives, and rewards)
		It is necessary to provide awards or *rewards* that support employee performance improvement. (COSO Internal Control Framework, Establishes performance measures, incentives, and rewards)
b	Explanation	Employee performance is reviewed and evaluated periodically to achieve company goals.
	Management Recommendations	It is necessary to perform a review and monitoring to understand the achievement of work targets reflects the achievement of organizational goals. (COBIT 5 Enabling Process,)
	Operational Recommendations	Establish a team to conduct a performance evaluation after a technical trainin is held to facilitate the competency evaluation process and overcome employee performance gaps. (COSO Internal Control Framework, Evaluates competence and addresses shortcomings)

Table 9. is an improvement recommendation to improve level 1 performance from APO07 to meet targets and level up to level 2.

Table- 10: Recommendation for APO08

No	Existing Level 2 APO08 Conditions Achievements	
a	Explanation	Communication, Informatics and Statistic Office has not determined through requirements in the process of media collaboration to archieve outputs that result from employment of social media.

	Management Recommendations	It is necessary to identify technological trends that are applied to society at the current era, therefore the employment of technology as media cooperation is accurate and supports the connecting process between the community and the institution. (COBIT 5 Enabling Process)
	Operational Recommendations	It is necessary to conduct a collaboration through communication to the communities in the process of IT service initiatives planning to ensure harmony and in accordance with community needs through online media. (COBIT 5 Enabling Process)
		It is necessary to establish a special team in identifying profiles of service users, namely the community, by analyzing service usage patterns, therefore the services provided are easily received from various types of users. (ITIL-Service Strategy, p.245)
b	Explanation	Monitoring and measurement of media collaboration so as to document the extent to which the performance of Denpasar City public media collaboration has not been performed optimally
	Operational Recommendations	Gives the opportunity to submit suggestions and complaints to the community through social media posts by suggestions and complaints content of Denpasar City every weekend.
		Conduct regular online community satisfaction surveys regarding the use of social media as a means of communication and information dissemination in Denpasar City. (ITIL-Service Design, p.117)
	Management Recommendations	Develop key performance indicators to facilitate the institution's social media programs success evaluation based on the agreed objectives (ITIL-Service Design, p.117)

Table 10 is a recommendation for improvement to improve level 2 performance of APO08 to meet targets and level up to level 3.

Table- 11: Recommendation for APO04

No	Milestone Existing Level 1 APO04 Conditions	
a	Explanation	The Communication and Information Agency has not fully realized the value of the organization through qualifications and mapping the progress of innovation and the most appropriate technology as IT solutions.
	Operational Recommendations Recommendations	Providing infrastructure or a forum for cross-functional that is creating discussion programs from different fields to exchange ideas. (COBIT 5 Enabling Process)
		Form a team to analysis of opportunities that occur in the community so as to produce a new innovation idea. (COBIT 5 Enabling Process)
	Management Recommendations Recommendations	Create a conducive work environment and provide opportunities for staff to brainstorm so as to produce creative ideas. (COBIT 5 Enabling Process)
		Need to provide feedback or appreciation to staff so that they are more motivated to come up with ideas. (COSO, Evaluates performance and rewards or disciplines individuals)

Table 11 is an improvement recommendation for improving level 1 performance from APO04 to meet targets and level up to level 2.

Table- 12: Recommendation for EDM05

No	Level 1 EDM05 Existing Condition Achievements	
a	Explanation	Data Bank employment to bridge information dissemination that corresponds the society needs
	Operational Recommendations	Form and direct a communication strategy between the relevant regional staff organizations, in order to provide accurate information to the community. (COBIT 5 Enabling Process)
	Management Recommendations	Scheduled information reporting mechanisms is necessary in order to provide information in a timely manner. (COBIT 5 Enabling Process)
	Operational Recommendations	Design a mobile application to provide convenient access. (COBIT 5 Enabling Process)
		Evaluation meeting to assess the effectiveness of the accuracy and reliability of information provided at Denpasar Geoportal or Data Bank. (COSO, Considers a mix of ongoing and separate evaluations
		Evaluating application performance through surveys available on the web to determine community satisfaction to the provided service. This may be employed as a reference for improvement. (ITIL-Service Design, p.117)

Table 12 presents improvement recommendations to improve level 1 of EDM05 performance to meet targets and level up to level 2.

IV. CONCLUSION

The conclusions obtained through the research is the audit aims to find out the organization's performance based on its goals. The audit process at the agency where the case study was conducted by identifying the work indicators listed in the Regional Medium-Term Development Plan (RMDP), identification of business objectives, identification of IT objectives, IT processes, data collection through interest level questionnaires and capability level questionnaires. The results of the audit activities by employing the COBIT 5 framework resulted in 5 IT processes at the lowest level based on the capability level questionnaires calculation, namely APO04 at level 1 with GAP capability 4, APO07 at level 1 with GAP capability 4, EDM05 at level 1 with GAP capability 4, BAI01 at level 2 with GAP capability 3, and APO08 at level 2 with GAP capability 3. These results indicate gaps between the expected goals and the current achievements, therefore several recommendations have been established to improve levels in respective process based on several best practice standards, both for operational and managerial levels.

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