IT Governance in Public Organization

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IT Governance in Public Organization
Based on ITBSC and Cobit 5

The Case of Kupang Municipality

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Abstract—IT Governance becomes a key component in corporative governance because of the influence of information systems and technologies that support every component of the organization. IT governance which is applied to government organizations can provide positive benefits and support the achievement of business objectives to increase the quality of public services. Application of a good IT Governance is used to apply it in accordance with institutional context. The method used is COBIT 5 combined with ITBSC, then mapping with institutional objectives. The process of collecting data using structured interview methods to the stakeholders in Kupang Municipality. This research found that capability level of Kupang Municipality is in position 0 (incomplete process) with target level of capability of 3, it means that IT Governance of Kupang Municipality not in a maximal condition to responding business process. This study also produced a recommendation for improvement in order to increase the value of capability levels that were set based on COBIT 5.

Keywords—*IT Governance; ITBSC; COBIT 5; public organization; municipality*

I. INTRODUCTION

IT governance becomes a key component of governance due to the influence of information systems and technologies that support every component of the organization. In other words, good IT governance supports the good corporate governance [1]. The need for IT governance is increasing in the era of globalization where IT Governance in practice is very important for governance change [2]. Reliance on information technology is a common characteristic for almost all modern organizations including government organization. Utilization of IT governance in government organizations at the central and regional levels will ensure increased efficiency, effectiveness, transparency and accountability in good governance [3].

Application of good IT governance is used to apply it in accordance with institutional context. However, organizing information technology (or IT governance) is not an easy task as it is recognized as a critical issue facing the public sector today [4]. These factors include; The complexity of accountability relationships between the government and the legislature [5], the factors of political influence and structural change are primarily concerned with the public sector that can disrupt governance mechanisms [6]. The political cycle influences the organizational structure so that it significantly affects the priority change of the program. This resulted in data discontinuity and weakened governance monitoring [7]. This shows that the organizational structure plays an important role in IT Governance [8]. In spite of all the nuances, effective IT Governance plays an important role for the economic and social life of citizens [9].

Kupang Municipality has Electronic Data Processing (EDP) division that in charge of managing all the data. There are 3 research questions to be answered: (1) How to evaluate and measure the capability level of existing IT Governance?. (2) How to construct IT Governance with approach of ITBSC and COBIT 5 in public service accordance with the Kupang Municipality context?. This study will answer these research questions through research stages. This paper consists 5 sections. Section 2, the next section, provides a theoretical of IT governance, BSC and its transformation into ITBSC, overview of COBIT 5 and previous studies about IT governance in public sector. Section 3 describes the research method. Section 4 reports the result, analysis and recommendation for IT governance improvement based of COBIT 5 process. Section 5 summarizes the research and suggestion for future research.

II. THEORETICAL AND PREVIOUS STUDIES

A. IT Governance

The Information Technology Governance Institute (ITGI) defines IT governance as the responsibility of directors and executive management because information technology is an integral part of institutional governance which consists of leadership, organizational structure and processes that ensure information technology sustains and broadens institutional strategies and objectives [10]. IT governance is an organizational action undertaken by commissioners, executive

management and IT Management to control the formulation and implementation of IT strategy in this regard to ensure IT alignment with business processes [11]. This means, IT governance is part of corporate governance [12]. From the above definition can be concluded that the Information Technology Governance is part of the Institutional Governance, in which there are stakeholders, structures and processes that ensure information technology resources in coherence with the strategy and objectives of the institution

B. ITBSC

The Balanced Scorecard translates the organization's vision and strategy into a comprehensive set of measures that provides a framework for measurement and strategic management systems [13].

This concept introduces a company's performance measurement system using certain criteria. The criterion is actually a description of what the company's mission and strategy are in the long run, which are classified into four different perspectives as shown in Fig. 1 and the transformation traditional BSC to ITBSC is shown in Fig. 2

C. COBIT 5

Control Objective for Information and Related Technology (COBIT) is a standard guide to information technology management practices. COBIT designed to be a single integrated framework [15]. This framework is a comprehensive tool for creating IT governance in organizations by meeting the diverse needs of management by bridging the gap between business risk, IT needs and technical issues.

The capability level of COBIT 5 provides a measure of process capability in achieving organization's objectives to be projected in the future. The current capability level achieved then calculated by the gap to produce recommendations for improvement. Assessment Capability level is divided into the following levels [15]:

1. Level 0 – **Incomplete Process**
    The process has not been implemented or failed to achieve its objectives.

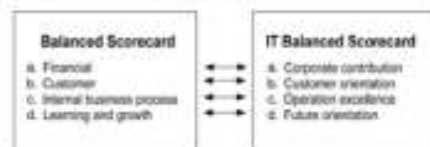Fig. 1. Balance Scorecards Perspective [13]

Fig. 2. BSC to ITBSC transformation [14]

2. Level 1 – **Performed Process**
    The process is implemented and able to achieve its objectives, although the process is accomplished through ad hoc action, lack of planning or standards and depends on individual capabilities.
3. Level 2 – **Managed Process**
    Implementation of a process is well managed (planned, monitored and organized).
4. Level 3 – **Established Process**
    The process is executed regularly, effectively and documented using standard to achieve the goal.
5. Level 4 - **Predictable Process**
    The process has been done regularly using certain standards and can be monitored, measured and predicted results.
6. Level 5 - **Optimizing Process**
    The predicted process is enhanced continuously in order to achieve organizational goals that have been determined.

D. Previous Studies

Assessment related to IT Governance implementation is done through integrated approach with 3 stages namely; Underscore the basic needs of IT Governance from various existing methods, design an integrated approach to address needs and uses knowledge management principles and illustrate the use of an IT governance approach. The approach uses the Strategy, Technology, Organization, People, Environment (STOPE) perspective to integrate knowledge management principles as an added value and six sigma phases for process improvement. Aspects of knowledge management and human resources are added as the primary domain. From an integrated perspective it highlights the human resource factor in IT governance [16]. IT governance evaluation that generates recommendations in the form of improvement priorities to improve the capability of IT Governance in the general secretariat of the House of Representatives. This research uses 3 main criteria in improving business process that is stakeholder support, human resources in IT field and target achievement time [17]. The Research that was conducted on the U.S. State government found that the legislature plays an important role in the implementation of IT governance [18]. The IT governance research on public organizations in developing countries finds that the public sector is beginning to realize the benefits of implementing effective IT Governance. The focus of revamping IT governance in the public sector is governance structures, processes and relational mechanisms that will enhance the accountability of IT projects and contribute to effective IT Governance [19]. Good IT governance needs to be applied to the public sector because of the public-sector focus on services that must be effective, efficient and sustainable. There are 5 dimensions that must be fulfilled in achieving good IT governance which are Leadership, Organizational Structure, Decision-making Process, Paradigm and Competency, and Performance Measurement [20].

Research gap with previous studies is using ITBSC to align institution goal with 4 ITBSC perspective and then

mapping it with Enterprise Goal and IT related Goal in COBIT 5 to measure IT Governance capability level and evaluative study which resulted recommendation for IT governance improvement.

III. RESEARCH METHOD

The data used in this research is by conducting interviews and observations at the Kupang Municipal Secretariat Office. Supporting data required is Regional Medium-Term Development Plan, IT Master Plan, Standard Operating Procedures (SOP), Blueprint Architecture.

The process based of Fig 3 is describes below:

A. Mapping ITBSC with Objectives

This stage will be mapping ITBSC with goals of EDP division. Mapping is done by aligning the institution's Mission with 4 perspectives in ITBSC.

B. COBIT 5 process selection

This stage will be alignment institutional strategic targets with the Enterprise goal contained in COBIT 5. The mapping will result in a COBIT 5 Enterprise goal that is in line with institutional strategic targets. Enterprise Goal mapping results will be re-mapped with IT related goal COBIT 5 which has been mapped with the EDP divisions goals. Then the results of both mapping will result in processes in COBIT 5 that are relevant to the objectives of the institution.

C. Data Collection

Data collection using interview method to personnel of EDP division; Head of EDP, Sub-Head of Management and Data Services, Sub-Head of Code and Telecommunication, Sub-Head of Network and Data Transmission, and some IT staff in EDP to find if the process fulfill the criteria in COBIT 5. The supporting data collected for the verification of the assessment process are; RMTDP (Regional Medium Term Development Plan), organizational structure, job description (main tasks and functions), IT Masterplan, Standard Operational Procedure (SOP).
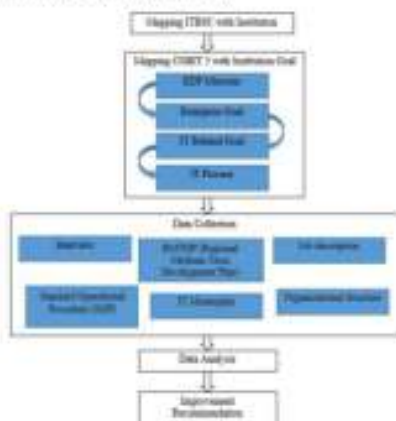

Fig. 3. Research Design

D. Data analysis

The provisions in measuring the level of capability in each process is the process of achieving enough category Largely achieved (L) with a range of values ranging from 50-85% or Fully achieved (F) with a range of values ranging from 85% - 100% to be stated that the process has achieved a Capability level, but the process must reach the Fully achieved category (F) in order to continue the assessment to the next level capability. To know the average of Capability level that has been achieved can be done with (1)

$$\mathbf{P} = \frac{\sum_{i=1}^{n} P_i}{n} \qquad (1)$$

P : level of process capability
n : number of criteria
to obtain the overall result of institutional capability level using (2),

$$Capability\ level = \frac{\sum_{i=0}^{n-1} y_i}{n} \qquad (2)$$

$y_i = 0, 1, 2, 3, 4, 5$: number of processes that are at the level capability -i
n : number of process

IV. RESULT AND ANALYSIS

A. Aligning COBIT 5 with institution's objectives

Mapping process has goals to align EDP division's objectives with 4 perspectives on ITBSC that is in perspective Corporate Contribution answered by Mission "Realization of Electronic Data Management Division in the field of duty". Then in the perspective of User Orientation is answered by the Mission of "Integration of Information and Data Systems", "Realization of Integrated Information Resources", and "Work Settlement on time". Perspective of Operational Excellence is answered by the Mission of "Utilization of the appropriate facilities and infrastructure of technology". The Future Orientation perspective is answered by the mission of "Quality of Human Resources" both governmental institutions and other non-formal private institutions in the field of Information Technology". The aligning obtains 5 relevant Enterprise Goal COBIT 5 items. Enterprise Goals are: EG6 Customer-oriented service culture; EG7 Business service continuity and availability; EG11 Optimization of business process functionality; EG14 Operational and staff productivity; EG16 Skilled and motivated people.

IT Related Goals Mapping with EDP division's objectives generates 6 IT Related Goal items that is being targeted: ITRG1 Alignment of IT and business strategy; ITRG7 Delivery of IT services in line with business requirements; ITRG8 Adequate use of applications, information and technology solutions; ITRG11 Optimization of IT assets, resources and capabilities; ITRG12 Enablement and support of

TABLE 1. MAPPING EG AND ITG

EG	Information and Technology Related Technology (ITRG)					
	ITRG 1	ITRG 7	ITRG 8	ITRG 11	ITRG 12	ITRG 16
EG6	P	P	S		S	S
EG7	S	S				
EG11	P	P	P	S	P	
EG14			P	S	S	P
EG16	S	S	S			P

business processes by integrating applications and technology into business processes; ITRG16 Competent and motivated business and IT personnel. After obtaining the results of Enterprise Goal Mapping and IT Related Goal based on the Mission of EDP Division, it will be mapped again between the two to get priority in answering Enterprise Goal through IT Related Goal. Both mappings have been determined by COBIT 5 as shown in Table 1.

Based on the mapping produces the degree of importance between ITRG and EG. Primary means that between ITRG and EG have a strong and influencing relationship. In the sense of answering EG, the ITRG of Primary value has an influence to achieve it. From the table above can be seen that the ITRG priority in answering Enterprise goal is ITRG1, ITRG7, ITRG8, ITRG12 and ITRG16. After ITRG obtained a primary scale then the selection process of COBIT 5 was conducted. COBIT 5 process affected the achievement of ITRG, among others; EDM01, EDM02, EDM04, EDM05, APO01, APO02, APO03, APO04, APO05, APO07, APO08, APO09, BAI01, BAI02, BAI03, BAI04, BAI05, BAI06, BAI07, DSS01, DSS02, DSS03, DSS04, DSS06, MEA01.

B. Assessment result

The current capability level (as is) is then compared with the target capability (to be) target value of 3 (Established). Target Capability level is obtained from the results of discussions and interviews with EDP Head Division who want the activities and business processes related to IT can be documented in standard procedure, in the form of SOP.

Based on the level achievement of each process, the average value of existing IT governance capability level of Kupang municipal government is equal to 0,12 (2) which rounded down to 0. Findings and recommendations for improvements to create IT governance in accordance with the context of Kupang Municipal Goverment will be constructed. The level achievement of capabilities (1) and gaps is shown in Table 2.

C. Analysis and Improvement Recommendation

In EDM01 process finds that alignment between IT related process and policy has been elaborated in Regional Medium Term Development Plan (RMTDP) 2013-2017 of Kupang Municipality which is derived from Regional Long-Term Development Plan (RLTDP) 2010-2025 and Vision / Mission of Mayor, Regional Development Planning Agency, Deliberations of Regional Leaders with House of Representatives approval. RMTDP states that, development of the quality of governance that effective and efficient in accordance with the principles of Good Governance and is supported by the application of appropriate Information

TABLE 2. CAPABILITY LEVEL

No	ID process	Capability Level	Capability target	Gap
1	EDM01	1	3	2
2	EDM02	0	3	3
3	EDM04	0	3	3
4	EDM05	0	3	3
5	APO01	0	3	3
6	APO02	0	3	3
7	APO03	0	3	3
8	APO04	0	3	3
9	APO05	0	3	3
10	APO07	0	3	3
11	APO08	1	3	2
12	APO09	0	3	3
13	BAI01	0	3	3
14	BAI02	0	3	3
15	BAI03	0	3	3
16	BAI04	0	3	3
17	BAI05	0	3	3
18	BAI06	0	3	3
19	BAI07	0	3	3
20	DSS01	0	3	3
21	DSS02	0	3	2
22	DSS03	1	3	2
23	DSS04	0	3	3
24	DSS06	0	3	3
25	MEA01	0	3	3

Technology to e-City with the focus: improving the quality of government information through e-Government in Kupang Municipality. However, the certainty of the effectiveness of IT Governance in Kupang Municipality can't be ascertained because there is no Master Plan for IT development in accordance with strategic objectives, institutional objectives and stakeholder needs in addition to the absence of IT performance measurement (IT Assessment). Therefore, it is necessary to develop IT master plan in accordance with strategic objectives, institutional goals and stakeholder needs, and also the governance needs to develop IT performance evaluation guidelines that define(s) Standard assessment of IT performance in Kupang Municipality.

The results of the analysis based on the EDM02 process that there is no strategic plan that specifically regulates IT (IT Strategic Plan) so that the portfolio of IT services does not exist yet. Therefore, it is necessary to create an IT Strategic Plans, and a portfolio of services based on existing business processes to support integrative information and data systems. It also requires a policy of stakeholders who make IT Governance as a priority program, as well as the creation of efficient budgeting in line with the budget ceiling.

The EDM04 process finds that personnel resources are optimally utilized in accordance with their job description to avoid overlapping in the work. The financial resources is allocated in accordance with work program priorities. It is necessary to maximize the utilization of information technology resources by maximizing personnel, technology architecture and budget. In EDM05, the reporting process is done in a routine meeting. Effective communication is also conducted. There is no standards related to reporting and assessment of IT performance. Therefore, it is necessary to

develop IT performance assessment instruments and IT reporting standards.

The analysis according to the APO01 process finds that there was no step-by-step guidance on identifying, defining, processing, analyzing, displaying and implementing policy tools into the IT governance framework. Government has some constraints in cascades RMTDP strategic goals into IT strategic targets, due to lack of planner competency in EDP division. Therefore, it is necessary to increase the capacity of personnel as planners, and the government needs to define IT strategic targets derived from RMTDP operational level APO02 process analysis finds that EDP division realize that IT has a positive contribution and is a value driver within the institution. The municipal government is aware that IT Governance supports the achievement of Good Governance, but these strategic targets have not been formally and specifically defined in the form of the IT Master Plan. RMTDP needs to be cascaded to a more operational level IT Master Plan.

At APO03, The Kupang Municipality does not own an enterprise information architecture model yet, service portfolio and IS architecture model resulted government has no reference in developing information systems. Kupang Municipal Government becomes slow in responding to changes. An enterprise information architecture model, service portfolio and SI architecture model are required. The analysis on the APO04 process finds that there is an awareness in the municipal government that information technology is very important in supporting operational activities but the current state of IT has not played an important role in answering institutional goals to improve public services. It needs to create a service catalog that suits the business process. In APO07, the organizational structure in the EDP is considered responsive and has been able to answer the needs of government. The existence of human resource development plan is considered capable by involving in the training. The capacity of personnel expertise in EDP is still limited to operational and does not have the competence of planners in general, therefore it needs to increase the capacity of employees to have the ability as planners.

In the APO08 process, the strategy in working program planning in Kupang Municipal Government is arranged in a mechanism. However, IT-related Programs do not respond to strategic goals in RMTDP. The absence of an IT Master Plan results no guidance in making IT investments. In APO09 there are no steps in identifying, determining, and analyzing Pattern Business Activity (PBA) to determine the appropriate IT services so that there is no defined IT service in the catalog of services that suits the needs of the Institution. Kupang Municipality only has a simple list that includes IT services in the municipal government without detailed technical information. The SLA is not defined for all IT services. Hence, IT Master plan, PBA and the catalog of IT services are needed. At BAI01 Programming has not answered the strategic objectives in the RMTDP. Viewed from human resources and budget, Kupang city government actually has

the resources to execute the work program. The need for standard guidance to determine the success rate of work programs especially related to IT. In BAI02 finds that City Government never did the need assessment by identifying Business Case, specifications, and technical needs as well as the required functions then determine priorities in IT implementation. Identify institutional IT needs to ensure that the solutions offered actually is to answer the Institutional strategic goals. The municipal government has to conduct feasibility study to map potential alternatives and determine options for implementing IT based on risks and costs. In addition, it is necessary to make Risk Register to know and minimize IT risk so that IT risk mitigation is in line with institutional needs.

In the BAI03 process, the Kupang Municipal Government doesn't have the documents related to high level design and development of Information Technology within the City Government. The design must be completed with development phases appropriate to standardized information systems development and methodology techniques and Quality Assurance (QA). The design should be in line with IT strategy and institutional architecture. The designs must have mapped components such as business processes and automation as well as manual controls, applications, service infrastructure and the type of technology used and assisting third parties. The design should also map integrated solutions to business activities, each technology service must be auditable and in control to protect resources and ensure data integrity and contain a test plan prior to implementation and can be reviewed periodically.

On BAI04 The EDP Division has never been assessed the availability, performance and capacity of services and resources to ensure IT performance can support business needs. City Government is expected to make baseline availability, performance and capacity of IT services. With the identification of Core Business, Kupang Municipality can find out the solutions or services that play an important role in the availability and capacity of the Public Service process. In BAI05 Government Stakeholder wants to change to good governance system. The desire for such change is contained in the strategic objectives of the RMTDP. The Government needs to cascade strategic goals into an operational level. In BAI06 city government needs to monitor, measure, analyze, report and review the performance of information technology that has been implemented in order to be able to measure the impact of IT on institutional performance. In BAI07 Governance needs to create change plan management of IT services in the municipal environment. Changes include 3 additions, modifications and deletions. Changes consist of 3 types: Standard, Emergency and Normal. In DSS01 There is no SOP related to IT operations in the municipal government so that operational activities are run based on the direction of leadership. IT operational activities in the municipal government are also not scheduled yet. There is no monitoring process of operational activities, monitoring process is only being done to network and server. In the municipal government also have no process of measuring operational

activities to see the level of user satisfaction of the operational services. In DSS02 there is no incident resolution scheme along with incident classification in government environment. Incidents and service requests are not recorded and their priority scale is also not determined. Municipality needs diagnostic procedures, investigation and incident allocation that are found also service desk in charge of receiving complaints, service requests, incident reporting and incident resolution. In DSS03, the handling of IT related problems in the municipal government is done by the EDP Division. In general, EDP is able to handle any incidents and problems. The problem handling process is done by the officer based on his own experience. Municipality needs to make category division of issues and priority scales and time targets for problem solving and reference to a written document on the process of problem solving. In DSS04 there is no rules, objectives and scope of the sustainability of IT implementation. The municipal government needs to map of stakeholder roles and responsibilities in the IT sustainability plan for business processes to make IT Continuity Plan in Kupang municipal Government environment.

In DSS06 Control activities have not been defined in accordance with business processes and institutional goals. The guide lines are needed regarding to the classification of data. The government needs to define inventory of roles, responsibilities and access authority in accordance with legitimate needs. In MEA01 the municipal government has never conducted a process of performance measurement and user satisfaction because there is no standard performance appraisal and a standard user satisfaction assessment to assess the performance of IT and EDP Divisions. City Government needs to identify stakeholders who play a role in it (management, business processes and users). In addition, there is no performance measurement metrics for technology, service and process performance. City Government has to formulate Critical Success Factors (CSF) and Key Performance Indicator (KPI).

V. CONCLUSION

The implementation process of IT governance in Kupang City Government consists of 25 processes from COBIT 5 that is obtained from ITBSC mapping with Mission, EG and ITRG with EDP Division Mission. The target of capability level is obtained by interview with Head of EDP Division and some personnel. Capability level of Kupang Municipal Government is 0, and cannot reach the target of capability level which is 3. It indicates that the IT Governance has not been implemented. This research implication to Kupang municipal governments is to discover their IT governance capabilities and to know the steps to improve it. Therefore, this study contributes to knowledge in IT governance by presenting a combine of ITBSC and COBIT 5 framework to improve IT governance in public organization.

It takes the role of stakeholders in determining the policy direction of IT governance in order to respond to the needs of the organization while improving the quality of public

services. It needs stakeholder commitment to make IT governance as a priority for Institutional development, also to increase the capacity of employees to have the competence as planners. Further research can create a contextual strategic plan of IT governance implementation.

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