Improvement of IT Governance
(Case Study: Government Institution Region X)

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ABSTRACT

The use of information technology in government processes will increase the efficiency, effectiveness, transparency, and accountability of government administration. Utilization of IT within an organization requires a system to manage IT better as well as the required audit of information technology that can be run in accordance as the expected. IT Audit is an important matter that must be carried out within an organization, also including the Government Institution Region X which utilize the technology of information as supporting the process of the public servicing. The audit of information technology is carried out with the purpose of fixing the critical point or problems that often occur in the process within the institution. As the result of study using the framework of COBIT 5, it shows the level of capability of five IT processes selected are at a lower level, namely APO07 at the level 2, EDM04 at the level 1, DSS01 at the level 1, BAI01 at the level 1, and APO08 at the level 1, whereas the expectation of capabilities of the organization's leader is at the level 4. The results of the audit of information technology that has been made, shows the difference of the level of gap between the current maturity level with the maturity level based on the organization's leader. In this study, will be getting suggestions and improvement recommendations according to the framework of COBIT 5 and ITIL 2011.

KEYWORDS: IT audit; COBIT 5; Maturity Level, IT Governance, Population Administration

1. INTRODUCTION

Information technology has been used by various organizations including the government institution itself. The better management of IT is required in utilizing the information technology for an organization. The success of IT Governance is determined by the alignment of the IT implementation within the organizational goals as well as the audit of information technology that is required. The audit of information technology is carried out with the purpose of fixing the critical point or problems that often occur in the process within the institution [1]. Government Institution Region X is one of the government institution that utilize information technology to improve the performance of governance towards a good government. The Government Institution Region X is a government institution which is in-charge of serving the community in terms of carrying out the recording, publishing, storing, and maintenance data of each civilian.

Government Institution Region X in carrying out the service of population administration, getting complaints by the public as well as the dissatisfaction experience in the servicing system making the audit is required to analyze IT governance in the process of business, through this audit can be looked for the critical point that occur due to the less than optimal in the process of the business itself. A kind of framework that used in the implementation of this audit is by using the framework of COBIT 5, which is a thorough framework that can assist institution in achieving its goals for governance and management of IT in a certain institution. This research is aimed to repair the critical point or problems that often occur in the process of Institution itself. This critical point will run the mapping of critical point institution based on the reference that are within the framework COBIT 5 about the problems of IT governance and will be getting suggestion and improvement recommendation by the standard of framework COBIT 5 and ITIL 2011.

2. LITERATURE REVIEW

The research conducted by Ni Putu Sri Merta Suryani, Gusti Made Arya Sasmita, and I Ketut Adi Purnawan which aims to determine the maturity level of IT services in supporting financial data management at one of the University in Indonesia using the framework of COBIT 4.1 and ITIL V3 as the support of improvement recommendation. The result of the audit shows that the maturity index of the entire IT process is 2.69, means that the current maturity level is at the level 3 (defined) [2].

The research conducted by Altry David Purba, I Ketut Adi Purnawan, and I Putu Agus Eka Pratama aims to ensure that security information and data management are applied at the Institution in Region X, which is in accordance with the procedure and determine the maturity level of information technology is applied by using framework ISO / IEC 27002 as a security control and COBIT 5 to identify business processes

and maturity levels. The result of this research is that the IT maturity level at Institution in Region X is 2.48 which falls into the category level 2 (managed process) [3].

The research conducted by I Putu Ade Ambara Putra, I Made Sukarsa, and I Putu Agung Bayupati which aims to measure work IT management company PT. X using the framework COBIT 4.1. The results of this research are the current maturity level condition is at level 3 and the expected condition is to reach the level 5, then a recommendation is made to minimize the maturity level of gap, also given suggestions taken from the high control objectives COBIT 3rd edition [4].

The research conducted by I Ketut Adi Purnawanaims to arrange guidelines for information technology governance PT. X uses the COBIT framework. The results of this research and analyze show that the level of management awareness of PT. X is at a sufficient level and the current maturity level is at the level 3 (defined process) and the expected maturity level is at the level 5 (optimized) [5].

3. RESEARCH METHOD
Stages are conducted in this study literature, the search of critical point, identify the purpose of business, identify the purpose of IT, identify the purpose of IT processes, data processing, data analysis, data test, and improvement suggestions if necessary. The research stages can be seen at Figure 1.
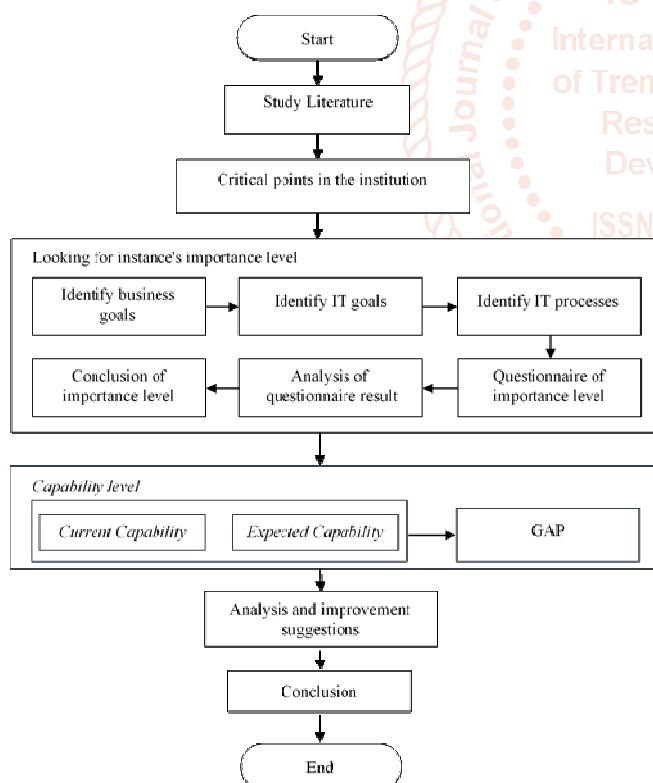

Figure 1 Research Stages

Research stages conducted at the Department of Population and Civil Registration Badung regency which began with the study literature where the auditor studying the framework of the audit that will be used and learn about the Institution to be audited. The next step is to find critical points in the institution being audited through interviews and data on the aspirations and complaints of the existing community. After getting the data, then performed mapping to business

objectives according to the framework COBIT 5. The next to identify business goals and do the mapping to the IT goals in the framework COBIT 5 uses a reference to the framework COBIT 5. After getting the results of IT goals, then identify the mapping to the IT processes according to framework COBIT 5. After obtaining the IT process through the identification of the IT process, the next step is to make a questionnaire on the level of importance that is distributed to relevant stakeholders, especially high-ranking institution responsible for the institution's business processes.

The results of the interest level questionnaire are used to conclude the level of importance, namely the most important IT process that will be carried out further assessment with an assessment of capability level. The next step is to create a capability level questionnaire that will be distributed to respondents and the results of the capability level will be compared to the expected capability, namely the capability level according to institution officials, so that a gap will be found between the two results. The gap obtained will be analyzed and given suggested improvement. The final step is to draw conclusion from the audit research.

4. CONCEPTS AND THEORIES
4.1. Audit
Audit is a process of collecting and evaluating evidence of information that can be measured on an economic entity which made a competent and independent to be able to determine and report the suitability of the information with the criteria that have been set. Auditing should be carried out by an independent and competent person [6]. In short, an audit is a comparison between conditions that occur with predetermined criteria.

4.2. Information Technology Audit
Information Technology Audit is a form of operational audit, but it's now recognized as a separate type of audit with the main objective of improving IT governance. Information technology audit is an operational audit of resource management information, namely the effectiveness, efficiency, and economics of the information system functional unit in an institution. With the introduction of COBIT, now the objective of auditing is not only limited to the classical concept, but now it is effectiveness, efficiency, confidentially, integrity, availability, compliance with policies, and reliability of information technology[7].

4.3. IT Governance
IT Governance is a structure of relationship and processes to regulate and control the organization which aims to achieve the purpose of the organization which has been determined by increasing the value and still balancing the risks with the value that is obtained from the application of IT and processes. The point of Information Technology Governance is how to manage the use of IT in order to produce output that is optimal in the organization, helping the process of decision-making and help the process of solving the problem [8].

4.4. COBIT 5
COBIT is a standard guide to information technology management practices. The COBIT standard is a considered as a complete standard and has comprehensive coverage as an audit framework. COBIT supports IT governance by providing a framework for managing IT alignment with

businesses. COBIT is developed regularly by ISACA. This COBIT, there are several domains that are used for the audit processes [6].

4.5. ITIL 2011
The Information Technology Infrastructure Library (ITIL) is a framework that describes best practices in the application of information technology service management. ITIL provides a series of process and function models that can be used as a guide in efforts to align IT processes and business processes, especially those related to IT service management. There are five stages of the ITIL process, namely Service Strategy, Service Design, Service Transition, Service Operation, and Continual Service Improvement [9].

5. RESULT AND DISCUSSION
5.1. Identification of Business Goals
Identification of business objectives is the first step to determine the IT process that will be audited, in this process a mapping of the critical point of Government Institution Region X against business objectives according to COBIT 5. Mapping results between critical points and business objectives according to COBIT 5 can be seen at the table 1.

Table1.Mapping Critical Points with Business Goals

Critical Points	No	Business Purpose
The role of officers who are considered less than optimal in serving the community in terms of managing population administration.	14	Operational and staff productivity
The response of population administration service officers via telephone is considered non-optimal by the community.	14	Operational and staff productivity
Lack of public information regarding the requirements and flow of population administration services.	11	Optimization of business process functionality
The lack of accuracy operator in putting the data so that can be found the occurrence of errors in inputting data.	14	Operational and staff productivity
The process of population administration service is relatively long.	11	Optimization of business process functionality
Obstruction of population administration services because the central service network connection is sometimes disconnected.	11	Optimization of business process functionality
The unavailability of an online population administration service system.	7	Business service continuity and availability
Applicant still incomplete to bring the data supporting so the delay of service is occurred.	11	Optimization of business process functionality

Table 1 is a mapping of critical points with business objectives in Government Institution Region X based on the COBIT 5 framework.

5.2. Identification of IT Goals
The mapping results obtained in business goals with a critical point are going to be carried out by mapping of business goals with IT goals based on the COBIT 5 framework with the following results.

Table2Mapping business goals and IT goals

No.	Business Purpose	IT Goals
7	Business service continuity and availability	4, 10, 14
11	Optimization of business process functionality	1, 7, 8, 9, 12
14	Operational and staff productivity	8, 16

Table 2 is a mapping of business goals with IT goals based on the COBIT 5 framework. There are 10 IT goals obtained from the mapping results.

5.3. Identification of IT process
After mapping between IT goals with business goals of organization, the next step is to identify IT process in COBIT 5. With the reference of obtained IT goals, the chosen domain processes at COBIT 5 which has linkages Primary (P). Table 3 is the IT process from the COBIT 5 framework obtained.

Table3 Mapping IT Goals with the IT processes

No.	IT Goals	IT Process				
		EDM	APO	BAI	DSS	MEA
1	Alignment of IT and business strategy	01 02	01 02 03 05 07 08	01 02	-	-
4	Managed IT-related business risk	-	10 12 13	01 06	01 02 03 04 05 06	01 02 03
7	Delivery of IT services in line with business requirements	05	02 08 09 10 11	02 03 04 06	01 02 03 04 06	01
8	Adequate use of applications, information and technology solutions	-	4	05 07	-	-
9	IT agility	04	01 03 04 10	08	-	-
10	Security of information, processing infrastructure and applications	-	12 13	06	05	-
12	Enablement and support of business processes by integrating applications and technology into business processes	-	08	02 07	-	-
14	Availability of reliable and useful information for decision making.	-	09 13	04, 10	03 04	-
16	Competent and motivated business and IT personnel	04	01 07	-	-	-

Table 3 represent 34 IT processes, the results of the mapping of IT goals with IT processes based on the COBIT 5 framework.

Table 4 is a summary of the results of the mapping of IT goals with the IT processes.

Table4.IT Processes related to IT Goals

Domain	Sub Domain						
EDM	01	02		04	05		
APO	01	02	03	04	05		07
	08	09	10	11	12	13	
BAI	01	02	03	04	05	06	07
	08		10				
DSS	01	02	03	04	05	06	
MEA	01	02	03				

5.4. Results of Questionnaire Level of Interest

Questionnaire level of Interest refers to the framework COBIT 5 toolkit 2 management awareness diagnostic, this questionnaire aims to find out the opinions of top-level management at the Government Institution Region X of the existing IT processes. The five processes that have the highest value will be selected as processes to be carried out in a more detailed audit. The table below is the result of search importance on IT processes in Government Institution Region X.

Table5 Importance Level of IT Process Results

Domain	Proses TI
APO07	Manage human resources
EDM04	Ensure resource optimization
DSS01	Manage operations
BAI01	Manage programs and projects
APO08	Manage relationship

5.5. Results of the Capability Level Questionnaire

The results of the questionnaire capability levels obtained after the processing of the questionnaire capability level that has been distributed to the respondents who have been determined are used to determine the capability level of IT Process of Government Institution Region X. Table 6 is the result of the maturity level questionnaire in the APO07 process.

Table 6 APO07 Process Questionnaire Results

Respondent	Maturity Level Process								
	Lv. 1.1	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	80	95	80	80	90	80	80	80	95
2	90	80	85	80	85	80	80	80	80
3	90	83	90	90	87	82	75	87	85
4	90	85	90	80	85	75	80	85	85
5	87	84	85	82	80	80	83	86	84
6	85	85	83	80	82	82	80	85	87
Average	87	**85**	86	82	85	80	80	84	86

Table 6 is the results of the questionnaire maturity level that is given to the respondents on APO07 process. The results obtained from the APO07 is at the level 2, since the value of the average of the ratings of the respondents i.e. 85 on the questionnaire level 2.1.

Table 6 Results Questionnaire Process EDM04

Respondent	Maturity Level Process								
	Lv. 1.1	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	80	90	95	80	80	90	80	80	80
2	85	80	80	80	85	80	80	80	80
3	75	82	83	83	80	75	70	75	77
4	70	80	80	85	85	75	75	80	80
5	80	85	82	87	84	80	80	80	82
6	79	82	80	85	82	80	80	82	80
Average	**78**	83	83	83	83	80	78	80	80

Table 7 is the results of a questionnaire maturity level that is given to the respondents on EDM04 process. The results obtained from the EDM04 is at the level 1, due to the value of the average of the ratings of respondents i.e. 78 on the questionnaire level 1.

Table 7 Results of the DSS01 Process Questionnaire

Respondent	Maturity Level Process								
	Lv. 1.1	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	95	95	80	80	80	80	80	90	90
2	80	80	80	85	85	80	75	80	85
3	83	85	85	86	85	84	82	85	83
4	80	80	80	85	85	80	80	80	85
5	85	84	80	87	80	85	80	82	87
6	82	85	85	85	85	82	78	86	85
Average	**84**	85	82	85	83	82	79	84	86

Table 8 is the result of the questionnaire of maturity level that is given to the respondent on DSS01 process. The results obtained from the DSS01 is at the level 1, because the value of the average ratings of respondents i.e. 84 on the questionnaire level 1.

Table 8 BAI01 Process Questionnaire Results

Respondent	Maturity Level Process								
	Lv. 1.1	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	20	15	30	30	15	15	10	10	15
2	14	10	20	20	15	15	15	15	15
3	15	12	20	16	12	15	15	15	16
Average	**16**	12	23	22	14	15	13	13	15

Table 9 is the results of the maturity level questionnaire that is given to the respondents on BAI01 process. The results obtained from the BAI01 is at the level 1, because the value of the average ratings of respondents i.e. 16 on the questionnaire level 1.

Table 9 APO08 Process Questionnaire Results

Respondent	Maturity Level Process								
	Lv. 1.1	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	65	60	15	50	50	50	60	55
2	70	70	70	20	50	60	50	50	50
3	72	70	62	30	60	50	50	50	60
Average	**72**	68	64	22	53	53	50	53	55

Table 10 is the results of the maturity level questionnaire that is given to the respondents on APO08 process. The results obtained from the APO08 is at the level 1, because the value of average ratings of respondents i.e. 72 on the questionnaire level 1.

5.6. Gap Level Analysis
The gap level analysis is carried out by looking at the condition of the maturity level of the existing IT processes in the current Institution (Current Capability) by distributing a questionnaire and the comparing it with the expected IT process conditions (Expected Capability) by the Institution.

Table 10 Gap Level of Capability Level Process

Proses TI	Current Capability (CC)	Expected Capability (EC)	GAP (EC-CC)
APO07	2	4	2
EDM04	1	4	3
DSS01	1	4	3
BAI01	1	4	3
APO08	1	4	3

Table 11 is the current maturity level (current capability), the maturity level according to the head of the Institution (expected capability), and the gap. Based on the distribution of the capability level of IT processes at the Institution had an average capability level 1 which can be interpreted that the Institution is already running processes and processes implemented have succeeded in achieving its goals.

5.7. Recommendations for Suggestion and Improvement
The gap from the process of determining the capability level at Government Institution Region X is used to determine the steps for changing the current maturity with the maturity expected by the institution. This audit research uses two frameworks as suggestions and recommendations, namely COBIT 5 and ITIL 2011. The use of the two frameworks is expected to expand the scope of suggestions and recommendations also to reach all the problems in detail that are generated based on various guidelines in helping institution achieve the expected maturity level and improving institution performance. Increasing each maturity level is done in a structured and gradual manner. Here are suggestions and recommendations on improvements to IT processes at the Government Institution Region X.

Table 11 APO07 Process Suggestions and Recommendations

APO07 Process Improvement	
Explanation	Providing and evaluating the human resources needed to fulfill the population administration service process.
Recommendations	Providing technical guidance on a regular basis and targeted to all employees to improve knowledge and quality of employees. (ITIL 2011 Service Design, Capacity Management, p.158).
	Evaluating employee's performance once a month and the results of the evaluation process used to develop a plan to improve employee subordinate's performance to be applied and instructed directly, focus, and discipline. (COBIT 5 Enabling Process, APO07 Communicate management objectives and direction, p.86).
	Cooperate in holding workshops on population administration services with sources from the Central Government to each employee at least once a year. The delivery of material in the workshop must be clear and consistent, in order to encourage the development of knowledge and employee performance. (COBIT 5 Enabling Process, APO07 Maintain the enablers of the management system, p.85).
	Providing awards which is a kind of scholarship to improve career paths to employees who have good performance and discipline also as a form of appreciation from institution to increase the motivation of other employees in order to improve their performances. (COBIT 5 Enabling process, APO07 Communicate Management Objectives and Direction, p.86).

Table 12 Provides recommendations and improvements to address gaps in the capability level of the APO07 process, namely regarding managing human resources which refers to the framework COBIT 5: Enabling Process and ITIL 2011 Service Design.

Table 12 EDM04 Process Suggestions and Recommendations

EDM04 Process Improvement	
Explanation	The capacity of the resources of Government Institution Region X is met.
Recommendations	Providing resources, such as employees who are competent in accordance with the field as well as other resources, such as computers, internet, electricity, and the rooms were adequate for the implementation of inputting the data on population administration running well, and able to minimize mistakes. Information in the form of guidelines is also provided before data entry begins, so that it can be carried out properly. (ITIL 2011Service Strategy, Demand Management, p.245).
	Improving the ability of employees to conduct direct supervision and regularly, so that employees carry out services in inputting data can be monitored, when there are errors and irregularities in the inputting data on population administration can be implemented immediately. (COBIT 5 Enabling Process, EDM04 Evaluate resource management, p.44).
	Designing SOP regarding employee qualifications in operating population administration data entry, SOP contains job description, duties, responsibilities, authorities, education, and experiences that each employee has for the sake of good service. (COBIT 5 Enabling Process, EDM04 Evaluate resource management, p.44).

Table 13 is a recommendation for suggestions and improvements to overcome the gap in the capability level of the EDM04 process, namely regarding to ensure resource optimization, which refers to the framework COBIT 5: Enabling Process and ITIL 2011 Service Strategy.

Table 13 DSS01 Process Suggestions and Recommendations

DSS01 process improvement	
Explanation	The population administration service is carried out, monitored, and reported in accordance with established policies.
Recommendations	Managing the schedule service operations in accordance with the procedures established policies and to ensure that all data processing requirements needed services in a timely manner, in order to provide results in accordance with service standards. (ITIL 2011, Service Operations, Event Management, p.58).
	Evaluating policies and procedures of population administration services that can impede the course of settlement administration services that can be implemented immediately, so that services become more optimal. (COBIT 5 Enabling process, DSS01 Monitor IT Infrastructure, p.174).
	Making a daily schedule of population administration service processes and determine service process can be consistent, measurable, and can optimize the availability of resources. (COBIT 5 Enabling process, DSS01 Perform Operational Procedures, p.174).
	Making report or daily routine reports on the process of settlement administration services. Reports or daily routine reports on the service process are used in order to facilitate the evaluation and reporting process for population administration services. (COBIT 5 Enabling process, DSS01 Monitor IT Infrastructure, p.174).

Table 14 is a recommendation for suggestions and improvements to overcome the gap in the capability level of the DSS01 process, namely regarding to manage operations, which refers to the framework COBIT 5: Enabling Process and ITIL 2011 Service Operations.

Table 14 BAI01 Process Suggestions and Recommendations

BAI01 process improvement	
Explanation	Designing a system service population administration is online and provide a source of power that is in accordance with the plan of the institution.
Recommendations	Coordinate with the online service system developer regarding the flow, requirements, system design, and menu of each service in the online service system. (ITIL 2011, Service Design, Design Coordination, p86).
	Making indicators of the success of the online service system and it is recommended to create a menu of community aspirations and live chat that can be accessed by the public to facilitate interaction, resulting in feedback or responses from the community in determining indicators of the success of the online service system. (COBIT 5 Enabling Process, BAI01 Plan Projects, p.124).
	Determining the standard source of power that is needed to be able to support the needs of system service online, such as the Internet are stable, the computer with specs are adequate, and operators who meet the qualifications in order to be able to provide benefits in accordance with expectations. (COBIT 5 Enabling Process, BAI01 Manage projects resources and work packages, p.126).

	Creating a special user for institution leaders to be able to log in to the online service system that functions to track population documents and monitor the development of service processes in the online service system. (COBIT 5 Enabling Process, BAI01 Manage stakeholder engagement, p.122).
	Coordinate is routine with employees services online to make sure the results of the indicators of the success of the system services online according to the plan which is expected to institution and the public. In addition, the results can be used as a review to improve future services. (COBIT 5 Enabling Process, BAI01 Plan Projects, p.124).
	Defining with clear about roles and responsibilities for the procurement and management of source power to the employees of the service online, so that when the case an obstacle and problems in source power system services online can be immediately followed up and resolved. (COBIT 5 Enabling Process, BAI01 Manage project resources and work packages, p.126).

Table 15 provides recommendations for suggestions and improvements to address gaps in the capability level of the BAI01 process, namely regarding to manage programs and projects, which refers to the framework COBIT 5: Enabling Process and ITIL 2011 Service Design.

Table 15 SAPO08 Process Suggestions and Recommendations

APO08 Process improvement	
Explanation	Have a strategy in delivering data and service information through websites and social media.
Recommendations	Forming a special team in analyzing community needs on the use of websites and social media in the delivery of data and service information to be used as a review in implementing innovative data and information service delivery strategies, in order to improve performance. (ITIL 2011, Service Strategy, Demand Management, p.245).
	Coordinating with the employee in charge of managing the websites and social media, in order to be able to increase interaction and communication in the community actively in an easily understood in accordance with the standards and procedures. (COBIT 5 Enabling Process, APO08 Manage the business relationship, p.91).
	Coordinating regularly with employees to review the current technology trends and future use by the public, so that the application of technology in the delivery of data and information services to the appropriate target. (COBIT 5 Enabling process, APO08 Identify opportunities, risks and constraints for IT to enhance the business, p.91).
	Conducting community satisfaction surveys through websites and social media regularly to find out people's satisfaction and opinions regarding the delivery of data and service information, and to ensure that any problems are followed up and the use of technology used can be continuously improved. (COBIT 5 Enabling Process, APO08 Manage the business relationship, p.91).

Table 16 provides recommendations and improvements to address the gap in the capability level of the APO08 process, namely regarding managing relationships, which refers to the framework COBIT 5: Enabling Process and ITIL 2011 Service Strategy.

6. CONCLUSION

The conclusion that can be drawn based on the discussions that have been described from research audits of Information Technology at the Government Institution Region X is done by identifying the critical point were obtained from interviews in directly with senior Institution and aspirations of the public on the website of the Institution, identifying the purpose of business, identify the purpose of IT, and the identification of IT process. The methods used in the collection of data that interview and questions in the form of questionnaire the level of interest and capabilities are further analyzed to obtain the results that are needed. The results of the implementation of the audit using the framework COBIT 5 produces five IT processes that are at the level of the lowest based on the calculation of the questionnaire capability level, namely, among others APO07 about managing human resources were at level 2 with a gap 1 and the rest are at level 1 with a gap 3 of them, EDM04 about to ensure resource optimization, DSS01 on managing operations, BAI01 on managing programs and projects, and APO08 on managing relationships. Results have shown the gap between the goals that are expected by the institution with the current state is arranged with amount of suggestions and recommendations for improvement level on each process. Giving recommendations suggestions and improvement are carried out by referring to the framework COBIT 5 and ITIL 2011, is expected to reach the level of process that is expected by the Institution.

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