

Optimization of Information Technology Human Resources Using COBIT 5.0 EDM04 and APO07

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Abstract— The provincial service is one of the apparatus in the province. To carry out some of the tasks and functions of the Provincial Office in the Administrative City, a Sub-Department (Sudin) can be formed in accordance with the provisions of the legislation. In the East Jakarta Administrative City, there is a Kominfo City Sub-Department which has 3 sections, namely Public Communication and Information, Data Communication Networks and Information Systems, one of which is the Information systems, cyber, and password sections. The role and policies of Information Systems, Cyber and Passwords in implementing implementation as a provider of security applications and websites for the East Jakarta City Administration. Among the contracts for the policy staff of the Section Head of Information Systems, Cyber and Passwords regarding the proposal of 3 additional people using the APBD. The COBIT 5.0 framework from ISACA was used in this study with interviews, questionnaires and follow-up observations in the hope of providing relevance between the ability of adequate IT-skilled human resources to support optimal agency goals, respondents who are responsible for the RACI graph give an EDM04 value of 4.24 and APO07 4.24 is at Level 4 The process is predictable, which means that levels up to 3 are fully successful (F), because the process has measured its performance and is controlled so that it always produces the desired performance, policies that are carried out according to and support agency goals effectively at optimal costs and predictable within specified limits.

Keywords— Capability Level, COBIT 5.0, E-Government, Maturity Model, Information Technology Resources.

I. INTRODUCTION

In 2021, the world struggled to deal with the pandemic, as well as Indonesia and this affected the use of information systems in all sectors by all agencies, including government agencies, which increased faster for the sake of providing services to the community, so that they were required to further improve the efficiency of existing resources. The Provincial Government of the Special Capital Region of Jakarta made a breakthrough in improving services to the community through the Government-to-Citizen (G2C) model. To carry out some of the tasks and functions of the Provincial Office in the Administrative City, a Sub-Department (Sudin) can be formed in accordance with the provisions of the legislation. Because of its position in the city, not in the province, the Sub-Department is also known as the City Sub-Department. In East Jakarta Administrative City, there is a Sub-Department of Communication, Informatics and Statistics which has 3 sections, namely Communication and Public Information, Data Communication Network and one of them is the Information Systems, Cyber, and Passwords Section.

An information system audit is a structured activity in evaluating existing components to determine that an information system used by an agency can be said to be good

and controlled, in addition to an information system audit it also wants to ensure compliance with existing policies within the agency (Mulyadi, 2001). The information system audit framework that is widely used is the Control Objective for Information and Related Technology (COBIT) framework from the Information Technology Governance Institute (ITGI) which is part of the Information Audit and Control Association (ISACA) on the use of resources and information technology, and assessing the capability level of achievement that has been used as a form of accountability to the community.

As a consideration for choosing COBIT because it is also used by the Ministry of Administrative Reform and Bureaucratic Reform, especially the SPBE Architecture team to assess the level of policy maturity, governance and management capabilities in ministerial regulations issued.

The following are studies that have been carried out previously and become a reference in writing including, Abdul Hakim, et al. Using the capability level analysis method with the COBIT 5 framework in the EDM, APO, BAI, DSS, and MEA domains. It shows that the results of the APO13 process have the lowest value, so there are weaknesses in the handling of IT management that can interfere with data distribution and user performance. However, in the BAI domain, it has reached the target level of 3, meaning that almost all of them meet the requirements, but there is no adequate documentation when there is a change in the system, both in terms of hardware and software.

A. Moh. Sure Amen, et al. Using the COBIT 5 framework with domains EDM04, APO01, APO03, APO04, APO07, BAI04, BAO09, BAI10, DSS01, DSS03 and MEA01. Capability Level obtained in the process of each domain is at level 1.

Rahmi Novita, et al. Using the COBIT 5 Framework focuses on the domains EDM04, APO01, APO03, APO04, APO07, BAI04, BAI05, BAI06, BAI07, BAI09, BAI10, DSS01, DSS03, and MEA02. Domain APO 04 (Manage Innovation) and BAI 04 (Manage Availability and Capacity) are at level 0. Domain EDM 04 (Ensure Resource Optimization), BAI 05 (Manage Organizational Change Enablement), BAI 07 (Manage Change Acceptance and Transitioning), BAI 09 (Manage Assests), BAI 10 (Manage Configuration), DSS 01 (Manage Operations), DSS 03 (Manage Problems) and MEA 02 (Monitor, Evaluate and Assess the System of Internal Control) are located. at level 1. The APO 07 (Manage Human Resource) domain is at level 2. And the APO 01 (Manage the IT Management Framework) and APO 03 (Manage Enterprise Architecture) domains are at level 3.

II. METHODOLOGY

This research was conducted using the COBIT 5 framework at the Sub-Department of Communication, Information and Statistics, East Jakarta City Administration. The stages carried out in this research include literature study, defining the problem, collecting data, analyzing data, making recommendations, and drawing conclusions. The research flow is presented in Figure 1.

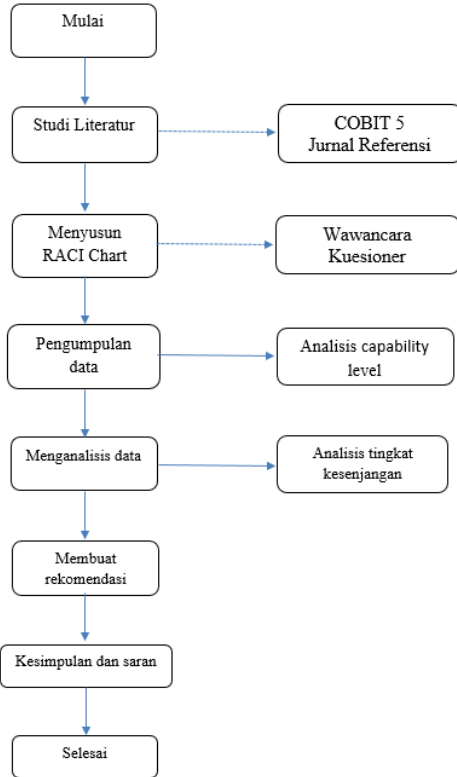


Fig. 1. Research workflow

A. Research Design

This research design uses two data, namely primary data obtained from observations, interviews and questionnaires filled out by respondents, and secondary data obtained from various existing sources such as websites, literature studies, and the results of research that has been done previously.

B. Data Collection Method

a) Literature Study

Using references to several journals, and thesis that discuss of information system audits, information system governance, COBIT and E-Government.

b) Operationalization of the Conceptual Framework

The data collection method described in the Operationalization Table used in the information technology governance evaluation research that described in table I.

c) Interview

Interviews were conducted with the Head of Section of the Information Systems, Cyber and Passwords who is the researcher himself and his staff and contract workers under it as resource persons in this study as described in the RACI chart.

TABLE I. Operationalization Table

Operationalization of The Conceptual Framework			
COBIT Domain	Data Collection Method	Sources of Getting Data	Proof
<i>Evaluate, Direct, Monitor</i>			
EDM04 and APO07- <i>Ensure Resource Optimisation</i>	<ul style="list-style-type: none"> Interview Document Analysis 	<ul style="list-style-type: none"> Respond to interview questions Document Strategic 	Verifying strategy documents through interviews and checking strategy documents
APO07- <i>Manage Human Resources</i>	<ul style="list-style-type: none"> Interview Document Analysis 	<ul style="list-style-type: none"> Respond to interview questions Document Strategic 	Verifying strategy documents through interviews and checking strategy documents

d) Document analysis

Documents are analyzed to support information are collected through interviews and provide level clarity at the capability level.

C. Data Analysis Method

a) Planning the Assessment

Assessment Process Activities is Planning the Assessment based on the RACI diagram, the following is an explanation of the selection of respondents based on the conversion of the RACI diagram that contained in the COBIT 5 framework with an institute structure.

TABLE II. Process Respondents of EDM04

No.	Functional Structure of COBIT Related	Respondent Structure
<i>EDM04.01 Evaluate Resource Management</i>		
1	Chief Executive Officer	Kasudin
2	Business Executives	Kasi KIP
3	Strategy Executive Committee	Kasubag TU
4	Chief Information Officer	Kasi SISS dan Kasi JKD
<i>EDM04.02 Direct Resource Management</i>		
1	Chief Executive Officer	Kasudin
2	Business Executives	Kasi KIP
3	Strategy Executive Committee	Kasubag TU
4	Chief Information Officer	Kasi SISS dan Kasi JKD
<i>EDM04.03 Monitor Resource Management</i>		
1	Chief Executive Officer	Kasudin
2	Business Executives	Kasi KIP
3	Strategy Executive Committee	Kasubag TU
4	Chief Information Officer	Kasi SISS dan Kasi JKD

TABLE III. Process Respondents of APO07

No.	Functional Structure of COBIT Related	Respondent Structure
<i>APO07.01 Maintain adequate and appropriate staffing.</i>		
1	Project Management Office	Kasudin
2	Head Human Resources	Kasubag TU
3	Head Architect	Kadis
4	Head Development	Kasi SISS
5	Head IT Operations	Kasi JKD
6	Head IT Administration	Kasi SISS
7	Service Manager	Kasi JKD dan Kasi SISS
8	Information Security Manager	Kasi SISS
9	Business Continuity Manager	Kasi KIP

APO07.02 Identify key IT personnel.		
1	Project Management Office	Kasudin
2	Head Human Resources	Kasubag TU
3	Head Architect	Kadis
4	Head Development	Kasi SISS
5	Head IT Operations	Kasi JKD
6	Head IT Administration	Kasi SISS
7	Service Manager	Kasi JKD dan Kasi SISS
8	Information Security Manager	Kasi SISS
9	Business Continuity Manager	Kasi KIP
APO07.03 Maintain the skills and competencies of personnel.		
1	Project Management Office	Kasudin
2	Head Human Resources	Kasubag TU
3	Head Architect	Kadis
4	Head Development	Kasi SISS
5	Head IT Operations	Kasi JKD
6	Head IT Administration	Kasi SISS
7	Service Manager	Kasi JKD dan Kasi SISS
8	Information Security Manager	Kasi SISS
9	Business Continuity Manager	Kasi KIP
APO07.04 Evaluate employee job performance.		
1	Project Management Office	Kasudin
2	Head Human Resources	Kasubag TU
3	Head Architect	Kadis
4	Head Development	Kasi SISS
5	Head IT Operations	Kasi JKD
6	Head IT Administration	Kasi SISS
7	Service Manager	Kasi JKD dan Kasi SISS
8	Information Security Manager	Kasi SISS
9	Business Continuity Manager	Kasi KIP
APO07.05 Plan and track the usage of IT and business human resources.		
1	Business Executives	Kasi KIP
2	Steering (Programmes/Projects) Committee	Walikota JT
3	Project Management Office	Kasudin
4	Chief Information Officer	Kasi SISS
5	Head Human Resources	Kasubag TU
6	Head Architect	Kadis
7	Head Development	Kasi SISS
8	Head IT Operations	Kasi JKD
9	Head IT Administration	Kasi SISS
10	Service Manager	Kasi JKD dan Kasi SISS
11	Information Security Manager	Kasi SISS
12	Business Continuity Manager	Kasi KIP
APO07.06 Manage contract staff.		
1	Project Management Office	Kasudin
2	Head Human Resources	Kasubag TU
3	Head Architect	Kadis
4	Head Development	Kasi SISS
5	Head IT Operations	Kasi JKD
6	Head IT Administration	Kasi SISS
7	Service Manager	Kasi JKD dan Kasi SISS
8	Information Security Manager	Kasi SISS
9	Business Continuity Manager	Kasi KIP

The next stage is Briefing and data collection, in data collection researchers identify the needs for each process to be carried out by the Department of Communication, Information

and Statistics of the East Jakarta Administration City. After that, perform of data validation on the findings of the documents shown by the respondents in accordance with the RACI Chart of the domain process that has been determined by ensuring that the documentation submitted by the respondents is accurate data and sufficiently covers the scope of the assessment.

b) *Process Attribute Level*

At this stage the researcher recapitulates the entire process that has been carried out, namely:

1. Comparison of work product actual with researcher standards to check of Generic Work Products (GWP). This is to see that the process has met the documentation requirements and the assessment is carried out based on data that has been validated at the previous stage.
2. Present it to the rating scale

c) *Reporting the Result*

At this stage the researcher will report the evaluation results of information technology governance in the form of findings, activities of each process, and gaps that aim to provide recommendations proposed by researchers to improve existing deficiencies based on research results in accordance with the COBIT 5 framework.

d) *Gap Determination*

Gap are obtained from deficiencies in each activity, output, input, and data on Generic Work Products or process performance indicators that have not been met, with the Human Resources condition that working in the Section of Information Systems, Cyber and Passwords against the desired ideal conditions as Figure 2 below:

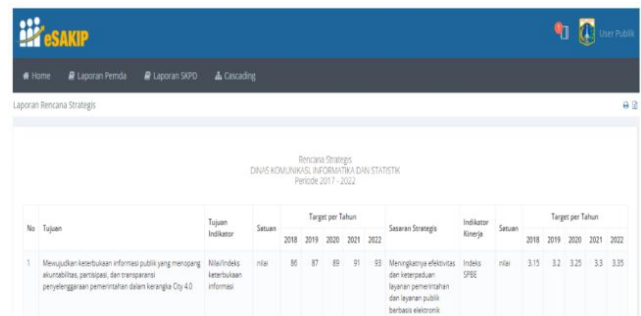


Fig. 2. Strategic Targets of the Department of Communication, Information and Statistics for 2018-2022 (<https://sakup.jakarta.go.id/>)

Adjustments were made to close the gap created by the IT conditions in the current section with the desired conditions, namely by looking for differences in COBIT governance conditions at which ideal stages can be achieved in the medium and long term with the existing conditions in 2021. The difference will be a recommendation on what must be improved so that good IT Governance is obtained. Then proceed to the recommendation stage obtained from the results of the capability level assessment analysis and gap analysis as a form of solution design to provide a proposed improvement to the assessed process. The proposed improvements suggested to direct the Sub-Department of Communication, Informatics and Statistics of the East Jakarta Administrative City in accordance with the expected level.

III. RESULT AND DISCUSSION

Organizational Structure of the Sub-Department of Communication and Informatics of the East Jakarta Administration City, Chart of the organizational structure of Sub-Department of Communication and Informatics of the East Jakarta Administration City.

The Sub-Department of Communications and Information Technology of the East Jakarta Administration City is led by a Head of Sub-department who is technically and administratively are under and responsible to the Head of Service, and operationally located under and responsible to the Mayor as in Figure 3.

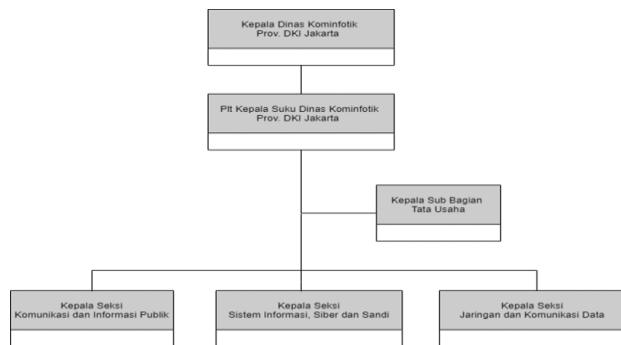


Fig. 3. Structure of the Sub-Department of Communication and Informatics of the East Jakarta Administration City.

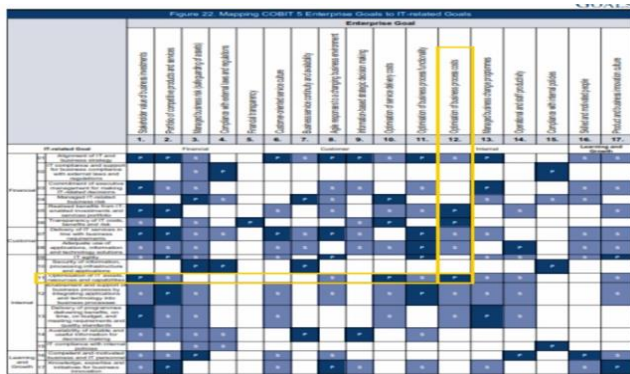


Fig. 4. Mapping Cobit 5 Enterprise Goal

Furthermore, conducting the determination of the domain contained in COBIT 5 for evaluation in the Section of Information Systems, Cyber and Password of the East Jakarta Administration City, based on the results of the interview, it can be known that the mission of the Sub-Department is to continue to provide value to internal or external and contained in figure 4.

TABLE IV. List of EDM04 capability level calculation results (Evaluating Resource Management)

Process	Respondent	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5	Capability Level
EDM04	R1	0	0	0	0	0.96	0	0.96
	R2	0	0	0	0	1	0	1
	R3	0	0	0	0	0.8	0	0.8
	R4	0	0	0	0	0.92	0	0.92
	R5	0	0	0	0	1	0	1
	R6	0	0	0	0	0.96	0	0.96
	R7	0	0	0	0	0.6	0	0.6
								0.89

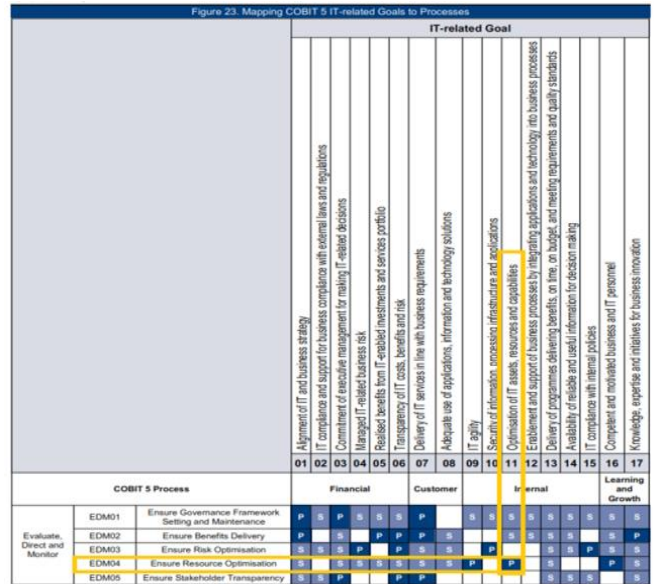


Fig. 5. Mapping Cobit 5 IT related goals to Processes

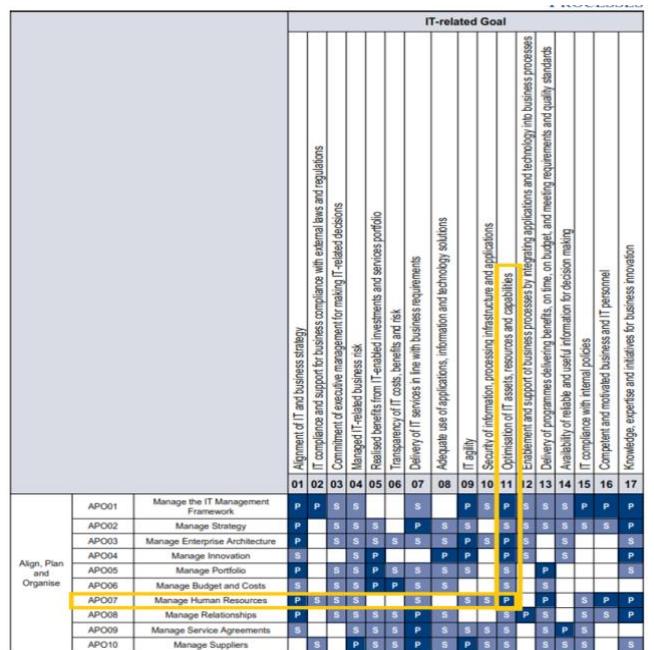


Fig. 6. Mapping COBIT 5 IT-related goals to Processes

A. Calculation of Capability Level Manage Human Resources EDM04

TABLE V. List of APO07 capability level calculation results (Maintain adequate and appropriate staff)

Process	Respondent	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5	Capability Level
APO07.01	R1	0	0	0	0	0.9	0	0.9
	R2	0	0	0	0	0.85	0	0.85
	R3	0	0	0	0	0.8	0	0.8
	R4	0	0	0	0	0.85	0	0.85
	R5	0	0	0	0	1	0	1
	R6	0	0	0	0	0.9	0	0.9
	R7	0	0	0	0	0.6	0	0.6
								0.84

B. Process Achievement

The level of capability determined in each process domain is to gradually check the process capability indicators that must be achieved by the Section of Information Systems, Cyber and Passwords of the Sub-Department of Communication and Information of East Jakarta Administration City. In calculations using a Likert scale, the capability level for each process is obtained, namely EDM04 (Ensure Resource Optimization) is currently at level 4, APO07 (Manage Human Resources) is currently at level 4. So, if the capability level of EDM04 is at level 4, so, it must meet of predictable process achievements. Likewise with the APO07 process which must meet the predictable process achievements. This examination refers to the process capability indicators that contained in COBIT 5. Process capability indicators are a means to achieve the capabilities expected by the Section of Information Systems, Cyber and Passwords. The following is a table explaining the process capability indicators that must be achieved in the EDM04 process.

a) EDM04 Process (Ensure Resource Optimization)

From the results of the questionnaires that have been filled out by respondents at the Planning the Assessment stage and after going through calculations at the Data Validation stage, the following capability levels are generated:

TABLE VI. EDM04 Capability Level

No	Sub Domain	Capability Value		Capability Level	
		As Is	To Be	As Is	To Be
1	EDM04.01	4.46	3.3	4	3
2	EDM04.02	4.09	3.3	4	3
3	EDM04.03	4.19	3.3	4	3

Table VI explains that the value for the current condition (as is) in EDM04 is 4.24 or the capability level is at level 4, namely Predictable Process. While the expected conditions (to be) according to the Plan and Strategy of the Office of Communication, Information and Statistics are at level 3 with a capability value of 3.3.

The EDM04 (Ensure Resource Optimization) process ensures that resource optimization reaches level 4 predictable process with largely achieved (L) category capability level assessment. Most of the resource optimization in implementation has been in accordance with the plan, but still adjusts if it is not as planned. At Level 0 reaching Fully achieved (F) because it has an organizational goal in the form of a vision of the mission and the implementation of these goals has been implemented, then checking at level 1 achieves Fully achieved (F) because it has carried out the implementation of

the performance of each process in achieving the goal to level 4 achieving Fully achieved (F) work implementation there have been guidelines such as basic tasks and functions and work plans used by employees to achieve the goals, Employee assessment can also be seen from the SKP (Employee Work Target) in which there are reports of things that have been done and have not been done in a certain period. After re-checking, most of the implementations have been as planned and there has been an evaluation, and in the work implementation there has been monitoring. It is evident from documents such as main tasks and functions, work plans and examples of Employee Work Target sheets, existing resources are sought to be utilized optimally. One of the efforts is with HR participating in training from various internal and external agencies and being able to register them and be reported in the employee system.

TABLE VII. Process Attribute 1.1 Process Performance EDM04

Base Practices	Work Products	Exist	Evidence
EDM04.01 Evaluating of resource management	Guiding principles for resource and capability allocation	√	RPJMD
	Guiding principles for enterprise architecture	√	Ritik, SPBE
	Approved resource plan	√	RKPD
EDM04.02 Directing the resources management	Resource strategy communication	√	Renstra
	Assignment of responsibility for resource management	√	Governor's Decree, Assignment Letter, Work Order
	Principles for protecting resources	√	Governor's Decree, Circular
EDM04.03 Monitoring of resource management	Feedback or suggestions regarding the allocation and effectiveness of resources and capabilities	√	Decree
	improvement actions to address resource management irregularities	√	JAKI, Work Plan
Average score			4.24

b) Process of AOP07 (Manage Human Resources)

From the results of the questionnaires that have been filled out by respondents at the Planning the Assessment stage and after going through calculations at the Data Validation stage, the following capability levels are generated.

Table VIII explains that the value for the current condition (as is) in APO07 is 4.24 or the capability level is at level 4, namely Predictable Process. While the expected conditions (to be) according to the Strategic Plan of the Office of

Communication, Information and Statistics are at level 3 with a capability value of 3.3.

TABLE VIII. APO07 Capability Level

No	Sub Domain	Capability Value		Capability Level	
		As Is	To Be	As Is	To Be
1	APO07.01	4.21	3.3	4	3
2	APO07.02	4.25	3.3	4	3
3	APO07.03	4.31	3.3	4	3
4	APO07.04	4.20	3.3	4	3
5	APO07.05	4.29	3.3	4	3
6	APO07.06	4.18	3.3	4	3

The APO07 (Manage Human Resources) process for managing human resources reached level 4 Predictable process with an assessment of the capability level for the Fully achieved (F) category. This process has been adjusted to the

organizational structure; the implementation of human resource management is partly in accordance with the agreed regulatory implementation plan. At level 0 it reached of Fully achieved (F) because it had a goal in the form of a vision and mission as published to the public and there had been implementation reports and achieved goals, then at level 1 achieved Fully achieved (F) because it had been carried out in the implementation of performance in achieving goals and then further checking is carried out at level 2 reaching Fully achieved (F) because it is documented in the form of images in the office. Each employee's work guidelines has also been documented and functional. The performance report carried out by each employee is seen from the Employee Work Target document. The implementation of employee work is in accordance with existing, but the achievements made by employees can be seen from the results of interviews.

TABLE IX. Process of EDM04

Process	Findings	GAP	Recommendation
Ensure that requirement of agency resource are optimally met, IT costs are optimized, and there is an increased likelihood of benefit realization and readiness for the future changes.	In EDM04.03 found: Has not been able to monitor the optimization of HR with the priority of agreed objectives.	PA 4.1 The lack of maximum measurement results is used to ensure that process performance supports the achievement of relevant process performance goals in support of specified business objectives and PA 4.2 Lack of maximum is also quantitative management to produce stable, capable, and predictable processes within specified limits.	The need for measuring tools that are fully integrated between all attributes in a structured and automated system and detail in a measurable period.

TABLE X. Process of APO07

Process	Findings	GAP	Recommendation
Optimizing the ability of human resources to meet of company objectives.	In APO07.01 found: a. not yet able to include background checks in the IT recruitment process for contract personnel depending on the level of sensitivity and criticality of functions in the agency. b. not yet able to establish flexible resource settings to support changing business needs and third-party service arrangements. In APO07.04 found: a. Have not been able to set individual goals in line with agency objectives that should better reflect core competencies. b. has not been able to compile 360-degree performance evaluation results. c. Has not been able to provide specific instructions for the use and storage of personal information in the evaluation process, personal data and employment law.	PA 4.1 The lack of maximum measurement results is used to ensure that process performance supports the achievement of relevant process performance goals in support of specified business objectives and PA 4.2 Lack of maximum quantitative management to produce stable, capable, and predictable processes within specified limits.	a. The need for standardization of IT-related processes in all relevant agencies. b. The need for employee assessment and evaluation whether in accordance with the existing position or to another agency. c. Need for IT audit d. It is necessary to develop the latest IT HR self-development measurement tool system.

IV. CONCLUSION

Based on the results of interviews, observations and assessment sheets in the statement to the Section of Information Systems, Cyber and Passwords, it can be concluded that the value of the capability level for the EDM04 Ensure Resource Optimization process is 4.24, which is at level 4 or a predictable process with a maturity level largely achieved (L) so that the process can be ensured to be optimally implemented in accordance with the Strategic Plan with evaluated employee performance targets. Then a stable and predictable or controlled process is produced with variations which become one of the additional objects of initiative assessment towards competitive human resources by seeking maximum utilization of resources. The value of the capability

level for the APO07 Manage Human Resource process is fully achieved 4.24 which is at level 4 or predictable process and the maturity level is largely achieved (L) so that most of the resource management has been optimal in line with the main objectives of the section, the work guide for each employee is mostly has been documented and evaluated in the form of a performance application for civil servants. In order to be able to measure the achievement of the target and become a consideration for the latest policy change recommendations.

To expand the scope of evaluation in the COBIT 5.0 framework in order to be able to identify and manage other controls from other stakeholders in a linear fashion so as to provide tasks and input in the form of recommendations by adding dynamic policy strengths and building digital

transformation in IT human resources in the field of Information Technology.

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