Evaluation of Patient Information System in Public Health Service Using the COBIT 5 Framework

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Abstract. The purpose of this study is to describe the current system process with the COBIT 5 domain, calculate the level of capability, link the assessment of COBIT 5 with the Public Health Service Accreditation instrument, and identification of resource support. Research design using qualitative methods and how to collect data using observation, interview and questionnaire. Stages performed in conducting the evaluation by conducting research planning, determine the scope of evaluation, data collection and processing, assessment report and evaluation, mapping the relationship with the guidance of Accreditation assessment at the Public Health Service. From the results of research using balanced scorecard on COBIT 5 instrument, the selected domains are EDM02, EDM04, AP001, APO06, APO07, DSS01, DSS02, DSS05, and DSS06. COBIT 5 users on Public Health Service Accreditation, supporting assessment activities in Chapter II and Chapter VII. Assessment of resources in the patient information system shows activities that still do not meet the level of capability.

1. Introduction
Public Health Service is a non-profit organization in the public sector, which is responsible for health problems in its working area. In helping the activities of them, the role of information technology is very important, so it can facilitate activities, especially the achievement of service quality [1]. In the process of improving patient satisfaction has used patient information system, it starts from the process of patient acceptance, drug expenditure, patient diagnosis data entry. To know the governance, it is necessary to evaluate the management of information technology that runs through the evaluation of information technology in one health center, which has been done by the accreditation assessment to evaluate the information technology related to patient information system [2].

The assessment of IT governance in the field of health is still small, which the differentiator of this research becomes is done in Public Health Service and is related to Accreditation instrument, so it can be the related method in assessing system implementation [3-10].

Based on our previous studies on the material properties, here, the purpose of this study was describe the current system process with the COBIT 5 domain, calculate the level of capability, link the assessment of COBIT 5 with the Public Health Service Accreditation instrument, and identification of resource support. The purpose of this study is to describe the current system process with the COBIT 5 domain, calculate the level of capability, link the assessment of COBIT 5 with the Public Health Service Accreditation instrument, and identification of resource support.
2. Methods
This study is a descriptive research with qualitative, in which the researcher presents a description of
the information and presents information that is focused, empirical in accordance with the context and
measure Capability Level. The following stages are carried out in carrying out the evaluation of the
patient information system, among others; 1) Research Planning, 2) Determine the scope of
evaluation, 3) Data Collection and Processing, 4) Assessment Reporting, 5) Conclusions and
Recommendations. The research informant was 6 persons, the health worker involved in the use of
patient information application. To obtain the data, done by way of; Analysis and Observation,
Interview, Questionnaire. The secondary data is done by conducting literature study to support the
research object discussed.

3. Results and Discussion

3.1 COBIT 5 Domain Selection
The balanced scorecard framework is important to implement to organizations in responding to public
demands that are stakeholders of the accountability and efficiency of public organizations. (See Table 1)

| BSC Dimension          | Strategic Objectives                                                                 |
|------------------------|--------------------------------------------------------------------------------------|
| Financial/Operational Efficiency | - Simplify patient calculations                                                      |
| Customer               | - Providing fast, precise and accurate service                                       |
|                        | - Facilitate the provision of continuous health information                          |
|                        | - Improve the quality of service that is evenly distributed and affordable           |
| Processes and products | - Data and Information for the management of rehabilitative,                         |
|                        | curative, preventive, and promotive services of quality to patients and / or clients |
|                        | - Data and information for unit management and resources to provide health services  |
|                        | - Data and Information for the management of health services or health programs for  |
|                        | a specific population within the area of service work                               |
|                        | - Facilitate disease report, visit report                                            |
|                        | - Maintain the continuity of patient data                                            |
|                        | - Developing Patient Applications                                                   |
| Employee and Organizational Capacity | - Improve the ability of officers in performing the right and fast data             |

Based on selected Enterprise Goals then the next step is to determine the IT-related goals selected
in accordance with Enterprise Goals selected using the COBIT 5 Enterprise Goals Mapping table with
IT-related Goals contained in COBIT 5. Not all processes of COBIT 5 can be used as a reference
assessment, because at the time of doing self-assessment tailored to the patient's information system
that existed. Here are the results of the above process mapping tailored to the needs of Public Health
Service (See Table 2).
Table 2. COBIT 5 Selected Process Appropriate IT-Related Goals.

| IT – Related Goals to Processes | ID Process COBIT 5 |
|---------------------------------|---------------------|
| IT RG 01 APO01, APO06, DSS01    |                     |
| IT RG 02 DSS01                  |                     |
| IT RG 03 APO01, APO06, EDM04, DSS05 |               |
| IT RG 04 EDM02                  | DSS02               |
| IT RG 06 DSS06                  |                     |
| IT RG 08 DSS02                  |                     |
| IT RG 09 EDM02, APO07           |                     |
| IT RG 11 EDM02, EDM04, APO01, APO07, DSS01 |     |
| IT RG 12 EDM02, APO01, DSS06    |                     |
| IT RG 13 DSS06                  |                     |
| IT RG 14 EDM02, APO01, DSS06    |                     |
| IT RG 17 EDM04                  |                     |

3.2 Evaluation of Process Capability Rate
The process of assessing the capability level of the COBIT process, each process is checked gradually whether the process has met the requirements that must be met at each level, ranging from level 1 to level 5. In addition, there are provisions on the category of assessment results in each level, which is a process of achieving the Largely Achieved (L) category with a range of 50-85% or Fully achieved (F) values ranging from 85% -100% to be asserted that the process has achieved a level of capability, but the process must reach the Fully achieved category (F) in order to continue the assessment to the next level of capability. Based on COBIT 5 Process Assessment Model and Self-Assessment Guide.

The result of process capability assessment toward EDM02, EDM04, APO01, APO06, APO07, DSS01, DSS02, DSS05 and DSS06, can be summarized in the following on Table 3:

Table 3. Process Capability Assessment Results.

| ID Process | Process Name | Process Capability Level |
|------------|--------------|--------------------------|
| EDM02      | Ensure Benefits Delivery | Fully Achieved |
|            | Ensure Resource Optimization | Fully Achieved |
| APO01      | Manage the IT Management Framework | Fully Achieved |
| APO06      | Manage Budget and Costs | Fully Achieved |
| APO07      | Manage Human Resources | Fully Achieved |
| DSS01      | Manage Operations | Fully Achieved |
| DSS02      | Manage Service Requests and Incidents | Fully Achieved |
| DSS05      | Manage Security Services | Fully Achieved |
| DSS06      | Manage Business Process Controls | Fully Achieved |
Based on the data of each level assessment, the calculation of the average size related to the level of Patient Information System capabilities, the calculation is done by the following formula:

\[
\text{Capability level} = \frac{(0\times L_0) + (1\times L_1) + (2\times L_2) + (3\times L_3) + (4\times L_4) + (5\times L_5)}{JP}
\]

Description: \( L_n \) = Number of processes at level \( n \), \( JP \) = Number of processes under assessment.

\[
\text{Capability level} = \frac{(6\times L_0) + (1\times L_1) + (3\times L_2) + (3\times L_3) + (4\times L_4) + (5\times L_5)}{9}
\]

\[
\text{Capability level} = 1
\]

Based on data achievement level of each process, based on result of above calculation, hence result of capability level is at level 1.

3.3 COBIT 5 Relationship with Accreditation Instrument

Accreditation is an acknowledgment given by an external agency on the conformity assessment results of the process with the applicable standard (used). From the results of the mapping evaluation using COBIT 5 is connected by using Accreditation instrument, it can be obtained the description that can be done in the implementation of the patient information system in Public Health Service, as follows. (See Figure 1).

![Accreditation Public Health Service](image)

**Figure 1.** Overview of Patient Information System Implementation.

In Figure 1, the implementation of patient information system consists of 6 activities, which are described as follows:

3.3.1 Physical facilities. Building Public Health Service pay attention to the function, safety, comfort, and ease of health services, with the availability of the room according to the needs of health services provided.

3.3.2 Availability of facilities and infrastructure. Where such infrastructure is available, maintained, and functioning properly to support access, safety, smoothness in providing patient services in accordance with the services provided. Especially in the availability, maintenance of IT.

3.3.3 Human Resources. Public Health Service must meet the type and amount of personnel required in the legislation, the purpose and objective is that the management of IT well managed, effective and efficient, it must be led by competent health personnel to manage the facility.

3.3.4 IT Management. Managers ensure effectiveness and efficiency in managing programs and activities in line with the values, vision, mission, goals, duties and functions.
3.3.5 Development of HR Competence IT Manager. In the managers and implementers of IT must meet the required competency standards and if not have the human resources with appropriate educational background there are at least a development plan in accordance with predetermined standards.

3.3.6 Management of Patient Information System. In carrying out the service by using patient information system, efforts / activities, and responsible to achievement of goal, quality of performance, and to resource usage.

4. Conclusions

Evaluation of the process of Patient Information System (Existing) based on COBIT 5 instrument from selected domain mapping is EDM02, EDM04, AP001, APO06, APO07, DSS01, DSS02, DSS05, and DSS06. Evaluation of Process Capability level based on the data of each level assessment, obtained level of capability at level 1. The use of COBIT 5 in patient information systems when associated with the accreditation instrument supports assessment activities in Chapter II on Leadership and Management with the standard of Health Manpower, Management Activities. And also the assessment in Chapter VII on Patient-Oriented Clinical Services on the Standard of Patient Registration Process.

Acknowledgements

We acknowledged Dinas Kesehatan Kota Cimahi for supporting and funding this study.

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