Design of IT Governance Evaluation Using COBIT Framework through Capability Maturity in Department of Transportation Cirebon

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Abstract. IT Governance Evaluation has not been carried out optimally because supervision and evaluation of IT is only done if there are complaints from work units regarding IT services. These problems relate to the services that need to be provided to users of the information system, starting from the operations that need to be carried out on data security, sustainability aspects, training of human resources that support the processes of the information system and related to the support processes that should first be determined to be able to give service. This research method used a qualitative research by using COBIT 5 framework dealing with the system analysis and design using the Use Case Diagram, Activity Diagram, Sequence Diagram, and Class Diagram tools. The programming language used is PHP Hypertext Preprocessor (PHP) while the database uses MySQL. This application was created to provide information about managing the IT Governance Evaluation in Department of Transportation Cirebon. The results of this study is IT Governance Evaluation using Cobit 5 Framework. Regarding to the IT Governance using COBIT 5, the Capability Maturity Level is at 3.28 that means defined-process. It represents that the IT Governance has been implemented to reach the goal of this organization. This assessment was aimed to determine the capabilities of IT performance and make recommendations for the proper management of IT Performance Management so that it can be used as a guide that can be used by the user and can increase the use of facilities optimally for better improvement of Department of Transportation Cirebon.

1. Introduction
The current technology has changed the development of Information Technology (IT) in such either public or private organization. This development is an important need to enhance the effectiveness and efficiency of performance through achieving the goal of organization. This becomes the enterprise governance has a major impact on the IT Governance in which the organization must evaluate IT Governance in order to achieve the optimal goal of organization [1]. To achieve the success of IT implementation depends on how organization manages and monitors the IT implementation in order to obtain the benefits for the organization [2].

Department of Transportation Cirebon is a public organization focusing on the public services. To give public services, the Cirebon Transportation Department has implemented Information
Technology (IT), especially the Information System. However, the IT audit in the Information System has not implemented periodically yet, due to the fact that IT supervision and evaluation is used during it is only needed in the organization.

According to the above problems, this study carried out the research to recommend good IT Governance in order to optimally develop the use of facilities in public services, especially in Department of Transportation Cirebon. IT Governance concerns on how IT is managed and structured in the organization. The COBIT (Control Objectives for Information and related Technology) is a framework proposed by ISACA (Information Systems Audit and Control Association). This COBIT provides a comprehensive framework that assists enterprises to achieve their goals and deliver value through effective governance and management of enterprise IT. It has become worldwide leader in IT Governance, control security, and assurance [3].

COBIT 5 is a framework developed by ISACA (Information Systems Audit and Control Association) in 2012 [3]. It becomes the guidance of organization in order to achieve organization’s goal depending on IT Governance. COBIT 5 enables information and related technology to be governed and managed in a holistic manner for the whole enterprise, taking in the full end-to-end business and functional areas of responsibility, considering the IT related interest of internal and external stakeholders. COBIT 5 principles and enablers are generic and useful for enterprises of all sizes, whether commercial, not-for-profit or in the public sector [3].

A number of researchers were interested in discussing COBIT in different areas. The study focused on DSS domain to discover the IT Governance in National Library by using COBIT [1]. In addition, to discover IT Governance in the Hospital existed the information governance and data management to achieve higher vision of the Hospital using COBIT [4]. In the News Company, it focused on DSS to find out the accuracy of management by using COBIT [5]. The last study was used COBIT to investigate the level value IS/IT design in Navy organization [6]. Those studies recommended COBIT as an effective control system in the implementation of IT Governance but those studies only focused on one domain in the COBIT 5 Framework. Therefore, this study focused on the use of COBIT 5 Framework in Cirebon Transportation Department to carry out the maturity level in all domains of COBIT 5. The fundamental problem of this study is how well the IT Governance Evaluation using COBIT 5 Framework. This study could be a recommendation for the Department of Transportation Cirebon to evaluate how good IT Governance is implemented by using COBIT 5 Framework.

2. Method

This study was a qualitative research by using COBIT 5 framework to provide a methodological way for evaluating IT Governance [3]. The COBIT 5 framework has been used as an effective framework to implement IT Governance audit to evaluate IT capability [7]. The subject of this study was IT Governance in the Department of Transportation Cirebon.

COBIT framework has developed by ISACA (Information Systems Audit and Control Association). This framework is evaluated and developed in term of scope. The evolution of scope in COBIT framework is explained in figure 1.

![Figure 1. Evolution of Scope in COBIT Framework [3]](image-url)
According to the evolution of scope in COBIT framework, it enables to succeed the control system in organizing IT Governance [8]. COBIT 5 is the newest framework that was proposed in 2012 by ISACA (Information Systems Audit and Control Association) to provide an end-to-end business view of the governance of enterprise IT that reflects the central role of IT in creating value for enterprises. This framework in each stages of evolution provides IT activities with five domains, including Evaluate, Direct, and Monitor (EDM, Align, Plan and Organize (APO), Build, Acquire and Implement (BAI), Deliver, Service and Support (DSS), Monitor, Evaluate, and Assess (MEA) [9]. Those domains are presented in Figure 2 below.

![Figure 2. COBIT 5 Processes](image)

The Capability Maturity Level (CML) is the COBIT’s maturity model utilizing to evaluate how well the COBIT 5 framework in IT processes based on the organization’s goal, operating environment, and industry practices [10]. This maturity level is performed from level 0 (non-existent) to level 5 (optimized) [11]. The description about the Maturity Level is presented in the table 1.

| CAPABILITY MATURITY INDEX | MATURITY LEVEL       |
|---------------------------|----------------------|
| 0-0.51                    | 0-Non-Existent       |
| 0.51-1.5                  | 1-Initial/ad hoc     |
| 1.51-2.5                  | 2-Repeatable but Intuitive |
| 2.51-3.5                  | 3-Defined Process    |
| 3.51-4.5                  | 4-Managed and Measurable |
| 4.51-5                    | 5-Optimized          |

3. Results and Discussion
This section discusses the analysis using COBIT 5 framework in this study. The explanation is presented below.

3.1 Use Case Diagram
The Use Case Diagram is the representation of users relating to the other users, especially with four domains of COBIT 5 in Department of Transportation Cirebon. Those relationship between users and
four domains were exported to the systems, including managing EDM, BAI, DSS, MEA, Graphs, and CM Report. The Use Case Diagram in this study can be seen in figure 3.

![Use Case Diagram](image-url)

**Figure 3.** Use Case Diagram

### 3.2 Activity Diagram

The Activity Diagram is the representation of activity flow, such as processes of four domains of COBIT 5 in Department of Transportation Cirebon. Those activity flow was exported to the systems, including managing EDM, BAI, DSS, MEA, Graphs, and CM Report in. The Activity Diagram in this study can be seen in figure 4.

![Activity Diagram](image-url)

**Figure 4.** Activity Diagram
3.3 Sequence Diagram
The Activity Diagram is the representation of managing EDM Domain of COBIT 5 in Department of Transportation Cirebon to be exported and presented to the systems in order to obtain assessment result/EDM assessment toward Department of Transportation Cirebon. Moreover, it is the process to discover EDM Data needed.

3.4 Class Diagram
The Class Diagram is the representation of code visualization from the application to provide attribute, operation, constraint in the system, including managing EDM, APO, BAI, DSS, MEA, Graphs, and CM Report in Department of Transportation Cirebon.

3.5 Information System of Department of Transportation Cirebon
3.5.1 Domain Data Page
Domain Data Page provides submenu, including EDM, APO, BAI, DSS, MEA and Report. The figure of Domain Data Page is presented below.

![Figure 5. Domain Data Page](image)

3.5.2 Graphic Data Page
Graphic Data Page represents graphic comparison from Maturity Level of domains in COBIT 5 (EDM, APO, BAI, BSS, MEA). The graphic data page can be seen below.

![Figure 6. Graphic Data Page](image)

3.6 Evaluation
The Capability Maturity was assessed to define how well the capability of IT management depending on the purposes of COBIT5. This Capability Maturity is used for all domains of COBIT 5 (EDM, APO, BAI, BSS, MEA) that is presented in the table 2.
Table 2. COBIT 5’s Domains Recapitulation in Department of Transportation Cirebon

| Domain | Maturity Level |
|--------|---------------|
| EDM    | 4.1           |
| APO    | 3.2           |
| BAI    | 2.8           |
| DSS    | 2.9           |
| MEA    | 3.4           |

Table 2 represents that the total of Capability Maturity Level is 3.28 in which the criteria assessment of capability maturity is in the third level that means 3-defined process. In other words, IT Governance is in the defined process in the Department of Transportation Cirebon.

4. Conclusion
The Capability Maturity was assessed in this study that showed 3.28 as defined-process. This value means that the IT Governance processes in Department of Transportation Cirebon have implemented to reach its goal of organization. Moreover, the Capability Maturity report deals with the assessment of all domains in COBIT 5 framework relating to the strategy and goals of Department of Transportation Cirebon.

This study using COBIT 5 framework eases the Department of Transportation Cirebon to analyse, evaluate, plan, create, implement, support, and assess the IT Governance, especially the public services in Department of Transportation Cirebon. In short, this becomes an effective way to assist the Department of Transportation Cirebon to evaluate the IT Governance.

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