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Management and Information Technology Audit Using the COBIT 5 Framework at Archives and Library Department Bali Region

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Abstract: Audit and Information Technology Governance Framework is an assessment that required to alin an organization's bussiness processes with technology of information. Archives and Library Department Bali Region is the government department that tasked to realizing potential archives and library in their valuable management as a vechile for learning and preservation towards BALI MANDARA. Anticipating the occurrence of obstacle such as lack of human resources and infrastructure optimalization to do an archival services and libraries which potentially make procedural errors happened. It is necessary to conduct a governance audit to determine the capability level of IT processes and the level of gaps. The IT's Procsses obtained according to COBIT 5 are EDM 04, APO 06, APO 12, DSS 04, MEA 01. Previously, the domain selection process has been carried out starting from the observation and interview stages to determined the critical point of the department, followed by identification of business objectives with department's critical point, identifixation od IT objectives, identification od IT processes, and level of importance analysis. The results of the IT process capability level obtained for the average current capability at the agency is a performed process while the target capability desired by the agency is a predictable process. The recommendations are given using the ISO 27002 standard which got through mapping IT process on COBOT 5.

Keywords: Audit; IT Governance; IT Audit; COBIT 5; RACI Chart.

1. INTRODUCTION

The use of information technology in government can increase the effectiveness, transparency, efficiency, and accountability of government administration. The implementation of IT governance runs efficiently and effectively if the agency has previously observed the extent to which IT governance has been implemented to the maximum. One of the government agencies that implement IT governance is the Office of Archives and the Bali Regional Library. The Office of Archives and the Bali Regional Library is an agency tasked with realizing potential libraries and archives in the management of valuable libraries and archives as a vehicle for learning and preservation towards Bali Mandara.

The purpose of this study is to obtain the results of the gap level that previously had obtained the capability level analysis results to be able to provide recommendations for improvements that are in accordance with existing problems in the agency in order to improve the existing IT governance in the Archives and Bali Regional Library. The audit was conducted using the COBIT 5 framework. COBIT 5 is a framework that provides standards in a domain framework consisting of a set of IT processes that represent activities that can be controlled and structured. COBIT 5 integrates good practices in managing information technology and provides a framework for IT governance that can help understanding and managing risks and obtaining benefits related to information technology [1].

2. LITERATURE REVIEW

Research conducted by Maskur, Nixon Adolong and Rusliy Mokodongan discusses the implementation of IT governance using the COBIT 5 framework. This research was carried out through the identification of IT objectives and IT processes, then mapped with the COBIT 5 framework. The research is used as a reference to determine the level of capability [2].

Research conducted by Ryan Randy Suryono, Dedi Darwis and Surya Indra Gunawan discussed the IT governance audit at the Lampung Sea Aquaculture Center. The method used is COBIT 5 as a reference for conducting audits. Constraints that occur in the Lampung Center for Aquaculture Fisheries, such as human resources who do not understand the e-SKP application. A thorough audit needs to be carried out to provide appropriate recommendations [3].

Research conducted by the State and Yudha Dwi Putra discusses how to identify the level of IT maturity so that related parties can find solutions to all the problems that exist in the academic information system at the Islamic University of Madura. The framework used is COBIT 5 because the method is more focused on the desired IT processes [4].

Research conducted by Aris Irwanto, Lukito Edi Nugroho and Eko Nugroho discusses the financial information system audit at the Audit Board of the Republic of Indonesia. The problem of auditors being the main focus is the lack of knowledge of human resources in using the information system. The COBIT 5 framework is needed as a reference to anticipate these obstacles [5].

3. RESEARCH METHODS

There are several steps in conducting this research. The stages of the research can be seen in Figure 1.

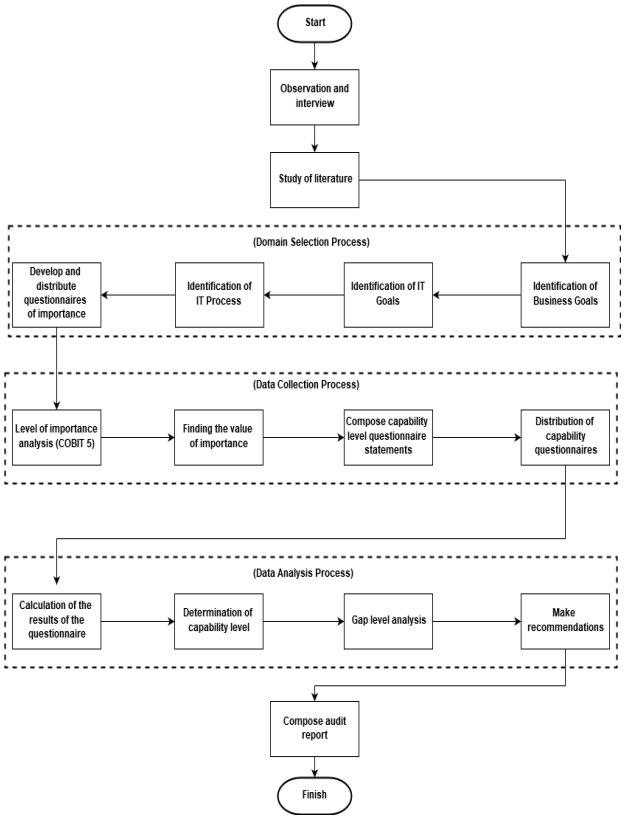

Figure 1. Research Stages

The first stage starts from the process of requesting permission to conduct audits at Archives and Library Department Bali Region. Next is conducting observations and interviews with the highest part that governs the course of information technology management to find out the problems faced. The interview also aims to know more clearly the object to be audited so that research is more directed at the time of the audit process. The next stage is to conduct a literature study related to information technology governance, implementation guidelines using the COBIT 5 framework. The next stage is the domain selection stage. This stage consists of several interrelated processes namely identifying business goals, identifying IT goals, identifying IT processes and compiling a questionnaire of importance. Identification of business goals aims to match business goals and critical points in agencies with business goals that exist in COBIT 5. Identification of IT goals aims to see the relationship between the organization's business goals from the matching business goals with IT goals on COBIT 5. IT process identification is the process of finding domain processes that are in COBIT 5 that are associated with previously mapped IT goals. The IT process that has been selected will then be carried out the preparation of a questionnaire of importance. The function of this level of importance questionnaire is to find out the opinion of the higher-ups of the institution regarding the importance of each IT process. The results of the importance level questionnaire, will then be summarized according to the results of the domain of importance level obtained through the highest assessment.

The next step is determining capability level through the capability questionnaire that has been made, which after getting the results of the questionnaire then analyzes the data. At the stage of data analysis the calculation of the results of the questionnaire was filled out by the respondents. The results of the answers to the questionnaire statements will be analyzed and then the level of maturity is calculated using the capability level assessment method. Furthermore, the gap level analysis is done by comparing the expected level of maturity with the current level of maturity. The level of gaps obtained is then given recommendations for improvement using development procedures based on COBIT 5 high level control objectives. The last stage is the preparation of audit report.

4. CONCEPTS AND THEORIES

Concepts and theories contain explanations of supporting theories that will be used in this study. These theories include Audit, Information Technology Audit, IT Governance, RACI Chart, and COBIT 5. The theory will be discussed as follows.

4.1 Audit

Audit or examination in the broadest sense means an evaluation of an organization, system, process or product. An audit is carried out by a competent, objective and impartial party called an auditor. The aim is to verify that the subject of the audit has been completed or is running according to accepted, accepted standards, regulations and practices [6].

4.2 Information Technology Audit

Information Technology Audit is an activity of collecting data and evaluating evidence to determine whether IT processes in the company have been managed in accordance with standards that are equipped with objective controls to monitor their use and whether they have met business objectives effectively [7]. Information Technology Audits can emphasize the use of integration between propriety and substantively tests whose composition is used in a balanced manner in accordance with the conditions of the process being audited. Information Technology Audit as a process of gathering and evaluating evidence to determine whether information systems can protect assets, existing information technology has maintained data integrity so that both can be directed towards achieving business objectives effectively by using resources effectively [8].

4.3 IT Governance

IT governance is the process of governance for decision making by ensuring the allocation of IT usage in the strategies of the organization concerned. IT governance reflects the application of organizational principles with a focus on management activities and the use of IT for organizational achievement [9].

4.4 RACI Chart

The RACI Chart is a matrix of all activities and authority in the organization that helps in making decisions. An explanation of the RACI chart includes having a responsibility that explains who is responsible for the given task. This refers to the main role or the person in charge of operational activities, meeting the needs and creating desired results for the organization. Accountable explains who is responsible for the success of the task. This refers to overall responsibility for the task that has been done. Consulted explained who provided input. This refers to the role that is responsible for obtaining information from other units or external partners. Informed explains who received the information. This refers to the role that is responsible for receiving the right information to oversee each task performed [10].

4.5 COBIT 5

COBIT 5 is a framework that can help companies or organizations achieve their goals for corporate IT management and management. Simply put COBIT 5 helps companies create optimal value from IT by maintaining a balance between getting benefits and optimizing the level of risk and using resources. COBIT 5 allows IT to be managed and managed in a more comprehensive way for the entire scope of the company, covering the entire scope of business and the functional area of IT, taking into account the interests of internal and external stakeholders associated with IT [10] .

5. RESULT AND DISCUSSION

The results and discussion of the audit process begins with the domain selection process which includes identification of business objectives, identification of IT objectives, and identification of IT processes. The data collection process includes analyzing the level of importance and finding the value of the level of importance. The data analysis process includes determining capability levels, analyzing gap levels and making recommendations for improvement.

5.1 Identification of Business Goals

The identification of business goals is the stage of mapping business objectives contained in COBIT 5 with the agency's critical point. This stage is carried out by analyzing the critical point in the Archives Service and the Bali Regional Library as the center of IT operations which is matched with the business goals contained in the COBIT 5 framework. Mapping critical points with COBIT 5 business goals is shown in Table 1.

Table 1. Mapping Critical Points with COBIT 5 Business Goals

Critical Point	No.	Business Goals	Performance Perspective
Limitations of human resources in operating computer systems at the Office of Archives and the Bali Provincial Library	16	Skilled and motivated employees	Learning and Growth Perspective
Infrastructure facilities are less than optimal due to lack of budget	12	Optimization of business process costs	Internal Perspective
There is no clear book coding standard and book grouping	11	Optimization of business process functions	Internal Perspective
The IT application system at the Bali Archives and Regional Library is not functioning optimally	11	Optimization of business process functions	Internal Perspective
There is no IT-based archiving service at the Bali Archives and Regional Library Office	11	Optimization of business process functions	Internal Perspective

Table 1 is a mapping of critical points with business objectives carried out based on the COBIT 5 framework. The mapping results were based on the results of analysis and interviews at the Bali Archives and Regional Library Office.

5.2 Identification of IT Goals

The identification of IT goals is done by looking at the results of the matching of the critical points of agencies with COBIT 5 business goals. COBIT 5 business goals that have an equivalent with the agency's critical point. Then mapped with the aim of IT COBIT 5 which can be seen in Table 2.

Table 2. Mapping Business Goals with IT Goals

No.	Business Goals	IT Goals
11	Optimization of business process functions	1,7,8,11
12	Optimization of business process costs	6,11
16	Skilled and motivated employees	11,16,17

The results of mapping IT objectives obtained are numbers 1,6,7,8,11,16, and 17 based on the COBIT 5 framework. Explanation of each IT objective is presented in Table 3.

Table 3. Explanation of IT Goals

No.	IT Goals
1	Aligning IT with business strategies
6	Transparency in IT costs, benefits, and IT risks
7	Delivery of IT services that suits business needs
8	Appropriate use of applications, information and technology solutions
11	Optimization of assets, resources and IT capabilities
16	IT personnel who are competent and have motivation towards the existing business
17	Knowledge, expertise and initiatives for business innovation

Table 3 is the result of mapping IT goals with business objectives. The purpose of IT is then used to map the IT process so that the results of the IT process focus on the company's critical points.

5.3 Identification of IT processes

After the IT goals and business objectives are mapped, the next process is to identify the IT processes on COBIT 5. Referring to the IT objectives obtained, the processes in the COBIT 5 domain are chosen. Mapping of the IT process from COBIT 5 is shown in Table 4.

Table 4. Mapping IT Goals with IT Processes

IT Goals		IT Processes				
		EDM	APO	BAI	DSS	MEA
1	Aligning IT with business strategies	01 02	01 02 03 05 07 08	01 02		
6	Transparency in IT costs, benefits, and risks	05	06 12 13	09		

7	Delivery of IT services that suits business needs	05	02 08 09 10 11	02 03 04 06	01 02 03 04 06	01
8	Appropriate use of applications, information and technology solutions		04	05 07		
11	Optimization of assets, resources and IT capabilities	04	01 03 04 07	04 09 10	03	01
16	IT personnel who are competent and have motivation towards the existing business	04	01 07			
17	Knowledge, expertise and initiatives for business innovation		01 02 04 07 08	05 08		

Table 4 is the result of mapping between IT processes and IT objectives. The mapping results obtained 33 interrelated IT processes. The selected IT process can be seen in Table 5.

Table 5. IT Support Process on COBIT 5

Domain	Sub Domain												
EDM	1	2		4	5								
APO	1	2	3	4	5	6	7	8	9	10	11	12	13
BAI	1	2	3	4	5	6	7	8	9	10			
DSS	1	2	3	4	5	6							
MEA	1	2	3										

Table 5 explains that there are 33 processes obtained after mapping according to COBIT 5 reference where the process will be filtered again using a questionnaire of the importance level carried out in the relevant agencies.

5.4 Importance Level Questionnaire Result

The determination of the importance level questionnaire refers to the research objectives, agency objectives as well as the critical point of the business process obtained from the importance level questionnaire. Based on observations, 5 IT processes were chosen that fit the audit needs, which can be seen in Table 6.

Table 6. Final Results Questionnaire Importance

Domain	IT Processes
EDM 04	Ensuring resource optimization
APO 06	Manage budgets and costs
APO 12	Managing Risks
DSS 04	Manage continuity
MEA 01	Monitor, evaluate and assess performance

5.5 Capability Level Questionnaire Results

The capability level questionnaire results are obtained after analyzing the capability questionnaire that has been distributed to respondents who have an interest. The following is a table of the results of the analysis of the capability level questionnaire EDM 04 process that can be seen in Table 7.

Table 7. EDM 04 Questionnaire Results

Respondents	*Capability Level* Process								
	Lv. 1	Lv. 2.1	Lv. 2.2	Lv. 3.1	Lv. 3.2	Lv. 4.1	Lv. 4.2	Lv. 5.1	Lv. 5.2
1	70	70	80	60	75	70	85	50	75
2	84	80	85	83	85	85	83	85	84
3	75	70	55	50	85	20	85	75	75
4	70	65	75	75	80	60	85	55	80
5	60	60	75	60	75	60	80	50	75
Average	72	69	74	66	80	59	84	63	78

Table 7 shows that the EDM04 process was at level 1, because the average value obtained from the five respondents was 72. The average value of capability is sought from the lowest process capability level with an average value below 85.

Table 8. APO 06 Questionnaire Results

Respondents	*Capability Level* Process								
	Lv. 1	Lv. 2.1	Lv. 2.2	Lv. 3.1	Lv. 3.2	Lv. 4.1	Lv. 4.2	Lv. 5.1	Lv. 5.2
1	60	80	50	75	80	85	80	80	85
2	85	87	83	90	85	90	90	85	85
3	90	75	75	85	80	65	85	90	90
4	55	75	50	60	75	80	86	80	80
5	50	75	50	75	75	80	85	70	85
Average	68	78	62	77	79	80	85	81	85

Table 8 shows that the APO 06 process was at level 1, because the average value obtained from the five respondents was 68. The average value of capability is sought from the lowest process capability level with an average value below 85.

Table 9. APO 12 Questionnaire Results

Respondents	*Capability Level* Process								
	Lv. 1	Lv. 2.1	Lv. 2.2	Lv. 3.1	Lv. 3.2	Lv. 4.1	Lv. 4.2	Lv. 5.1	Lv. 5.2
1	75	75	80	80	75	85	80	50	85
2	83	83	90	85	85	90	90	85	90
3	80	80	85	75	70	90	85	90	90
4	80	85	85	85	75	85	80	60	95
5	75	80	85	80	75	85	85	50	90
Average	79	81	85	81	76	87	84	67	90

Table 9 shows that the APO 12 process was at level 1, because the average value obtained from the five respondents

was 79. The average value of capability is sought from the lowest process capability level with an average value below 85.

Table 10. DSS 04 Questionnaire Results

Respondents	*Capability Level* Process								
	Lv. 1	Lv. 2.1	Lv. 2.2	Lv. 3.1	Lv. 3.2	Lv. 4.1	Lv. 4.2	Lv. 5.1	Lv. 5.2
1	70	80	85	70	85	85	80	85	85
2	83	85	83	83	85	85	84	83	86
3	95	85	95	90	85	75	70	70	80
4	65	80	90	70	85	90	80	85	90
5	60	80	90	70	90	90	85	85	90
Average	75	82	89	77	86	85	80	82	86

Table 10 shows that the DSS 04 process was at level 1, because the average value obtained from the five respondents was 75. The average value of capability is sought from the lowest process capability level with an average value below 85.

Table 11. MEA01 Questionnaire Results

Respondents	*Capability Level* Process								
	Lv. 1	Lv. 2.1	Lv. 2.2	Lv. 3.1	Lv. 3.2	Lv. 4.1	Lv. 4.2	Lv. 5.1	Lv. 5.2
1	90	85	90	90	85	85	80	80	85
2	90	90	90	90	84	85	87	90	90
3	90	75	90	80	70	70	75	80	85
4	90	90	85	90	80	85	85	90	90
5	95	90	95	90	80	90	85	95	85
Average	91	86	90	88	80	83	82	87	87

Table 11 shows that the MEA 01 process was at level 3, because the average value obtained from the five respondents was 80. The average value of capability is sought from the lowest process capability level with an average value below 85.

5.6 Gap Analysis

Gap level analysis is the process of comparing the current level of agency maturity with the expected level of maturity. The gap level of capability level process can be seen in Table 12.

Table 12. Gap Analysis

IT Process	Current Capability (CC)	Expected Capability (EC)	GAP (EC-CC)
EDM 04	1	2	2 - 1 = 1
APO 06	1	3	3 - 1 = 2
APO 12	1	2	2 - 1 = 1
DSS 04	1	2	2 - 1 = 1
MEA 01	3	4	4 - 3 =1
Gap Average			1,2

Table 12 is a gap level analysis in which the current capability is at level 1 (Performed Process). This is because the average value obtained from the company's current capability is 1.4 and in general the stages of the process that have been implemented have successfully carried out the IT process and achieved the objectives of the IT process. Expected capability is the capability desired by the company where for the EDM 04 IT process the desired capability is level 2 (Managed Process). The GAP value is obtained from the difference between expected capability and current capability, where the average gap obtained is 1.2. Gaps can occur because companies have not implemented COBIT 5 standards within the company so that IT governance has some differences with what is implemented by COBIT 5.

5.7 Recommendations for Improvement

Current conditions, conditions of hope and suggestions for improvement are given based on the COBIT 5 framework. Analysis of recommendations for improvement can be seen in Table 13.

Table 13. Analysis of Recommendations for Improvement

Domain	Current Conditions	Condition of Hope	Recommendations for Improvement
EDM 04	Lack of competent human resources	So that the existing human resources in the department can be competent and can operate existing computer systems to input book catalogs on the Inlislite information system	Provide a special training for HR who are not yet experts and competent in their fields, especially in operating computer systems (library information systems) such as computer basics training, especially Microsoft Excel
	in total there are 25 computers only 10 computers that can be used, 2 printers and 2 Wi-Fi routers cannot be used	The rejuvenation of infrastructure and the replacement of damaged computers with new computers and the addition of printers so that SOP can run well	Communicating the problem of lack of IT equipment to the relevant institutions in this case is the Ministry of Communication and Information, which is assistance for the necessary facilities such as the addition of computers, printers, and the addition of bandwidth and with regular repairs

APO 06	Lack of budget to buy and maintain IT devices such as computers, printers and Wi-Fi routers	Budget / cost transparency for maintaining and purchasing IT equipment that has been damaged to maximize business processes and SOP	The flow of funds to be used should be notified to all members in the form of a ledger to make it easier for all members to know the budget for the funds to be used
APO 12	Not all book catalogs have been entered into the inlislite system	The existence of a regular and clear book coding system and book grouping in the inlislite information system	It is recommended to enter a book catalog in accordance with the book code in the Inlislite information system
	There is no media for data backup outside the system that is safe in the library information system	The existence of a secure data backup media other than inlislite to prevent the loss of data catalog books that exist in the inlislite information system	Make secure data backup media such as NAS (Network Attached Storage), which is data storage media in an internet network that is separate from the PC. And do a full data backup every time a book catalog has been changed
DSS 04	IT officers are not responsive in handling when an incident occurs	IT officers are expected to quickly deal with disruptions to existing IT services at the service so that the IT process can run optimally	Coordinate all stakeholders involved in the IT service process to conduct a thorough and gradual review and evaluation
MEA 01	Most of the book catalog search process is still using manual methods and laying books are still irregular	A library service information system needs to be effective in the book search process	recruiting officers who are experts to assist in the process of inputting a book catalog

6. CONCLUSION

The level of information technology governance maturity that exists in the agencies of the 5 IT processes selected, namely for the IT process EDM04, obtaining an average value of capability 72. This can be identified that the EDM04 process has been implemented and successfully achieved its objectives. The IT process APO06 obtained an average rating of 68 capabilities. This can be identified that the APO06 process has been implemented and successfully achieved its objectives. The APO12 IT process scores an average of 79 capabilities. This can be identified that the APO12 process has been implemented and successfully achieved its objectives. The DSS 04 IT process has an average capability rating of 77. This can be identified that the DSS04 process has been implemented and successfully achieved its objectives. The MEA01 IT process has an average capability rating of 80. It states that the MEA 01 process has been implemented using certain predetermined processes, which are able to achieve the expected results. The result of the gap level value obtained from the gap analysis between the current capability level and the capability expected by the agency is 1.2.

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