
Information Technology Governance Audit Using COBIT 5 Framework in the Natural Resources Conservation Office

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ABSTRACT

One of the organizations that requires the implementation of good information technology governance is the natural resources conservation office. The audit was conducted to determine the level of IT process capability based on the COBIT 5 standard and to determine the level of gaps (gaps) owned by the natural resources conservation office. The process of implementing the audit begins with observing the agency's environment related to activity data and its implementation, then mapping the data with business objectives according to COBIT 5, followed by mapping business objectives with IT objectives to obtain IT processes. The IT processes obtained are then selected to obtain important IT processes according to company officials. The TI process obtained is then processed using the Guttman method. The results of the IT process capability level, namely EDM01, EDM02 and APO09, are at level 3 (established). The gaps found need to be given a corrective strategy to achieve the capability expected by the institution, namely 4 (predictable process) by providing recommendations regarding steps to achieve the expected capability value. The recommendations and improvements provided use ISO/IEC 15504:2 and ISO27002 standards which were obtained by mapping IT processes on COBIT 5.

Keywords: Audit, Governance and Information Technology, Guttman Method, COBIT 5

1. INTRODUCTION

Organizations are increasingly relying on IT and can effectively and efficiently integrate IT resources with other organizational and managerial processes (Zhang, Peiqin & Zhao, Kexin & Kumar, 2014). IT governance is widely adopted by organizations in Indonesia, both government and private organizations (Jingga, Kosala, Ranti, & Supangkat, 2019). Balai KSDA Bali Province is a Technical Implementation Unit for Conservation of Natural Resources and Ecosystems which is under and responsible for the Directorate General of Conservation of Natural Resources and Ecosystems (KSDAE) of the Ministry of Environment and Forestry in accordance with Regulation of the Minister of Environment and Forestry No: P.8/Menlhk/Setjen/OTL.0/1/2016 concerning the Organization and Work Procedures of the Natural Resources Conservation Technical Implementation Unit which has an accountable commitment, in which in carrying out all of its duties and functions it has utilized and implemented information technology in its organizational operational processes. Good governance in service orientation plays an important role in the process of agency performance to improve the ability to process information and service processing and also improve the performance of government institutions in a transparent and accountable manner so that they lead to good governance. Aspects such as effectiveness and accountability can be improved by the use of IT in government administration (Dharma, Sasmita, & Putra, 2021).

Evaluation and improvement of IT governance is very important because it supports agencies to control whether they make effective IT management and ensure the benefits and associated risk management (Pérez Lorences & García Ávila, 2013). IT governance audits need to be carried out to improve the performance of an agency, improve the management and distribution of information, and improve public services. Audits in the field of governance are useful for conducting evaluations on organizations, so that the level of maturity in organizational IT governance can be identified. The results of the audit evaluation process can be used as an increase in the value of IT Capability (Zakwan, S., Ratnawati, S., & Hidayah, 2014). IT Capability describes an organization's ability to create business value and to acquire, deploy, combine, and reconfigure IT resources to support and improve business strategy and business processes. Several frameworks for auditing IT governance can be used (Ranjbarfard, Mina & Mirsalari, 2020). (Drljaca, Dalibor & Latinović, 2016), in his research stated that there are three types of IT governance evaluation

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frameworks, one of which is COBIT.

COBIT is a management guideline issued by ISACA (Information Systems Audit and Control Association) and ITGI (Information Technology Governance Institute). COBIT provides general steps as well as best practices used to help utilize the use of IT in accordance with company goals (Zakwan, S., Ratnawati, S., & Hidayah, 2014). COBIT has the advantage of helping management understand the IT governance system, as well as helping management decide on the necessary controls (Steuperaert, 2019).

2. LITERATURE REVIEW

Research conducted by Ni Putu Sri Merta Suryani, Gusti Made Arya Sasmita and I Ketut Adi Purnawan in 2015 with the title "Audit Of Accounting Information System Using Cobit 4.1 Focus On Deliver And Support Domain", where the purpose of this research is to determine maturity level of IT services in supporting financial data management. The accounting information system audit phase begins with selecting a domain which includes identification of business objectives, IT objectives, IT processes and control objectives using the COBIT 4.1 framework. The next stage is to collect the necessary data through interviews and surveys using a questionnaire. The data collected is then processed to obtain the level of maturity. The results of the accounting information system audit that has been carried out show that the maturity index of all IT processes is 2.69, which means the current maturity level is in 3-defined. The expected maturity level is 4-managed. Improvement strategies are provided to address emerging gaps based on the COBIT 4.1 framework and supported by the ITIL V3 framework which has gone through a mapping process using the COBIT 4.1 IT process (Merta Suryani, Sasmita, & Purnawan, 2015). Another research that was carried out by Syukron Anas, Wing Wahyu Winarno and Hanif Al Fatta in 2017 with the research title "Evaluation of Academic Information Technology Governance at Stmik Dipanegara Makassar". The framework used in this study is COBIT 4.1, where the IT process used is only within the scope of ME due to observations made by auditors that this domain is still very low. The determination of this domain aims to obtain recommendations that are really focused so that they can support the business in a balanced way between the 4 domains in COBIT 4.1. The process of collecting data carried out by the auditor is by making observations starting from the study of the data literature that supports the research, then making a questionnaire in this study designed to determine the maturity level of academic information technology management that has been implemented by the institution by looking at the assumptions of users and implementers of the provisions in implementing technology within the institution. The next analysis stage is carried out by analyzing the current maturity level and the expected maturity level so that later the gap level will be found for a gap analysis. The results of the calculations for each domain are in the ME1 process with a value of 2.3, ME2 with a value of 2.3, ME3 with a value of 2.4, and ME4 with a value of 2.3 so that if the average value of the information technology governance domain is STMIK Dipanegara Makassar, which is 2.3. These results state that the management of information technology is carried out in a Repeatable but Intuitive manner, meaning that at this level many improvements are needed to be made in the subdomains because these four subdomains still exist in non-standard standardization (Anas, Wing Wahyu Winarno, & Fatta, 2017). Research conducted by Made Utu Tasmi in 2021 with the title "Analysis of the Capability Level of Badung Regency Online Licensing Services using the COBIT 5 Framework". The framework used in this study is COBIT 5 which is used to measure the performance of Information Technologists in achieving the vision and mission of the organization. The analysis carried out by the auditor begins by looking at the problems that exist in the Badung District DPMPSTP by mapping the business strategy with enterprise goals and IT related goals COBIT 5. Data collection techniques use observation, interviews and questionnaire distribution. Data processing and assessment is carried out by means of assessment models and gap analysis which are useful for determining the level of LAPERON capability. The analysis creates an audit focus on 7 COBIT 5 process domains, including Ensure Governance Framework Setting and Maintenance (EDM01), Manage the IT Management Framework (APO01), Manage Strategy (APO02), Manage Enterprise Architecture (APO03), Manage Human Resources (APO07), Manage Relationships (APO08) and Manage Requirements Definition (BAI02). The current capability level analysis results for the EDM01 and APO02 domains are at level 4 (predictable process). On the other hand, for the domains APO01, APO03, APO07, APO08 and BAI02, they are at level 3 (established process). The expected capability level for LAPERON governance is at level 5 (optimizing process). As a result, there is a GAP between the current and expected capability levels in each EDM01 and APO02 domain weighing 1 GAP. APO01, APO03, APO07, APO08 and BAI02 weigh 2 GAP (Tiasmi, Candiasa, & Indrawan, 2021).

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IT Capability

IT Capability is a term that can be described as the ability of a company to assemble and utilize IT resources in combination with other company resources(Nwankpa & Roumani, 2016). Companies that are able to plan and integrate their IT resources are in a better position to acquire customer information, share knowledge, and improve business processes. Therefore, it is necessary to prepare and assess IT Capabilities across the enterprise by combining IT infrastructure, IT human skills, and IT-enabled intangibles with other enterprise-specific resources to achieve consistent IT resource performance. The effect of IT capability on company performance has received a lot of positive attention, where companies with superior IT capabilities tend to outperform their competitors. Several studies argue that the competitive advantage of IT capabilities is a function of whether firms take full advantage of existing IT capabilities, in an effort to reconcile the status of developing IT as a capability and its impact(Chan, 2000). IT Capability has re-emerged in an increasingly digital business environment as an important mechanism by which companies can create pervasive digital connections between activities and entities in a chaos of values. With IT Capabilities, it enables companies to take advantage of emerging digital technologies and meet changing market demands.

COBIT 5

COBIT is an IT governance framework aimed at management, IT service staff, control departments, audit functions and more importantly business process owners, to ensure confidentiality, integrity and availability of data and sensitive and critical information(Putra, Sukarsa, & Bayupati, 2015). COBIT has developed into the most significant IT Governance framework and is also suitable for auditing because COBIT provides comprehensive guidance on the environment of IT processes and their relationship to business objectives.

According to ISACA (2012), that COBIT 5 has 5 basic principles:

1. Meet the needs of stakeholders.
2. Covers governance and work processes of End-to-End Enterprise.
3. Implement an integrated framework.Asd
4. Overall approach to governance capability and management of arrangements.
5. Separation between governance and management/regulation.



Fig. 1 Basic Principles of COBIT 5

3. METHOD

This sub-chapter describes the stages of the research conducted and the research data processing methodology.

Research Stages

The stages carried out in this research are in fig 2.

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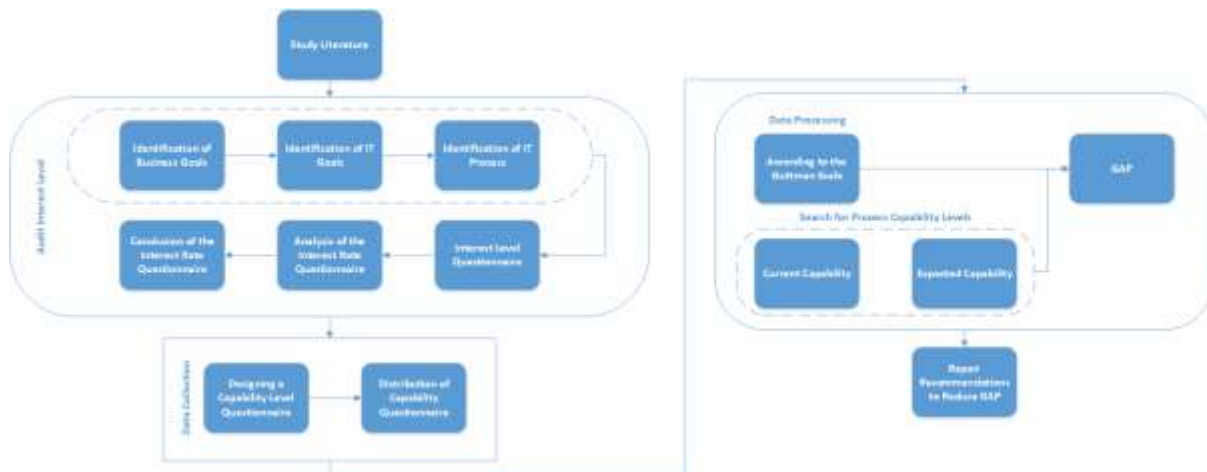


Fig. 2 Audit Process

The steps taken include the selection of IT processes in COBIT 5, as well as data collection consisting of interviews, observation and questionnaires, questionnaires processing, data analysis including the value of current capabilities and the expected level of capability, improvement of strategies based on COBIT 5 and framework best practices of ISO27002 and ISO / IEC 15504: 2 with COBIT mapping and final conclusions.

Guttman Method

The Guttman Scale was developed by Louis Guttman (1944, 1950) and was first used as part of a classic work of the Americans soldiers. The Guttman scale is applied to a set of binary questions (0 and 1). The purpose of this analysis is to get one firm answer like "Yes" and "No", "True" and "False" etc.(Abdi, Herve & Williams, 2010). The initial stages of data processing can be done by converting answers to each respondent where the answer "no" is converted to a value of 0 and the answer "yes" to a value of 1. The conversion results are formulated by looking for the average conversion value from the binary value which is obtained, divided with the number of questions for respondents (the number of questions in question is the number of questions from level 0-5) (1). Then the normalization process is carried out where the value obtained from the average number of conversions per level (level 0 - level 5) is divided by the total number of overall conversions (2). Afterward, normalization process is conducted where value obtained from the results of the previous normalization multiplied by the level in each domain process consisting of levels 0-5 (3). Calculating capability level domain data is obtained from the results of the level normalization process which is summed to get the result value from the capability level based on the id process (4). The value of the IT process id is obtained from the number of capability level values in each respondent in each domain process divided by the number of respondents in each domain process (5). The value of the current capability (current condition) is obtained from the total number of capability values in each IT process id divided by the number of IT processes contained in each IT process (6)(Iskandar & Rudyanto Arief, 2017).

$$R. K = \frac{nK}{\sum P_i} \quad (1)$$

$$N = \frac{\sum R K_i}{\sum R K_a} \quad (2)$$

$$NL = N \times L \quad (3)$$

$$CL_i = NL_0 + NL_1 + NL_2 + NL_3 + NL_4 + NL_5 \quad (4)$$

$$CL_a = \frac{\sum CL_i}{\sum R} \quad (5)$$

$$CC = \frac{\sum CL_a}{\sum P_o} \quad (6)$$

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4. RESULT AND DISCUSSION

Results and discussion explain the results of research at the natural resources conservation office which are Identification of Critical Points, Identification of Business Goals, Identification of Alignment Goals, Identification of IT Processes, Maintenance of Importance Levels, Capability of Maintenance Levels, and GAP Analysis. These results will provide recommendations for improving IT governance at the natural resources conservation office.

Identify Critical Points

The first stage in this research is the identification of critical points. The critical point was obtained from the results of interviews with the natural resources conservation office. Meanwhile, based on the results of the interviews, several critical points were obtained which are explained as follows table 1.

Table 1
 Results of Identification of Critical Points at Natural Resources Conservation Office

No.	Critical Points
1	Limited number of tools owned in the process of monitoring wild plants and animals for the conservation section.
2	The online portal for complaints and management of permits to enter conservation areas, some of their activities still require manual administration.
3	Due to the transition to the integration zone. Acceptance, processing of data to the process of publication to the public is a bit hampered.

Identify Business Goals

The business objectives that have been obtained from the mapping between the company's mission and business objectives will then be used to determine the relationship between the company's mission and IT goals according to COBIT5, which can be seen in table 2.

Table 2
 Mapping Business Goals with IT Goals

No.	Critical Points	Primary IT Goals (Primary)
3	Business risk management especially asset security	4,10, 16
4	Compliance with external laws and regulations	2, 10
9	Oriented to customer culture	1, 14
15	Compliance with internal policies	2, 10, 15

IT Process Identification

After mapping between IT objectives and the company's business objectives, the next step is to identify IT processes in COBIT 5. With reference to the IT objectives obtained, select processes in the COBIT 5 domain that have a Primary (P) linkage. Table 3 is the IT process from COBIT 5 obtained.

Table 3
 Mapping IT Goals with IT Processes

No.	IT Goals	IT Process				
		EDM	APO	BAI	DSS	MEA
1	Alignment of IT with business strategy	EDM01	APO01	BAI01		
		EDM02	APO02	BAI02		
			APO03			
			APO05			
			APO07			

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			APO08			
2	IT compliance and support for external regulatory and legal compliance		APO01 APO12 APO13	BAI10	DSS05	MEA02
3	Commitment from executive management to make decisions related to IT	EDM01 EDM05				MEA03
4	Handling IT issues related to business risks		APO10 APO12 APO13	BAI01 BAI06	DSS01 DSS02 DSS03 DSS04 DSS05 DSS06	MEA01 MEA02 MEA03
5	Recognizing the benefits of empowered investments in IT and portfolio services		APO04 APO05 APO06 APO11	BAI01		
6	Transparency on IT costs, benefits, and risks	EDM05	APO06 APO12 APO13	BAI09		
7	Delivery of IT services that match business needs	EDM05	APO02 APO08 APO09 APO10 APO11	BAI02 BAI03 BAI04 BAI06	DSS01 DSS02 DSS03 DSS04 DSS06	MEA01
8	Adequate use of applications, information and technology solutions		APO04	BAI05 BAI07		
9	IT agility	EDM04	APO01 APO03 APO04 APO10	BAI08		
10	Information security, processing infrastructure and applications		APO12 APO13	BAI06	DSS05	
11	Optimization of IT assets, resources and capabilities	EDM04	APO01 APO03 APO04 APO07	BAI04 BAI09 BAI10	DSS03	MEA01
12	Empowerment and support of business processes by integrating applications and technology into business processes.		APO08	BAI02 BAI07		
13	Delivery of programs that provide benefits, are on time, within budget, and meet quality requirements and standards.		APO05 APO07 APO11 APO12	BAI01 BAI05		
14	Availability of reliable and useful information for decision making.		APO09 APO13	BAI04 BAI10	DSS03 DSS04	
15	IT compliance with internal policies		APO01			MEA01 MEA02
16	IT personnel who are competent and have the motivation towards the existing business.	EDM04	APO01 APO07			

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17	Knowledge, expertise and initiatives for business innovation.	APO01	BAI05
		APO02	BAI08
		APO04	
		APO07	
		APO08	

Determination of Importance Level Value

Determining the level of importance is a detailed part of the IT process needed to support IT processes in agencies. Not all processes are used in the IT process, so when determining the level of importance, only processes with a very important level (SP) are selected based on the focus of the agency to be audited. Determining the level of importance in this study refers to the research objectives and the objectives of the institution and the level of criticality of business processes obtained from collecting data through a questionnaire on the level of importance. Table 4 is the result of mapping the importance level questionnaire which has been sorted from the highest value to the lowest value.

Table 4
Calculation of Interest Questionnaire Weight

Proses	STP (Bobot = 1)	TP (Bobot = 2)	CP (Bobot= 3)	P (Bobot=4)	SP (Bobot=5)	Total (N*B)
EDM01	0	0	0	2	6	38
EDM02	0	0	0	2	6	38
APO09	0	0	0	2	6	38
APO05	0	0	0	2	6	38
APO07	0	0	1	0	7	38
EDM04	0	0	0	3	5	37
APO01	0	0	0	3	5	37
APO03	0	0	0	3	5	37
APO08	0	0	1	1	6	37
APO13	0	0	0	3	5	37
BAI06	0	0	0	3	5	37
DSS03	0	0	1	1	6	37
MEA03	0	0	0	3	5	37
APO12	0	0	1	2	5	36
BAI04	0	0	2	0	6	36
DSS04	0	0	1	2	5	36
MEA01	0	0	0	4	4	36
APO02	0	0	0	5	3	35
APO10	0	0	1	3	4	35
BAI07	0	0	2	1	5	35
BAI10	0	0	0	5	3	35
DSS01	0	0	1	3	4	35
DSS02	0	0	1	3	4	35
DSS05	0	0	1	3	4	35
MEA02	0	0	0	5	3	35

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BAI01	0	0	1	4	3	34
BAI02	0	0	2	2	4	34
DSS06	0	0	0	8	0	32

Not all IT processes obtained from the results of the mapping are used. After knowing the processes involved, the weighted value of each process is calculated. The results with the highest weighted scores were 38 (thirtyeight) obtained from 5 (five) processes, from the 5 (five) processes with the highest weighted scores then carried out another observation at the agency to produce 3 (three) processes that were relevant and became the focus of the agency to be audited. These results will be developed as an IT process that will be further audited. Table 5 is the final result of the search for the importance of the IT process at the natural resources conservation office.

Table 5
Final Results of Interest Level Questionnaire

IT Process	Description
EDM01	Ensuring responsibilities and authorities are in line with the company's strategy and goals.
EDM02	Optimizing IT services and assets according to the cost.
APO09	Align IT-based services and service levels with needs.

Determination of Capability Level

Determination of capability level is used to determine the level of capability of IT processes in companies, the determination is made by giving capability level questionnaires to respondents who come from the operational division of the natural resources conservation office.

The gap value obtained through the process of determining the capability level at the natural resources conservation office. GAP values are shown in table 5.

Table 6
Capability Level Gap

IT Process	Current Capability (CC)	Capability (EC)	GAP (EC-CC)
EDM01	3,43	4	$4 - 3,43 = 0,57$
EDM02	3,18	4	$4 - 3,18 = 0,82$
APO09	3,28	4	$4 - 3,28 = 0,72$
GAP Average			0,70

Based on the capability level distribution of the IT processes involved shown in the table above, it can be concluded that the IT processes in companies have an average capability level of 3 - Established. This is because the average value obtained from the institution's current capability is 3.30 and in general the IT processes that are running at the agency have been implemented regularly, have been planned beforehand, process activities have been monitored so that the process is able to achieve results (outcomes) that are expected.

Recommendation

Recommendations are given based on the capability value of the current natural resources conservation office, with reference to the COBIT 5 Framework, with the target of achieving an increased level of capability. Recommendations that can be given based on current capability values can be seen in table 7.

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Table 7
IT Process Recommendations

IT Process	Recommendation Policy
TI EDM01	The information system owned by natural resources conservation office should be optimized in conducting more detailed outreach to users, both IT operators and other internal staff, as well as evaluating IT strategic processes in optimizing IT plans and decision making.
TI EDM02	Conduct a review of the value or benefits of procuring IT equipment to find out how much IT benefits in the overall process within the agency as well as Optimizing action or fast motion in terms of work program planning, investment, financing and risks to see how the benefits of using IT as a performance support towards predictable process level.
TI APO09	The process of evaluating agreements that have been carried out from business relations management to ensure the system/equipment used is still functioning properly or there has been damage to the system/equipment and the natural resources conservation office is expected to optimize its duties in reviewing service reports generated by third parties and arranging regular progress meetings as specified in the agreement.

5. CONCLUSION

Natural resources conservation office has carried out an Information Technology Governance Audit using the COBIT 5 framework, focusing on EDM01 Ensure Governance Framework Setting and Maintenance with Governance Practice (EDM01.01 Evaluate the governance system, EDM01.02 Direct the governance system and EDM01.03 Monitor the governance system), EDM02 Ensure Benefits Delivery with Governance Practice (EDM02.01 Evaluate value optimization EDM02.02 Direct value optimization and EDM02.03 Monitor value optimization), APO09 Manage Service Agreements with Management Practice (APO09.01 Identify IT services APO09.02 catalog IT-enabled service APO09.03 Define and prepare service agreements APO09.04 Monitor and report service levels APO09.05 Review service agreements and contracts). The audit result data obtained is quantitative data obtained from the processing of the results of the importance level questionnaire which is then analyzed and obtains the results of the IT process to be used as a capability level questionnaire, by processing data using Guttman scale measurements to determine current conditions (current capability) and expected expectations. desired by the agency (expected capability). The assessment consists of level 0 (incomplete process), level 1 (performed process), level 2 (managed process), level 3 (established process), level 4 (predictable process) and level 5 (optimizing process). The results of an Information Technology Governance Audit Using the COBIT 5 Framework at the Natural Resources Conservation are as follows. Based on the results of interviews, the expected level of capability at the natural resources conservation office is at level 4 (predictable process). Furthermore, from the distribution of questionnaires to the natural resources conservation office, the results were obtained from EDM01 which is a process of ensuring responsibility and authority that is in line with the strategy and objectives of the agency carried out having capability level 3 with an average capability value of 3.43. This states that the process on EDM01 has been implemented and is able to achieve results (outcomes). EDM02 is a standard process to meet business needs in order to respond quickly to governance and IT needs so as to provide consistent and reliable information and integrate it into the agency's business at capability level 3, where the average value of capability is 3.18. It can be identified that the EDM02 process has been implemented in a systematic and effective way and has achieved an outcome value. APO09 is a process with the activity of managing service agreements to ensure agencies have identified agreements, drafted contracts or agreements that are appropriate to the list of services at capability level 3. The score for the average capability score in the TI APO09 process is 3.28. It can be identified that the APO process has been operated properly and the results of this process are in accordance with the objectives and are able to achieve results. The result of the gap value obtained from the gap analysis between the current capability level and the expected capability by the agency is 0.70. Recommendations for improving information technology governance at the natural resources conservation office to achieve the conditions of alignment of governance that are expected to be obtained from the results of the gap analysis (gap). Recommendations and suggestions refer to the COBIT 5 standard as well as ISO/IEC 15504:2 and ISO 27002. The results of the analysis are used as a reference in preparing recommendations for improvement to achieve the desired alignment of governance conditions at the natural resources conservation office.

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6. REFERENCES

- Abdi, Herve & Williams, L. (2010). Correspondence analysis.
- Anas, S., Wing Wahyu Winarno, & Fatta, H. Al. (2017). Evaluasi Tata Kelola Teknologi Informasi Akademik STMIK Dipanegara Makassar. *Jurnal Penelitian Dan Pengabdian Kepada Masyarakat UNSIQ*, 4(1), 28–33. Retrieved from <https://ojs.unsiq.ac.id/index.php/ppkm/article/view/403>
- Chan, Y. (2000). IT Value: The Great Divide Between Qualitative and Quantitative and Individual and Organizational Measures. *J. of Management Information Systems*.
- Dharma, I. G. M. S., Sasmita, I. G. M. A., & Putra, I. M. S. (2021). Evaluasi Dan Implementasi Tata Kelola TI Menggunakan COBIT 2019 (Studi Kasus Pada Dinas Kependudukan Dan Pencatatan Sipil Kabupaten Tabanan). *JITTER- Jurnal Ilmiah Teknologi Dan Komputer*, 2(2).
- Drljaca, Dalibor & Latinović, B. (2016). Frameworks for Audit of an Information System in Practice. *Journal of Information Technology and Applications*.
- Iskandar, D., & Rudyanto Arief, M. (2017). AUDIT TATA KELOLA TEKNOLOGI INFORMASI PADA PERGURUAN TINGGI SWASTA DI SURAKARTA (Studi Kasus: Politeknik Indonusa Surakarta). *Jurnal Informa*, 3(1), 2442–7942. Retrieved from <http://informa.poltekindonusa.ac.id/index.php/informa/article/view/5>
- Jingga, F., Kosala, R., Ranti, B., & Supangkat, S. H. (2019). It governance implementation in indonesia: A systematic literature review. *International Journal of Scientific and Technology Research*, 8(10), 2074–2079.
- Merta Suryani, N. P. S., Sasmita, G. M. A., & Purnawan, I. K. A. (2015). Audit of accounting information system using COBIT 4.1 focus on deliver and support domain. *Journal of Theoretical and Applied Information Technology*, 78(3), 456–463.
- Nwankpa, J. K., & Roumani, Y. (2016). IT capability and digital transformation: A firm performance perspective. 2016 International Conference on Information Systems, ICIS 2016, 1–16.
- Pérez Lorences, P., & García Ávila, L. F. (2013). The Evaluation and Improvement of IT Governance. *Journal of Information Systems and Technology Management*, 10(2), 219–234. <https://doi.org/10.4301/s1807-17752013000200002>
- Putra, I. P. A. A. P., Sukarsa, I. M., & Bayupati, I. P. A. (2015). Audit Ti Kinerja Manajemen Pt. X Dengan Frame Work Cobit 4.1. *Lontar Komputer : Jurnal Ilmiah Teknologi Informasi*, 6(1), 13–24.
- Ranjbarfard, Mina & Mirsalari, S. (2020). IT Capability Evaluation through the IT Capability.
- Steuperaert, D. (2019). COBIT 2019: A SIGNIFICANT UPDATE. EDPACS.
- Tiasmi, N. L. M. U., Candiasa, I. M., & Indrawan, G. (2021). Analisis Tingkat Kapabilitas Layanan Perizinan Online Kabupaten Badung Menggunakan Framework COBIT 5. *Jurnal Eksplora Informatika*, 10(2), 167–175. <https://doi.org/10.30864/eksplora.v10i2.501>
- Zakwan, S., Ratnawati, S., & Hidayah, N. A. (2014). Audit Tata Kelola Sumber Daya Teknologi Informasi Dengan Kerangka Kerja Cobit 4.1 Untuk Evaluasi Manajemen Pada Badan Pengawasan Keuangan Dan Pembangunan. *Studia Informatika : Jurnal Sistem Informasi*, 7(2014), 1–16.
- Zhang, Peiqin & Zhao, Kexin & Kumar, R. (2014). The impact of IT governance on IT capability and firm performance. *Information Systems Management*.

* Corresponding author

