Evaluasi Tingkat Efektivitas Sistem Informasi Menggunakan Framework COBIT 5

Evaluation of Information System Effectiveness Level Using COBIT Framework 5

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Abstrak

PT XYZ Expo merupakan perusahaan yang bergerak di industri MICE (Meeting, Incentive, Conference, Exhibition). Perusahaan ini telah menerapkan sistem informasi untuk memudahkan proses penyewaan gedung. Masalah yang pernah terjadi pada kegiatan operasional adalah ketidaksesuaian antara stock barang fisik yang berada di gudang dengan stock barang yang terdapat pada sistem. Audit sistem informasi dilakukan untuk mengetahui bagaimana perusahaan mengkoordinasikan kegiatan operasional. serta untuk mengetahui bagaimana perusahaan mengelola masalah yang ada melalui evaluasi tingkat efektivitas pada sistem informasi. Penelitian ini dimulai dari melakukan observasi, mengidentifikasi masalah sekaligus melakukan pengumpulan data, selanjutnya menentukan domain yang akan digunakan dalam wawancara, setelah melakukan wawancara peneliti melakukan analisa sekaligus menghitung capability level, terakhir peneliti memberikan rekomendasi sekaligus laporan untuk dijadikan feedback. Penelitian ini menggunakan capability model pada framework COBIT 5 untuk mengukur level kapabilitas pada setiap proses. Penelitian ini berfokus pada proses DSS01 Manage Operation dan DSS03 Manage Problem. Berdasarkan penelitian ini, ditemukan bahwa pada DSS01 dan DSS03 berada pada nilai 2.4. Kesimpulan yang diperoleh dari hasil tingkat capability level ini yaitu PT. XYZ Expo telah berjalan dengan baik dan efektif namun masih perlu melakukan beberapa perbaikan untuk meningkatkan capability level yang ada.

Keywords : Audit, COBIT 5, PT XYZ Expo

Abstract

PT XYZ Expo is a company engaged in the MICE industry (Meeting, Incentive, Conference, and Exhibition). The company has implemented an information system to facilitate the process of leasing building. Problems that have occurred in the operational activities is a discrepancy between the stocks of physical goods with the stock in the system. Audit information system is conducted to find out how the company coordinate operational activities and manages the existing problems through the evaluating the effectiveness level of information systems. The research starting from observation, then identify problem and collecting data, then determine the domain that will be used in interview, after conducting interview the author do analysis and also calculate capability level, last the author give a report and recommendation for feedback. This research uses capability model in framework COBIT 5 to measure capability level in each process. This study focuses on the process of DSS01 and DSS03. Based on this research, it was found that the sub-domains of DSS01 and DSS03 were at 2.4. The conclusion obtained from the

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level of capability level is PT. XYZ Expo has been running well and effective but still needs to make some improvements to improve the capability level.

Keywords : Audit, COBIT 5, PT XYZ Expo

1. INTRODUCTION

Along with the development of the times has made the human need for a building is increasing. People no longer use buildings only as a shelter, but they also use the building for various purposes, the building can be used as a place to conduct meetings, seminars, exhibitions, concerts and others [1]. This opportunity is taken by PT. XYZ Expo, so people can use the building or hall to organize various events by renting the building in accordance with their needs.

An Information system is one of the means used to support the processing of information technology. The information technology (IT) function is responsible for designing, implementing and maintaining many of controls over an organization's business processes [2]. IT governance is defined as a set of processes that ensure the effective and efficient use of IT that enables an organization to achieve its goals [3]. Without good IT governance, there will certainly have an impact on the company's business processes. Through information systems, business processes can be supported more effectively and efficiently [4].

Audit Information technology is essentially one form of operational audit, but now an information technology audit is known as a separate audit type unit whose main purpose is more to improve IT governance [5]. There are many tools that can be used to measure information technology governance, one of which is the COBIT framework [6]. COBIT is a framework that combines modern thinking in corporate management and management techniques and presents globally accepted concepts, the practice of using analytical tools and modeling to increase the value and trust of an information system [7, 8]. In COBIT 5.0, a process capability model, based on ISO / IEC 15504, is standardized on Software Engineering and Process Assessment. This model measures the performance of each governance process or management process and can identify areas that need to be improved performance [7, 9].

PT. XYZ Expo is engaged in the MICE (Meeting, Incentive, Conference, and Exhibition) industry in Indonesia that provides building and hall leasing facilities for various events and activities. The business process at this company starts from the offering price proposed by the event organizer to the marketing department. After the price is approved, then the finance will print an invoice to be billed to the event organizer. This billing process is done by the marketing department. After completing the payment affairs, the organizer can run the event. The company has implemented an information system to help run the business process but based on author observations, there are additional applications made in-house by the company to complement the lack of existing system and the application itself has not been audited. The author sees an error that occurs in the operational activities where the data of physical goods stored in the warehouse is not match with data on the system. That matter can affect the value of inventory of goods in the database.

The scope of this study focuses on the domain of DSS (Deliver, Service, and Support) because the existing system is already running. The author will focus on the process of DSS1 (Manage Operation) and DSS3 (Manage Problem) that discusses how the company manage information systems and information technology in the day-to-day operations and also about company's ability to manage and handle the problem when an error occurred. DSS01 is chosen because in this domain focuses on how the company manages the company's operational activities every day both from the performance of applications and employee work operations. And DSS03 is chosen because in this domain will be discussed how companies addressing and manage the problems that occur in the company. With the conduct of the audit is expected the

company can get an idea about the effectiveness level on an information system that already running. And also will be given recommendations and input for this company to be better.

2. RESEARCH METHODOLOGY

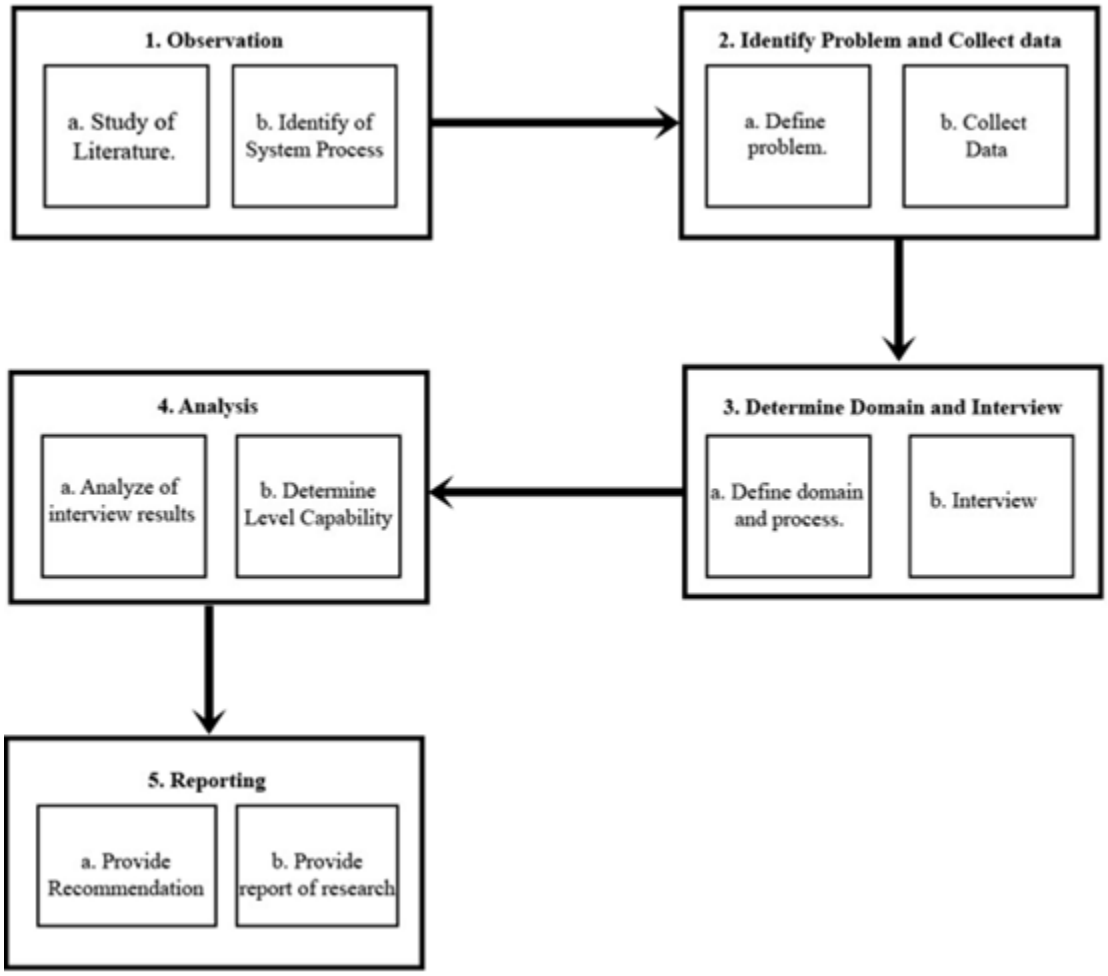

Figure 1. Research Methodology [10, 11]

In this section the author will explain in connection with the existing research methodology which is divided into 5 parts:

1. **Observation**
   a. Conduct a study of literature related to the purpose of doing this research.
   b. The Author identifies the work process of the application system to be audited.
2. **Identify Problem and Collect Data**
   a. In the second stage, author defines problem based on observation results.
   b. after that, The Author collects data needed to help conduct research.
3. **Determine Domain and Interview**
   a. In the third stage, The Author determines the domain and process that will be used in research.
   b. Make a list of questions for the interview.

4. **Analysis**
   a. The Author analyses the result of the interview.
   b. After that, the author conducts the calculation of capability level.
5. **Reporting**
   a. Author Provide recommendation to improve existing level of capabilities.
   b. Provide the report of research to give feedback.

2.1 Process Capability Level

Table 1. Capability Level and Process Attribute [12]

Level	Description
Level 0: Incomplete process	The process is not implemented or fails to achieve the goal. There is a little or no process achievement
Level 1: Performance Process.	The implementation of the process reaches its goal. The process attribute that reflects the achievement of this level is PA1.1 Process Performance.
Level 1.1 : Process performance	The process already exists and achieves its goal of the process.
Level 2 : Managed Process	Processes at level 1 have been set (planned, monitored and evaluated) and work products have been established, managed and maintained.
Level 2.1 : Performance management	The process has been implemented, organized, and managed
Level 2.2 : Work product management	The process has been correctly identified and controlled.
Level 3 : Established process	At this level, the process is implemented following a defined process that enables the achievement of the results of the process
Level 3.1 : Process definition	The process has been defined and has procedures that support the implementation process.
Level 3.2 : Process Deployment	Process standards are implemented effectively.
Level 4 : Predictable Process	This level implements the process within the specified limits that enable the achievement of the results of the process
Level 4.1 : Process measurement	Implemented processes can achieve organizational goals. Measurement results are used to ensure the implementation of the process can support the achievement of organizational goals.
Level 4.2 : Process control	The process can be set quantitatively to produce a stable and predictable process
Level 5 : Optimizing process	This level implements processes that enable the achievement of relevant, current and projected business objectives.
Level 5.1 : Process innovation	Increased process and innovation to process implementation

Level 5.2 : Process optimization	Improved processes have been defined, managing the execution of the process is done effectively to support the achievement of process improvement objectives

COBIT 5 has 6 Capability Model processes. Capability processes are represented in terms of process attributes grouped into capability levels, as in Table 1 Capability Level and Process Attribute. In each of the assessed processes will result in a 4 level rating point [12, 13]:

a. Not achieved if the result of rating between 0 - 15%,

b. Partially achieved, if the result of rating between 15 - 50%,

c. Largely achieved, if the result of rating between 50 - 85%,

d. Fully achieved, if the result of rating between 85%-100%.

3. RESULT AND DISCUSSION

3.1 DSS01 Managed Operation

Coordinate and implement the operational activities and procedures necessary to provide internal and outsourced IT services, infrastructure maintenance, environments and facilities including the implementation of predefined standard operating procedures and required monitoring activities.

3.1.1 DSS01.01 Perform Operational Procedures

In this sub-domain, it discusses the maintenance of operational procedures that support the business, management, and implementation of activities or activities that related in accordance with the schedule or procedures that have been established or in accordance with the policy and discuss the policy of data backup.

This company uses SQL server to auto backing up data every day, but there is no regular maintenance of operational procedures. There are scheduling of operational activities and performance management. There are security standards in the reception, processing, storage and retrieval of data in accordance with applicable policies. Data and information can be processed accurately and on time. Overall, the activities of the company running well. In sub process, DSS01.01 Perform Operational Procedures attribute process reaches a value at 2.2 Work Product Management and is at capability level in level 2 that is Managed Process, because the process has been correctly identified and controlled.

The recommendations are to improve capability level of this sub domain by ensuring that applicable security standards are met for the receipt, processing, storage, and output of data in a way that meets enterprise objectives, the enterprise's security policy, and regulatory requirements. Develop and maintain operational procedures and related activities to support all delivered services. Verify that all data expected for processing are received and processed completely, accurately and in a timely manner. Deliver output in accordance with enterprise requirements. Support restart and reprocessing needs. Ensure that users are receiving the right outputs in a secure and timely manner. Maintain a schedule of operational activities, perform the activities, and manage the performance and throughput of the scheduled activities.

3.1.2 DSS01.02 Managed Outsourced IT services

Manage the operation of outsourced IT services to maintain corporate information protection and reliability in service provision. In this sub-domain, it discusses how relationship management with service providers relates to the system used and how the relationship between the service providers and the internal IT management process includes, performance and capacity planning, change management, configuration management, service demand and internal management, problem management, security management, business continuity and performance monitoring and process reporting.

The company uses in-house application designed by the IT department and that has access to information systems is Supervisor facility, Customer Service (Cashier), IT, Financial Auditors and stock. The operational activities are running well, although there is no formal policy. And if there is a problem has an urgency level that must be handled immediately will be processed and if it is not urgent it can be postponed temporarily. DSS01.02 Managed Outsourced IT services attribute process reaches a value at 3.1 *process definition* and is at capability level in level 2 that is Managed Process, because the process has been defined and has procedures that support the implementation process.

The recommendations are to improve capability level of this sub domain by ensuring that the enterprise's requirements for security of information processes are adhered to in accordance with contracts and Service Level Agreement with third parties hosting or providing services. Integrated critical internal IT management processes with those of outsourced service providers, covering, e.g., performance and capacity planning, change management, configuration management, service request and incident management, problem management, security management, business continuity, and the monitoring of process performance and reporting. Plan for independent audit and assurance of the operational environments of outsourced providers to confirm that agreed-on requirements are being adequately addressed.

3.1.3 DSS01.03 Monitor Infrastructure

In this sub-domain, it discusses how the company manages the list of infrastructure assets, activity log records or event logs associated with the infrastructure that company has.

The company already has in-house application to manage asset inventory that can monitoring displacement of devices by scanning the barcode. If there is a problem, a report will be made on the spot to facilitate reporting to the authorized or responsible person. There are some documentation but not specified, and there is no recording on who is monitoring the infrastructure. DSS01.03 Monitor Infrastructure attribute process reaches a value at 2.2 Work product management and is at capability level in level 2 that is Managed Process, because the process has been correctly identified and controlled.

The recommendation is to specify the documentation, identify and maintain a list of infrastructure assets that need to be monitored based on service criticality and the relationship between configuration items and services that depend on them. Define and implement rules that identify and record threshold breaches and event conditions. Find a balance between generating spurious minor events and significant events so event logs are not overloaded with unnecessary information. Produce event logs and retain them for an appropriate period to assist in future investigations. Establish procedures for monitoring event logs and conduct regular reviews and ensure that incident tickets are created in a timely manner when monitoring identifies deviations from defined thresholds.

3.1.4 DSS01.04 Manage the Environment

In this sub-domain, it discusses how the management of the IT environment or area within the enterprise, including the laying of IT equipment, the policy set when it wants to access or enter the IT environment, identifies possible problems such as human error or natural disaster and how companies manage equipment and devices specifically to monitor and control the IT environment.

The company already has policies on anticipating natural disasters. The server should be placed on the 2nd floor to prevent flooding and should not be placed on high floors due to preventing the earthquake also to be equipped with UPS (Unit Power Supply) to prevent the occurrence of power outages, do back up periodically to prevent the occurrence of the human error and natural disaster. This company uses D-3 back up to prevent unwanted things happen. There are some extinguisher, alarm, smoke detector, and sprinkle. There are rules governing who may enter the IT area are only IT employees (who are interested) and are prohibited from bringing in food, drink and flammable chemicals. And in relation to the management of the working environment, the company has kept environment well. This company also has plans on what to do if there is a problem with the IT infrastructure. DSS01.04 Manage the Environment attribute process reaches a value at 3.2 Process Deployment and is at capability level in level 3 that is establishes the process, because process standards are implemented effectively.

The recommendation is to regularly monitor and maintain devices that proactively detect environmental threats. Compare measures and contingency plans against insurance policy requirements and report results. Address points of non-compliance in a timely manner. Document and test procedures, which should include prioritization of alarms and contact with local emergency response authorities, and train personnel in these procedures.

3.1.5 DSS01.05 Manage Facilities

In this sub-domains, it discusses how the company manages facilities, including electrical and communications equipment, in accordance with regulations, technical and business requirements, vendor specifications and safety and health guidelines. Managing facilities includes policies on the use of facilities, maintenance of IT facilities (such as equipment that can support when power changing or power outages), training employees on occupational safety and health (such as fire drills to find out what to do in the event of a fire) and also records, monitors, manages and resolves incidents related to IT facilities.

The company has some generators when the power goes out and UPS (Unit Power Supply) to support server. This company has run the cabling requirements in accordance with applicable rules. There is no cabling diagram (ensuring cabling and physical filling are done in a structured and orderly manner). The maintenance of the facility is done regularly, DSS01.05 Manage Facilities attribute process reaches a value at 3.2 Process Deployment, and is at capability level in level 3 that is established the process, because process standards are implemented effectively.

The recommendation is to regularly test the uninterruptible power supply's mechanism, and ensure that power can be switched to the supply without any significant effect on business operations. Analyses physical alterations to IT sites or premises to reassess the environmental risk (e.g., fire or water damage). Report results of this analysis to business continuity and facilities management. Ensure that IT sites and facilities are in ongoing compliance with relevant health and safety laws, regulations, guidelines, and vendor specifications. Educate personnel on a regular basis on health and safety laws, regulations, and relevant guidelines. Educate personnel on fire and rescue drills to ensure knowledge and actions taken in case of fire

or similar incidents. Record, monitor, manage and resolve facilities incidents in line with the IT incident management process. Make available reports on facilities incidents where disclosure is required in terms of laws and regulations. And also ensure that IT sites and equipment are maintained according to the supplier's recommended service intervals and specifications. The maintenance must be carried out only by authorized personnel.

Table 2. Process Capability Domain DSS01. Manage Operation

Domain	Description	Process Attributes	Capability Level
DSS01.01	Perform Operational Procedures	2.2	2
DSS01.02	Manage outsourced IT services	3.1	2
DSS01.03	Monitor IT Infrastructure	2.2	2
DSS01.04	Manage the environment	3.2	3
DSS01.05	Manage facilities	3.2	3
Average			2.4

From Table. 2, it can be concluded that the average level of capability of domain DSS01. Manage Operation is at level 2.4. Where there are 3 subdomains reaches level managed process, and 2 subdomains reaches level established process. Overall the company already running well but still has to improve the management of the system and operational.

3.2 DSS03 Managed Problems

Identify and classify the problem and the root of the problem and provide timely resolution to prevent the problem from recurring. Provide recommendations for improvement. Increase availability, improve service levels, reduce costs and improve customer satisfaction and convenience by reducing the number of operational issues.

3.2.1 DSS03.01 Identify and Classify Problems

Define and apply the criteria and procedures to report the identified problem. The problems that occur will be identified through incident reports, error logs and other problem sources. Troubleshooting will be done by looking at priorities based on impacts on business and urgency.

When there is a problem occurred they will contact IT department, the problem will be categorized, determine person in charge, and the problem will be prioritization whether the problem should be resolved immediately or can be delayed. The company uses in-house applications to determine the problem, identify problems and provide solutions, there is a status to see if the problem has been completed or not. But there is no status to see the progress. DSS03.01 Identify and Classify Problems attribute process reaches a value at 3.2 Process Deployment, and is at capability level in level 3 that is Established Process, because process standards are implemented effectively.

The recommendation is to maintain and improve capability level of this sub domain by Handle all problems formally with access to all relevant data, including information from the change management system and IT configuration/asset and incident details. And maintain a single problem management catalogue to register and report problems identified and to establish audit trails of the problem management processes, including the status of each problem (i.e., open, reopen, in progress or closed).

3.2.2 DSS03.02 Investigate and Diagnose Problems

Investigate and diagnose problems by using relevant management subjects to assess and link the root cause of the problem. Problem identification is done by comparing incident data with existing data in the database. And do reporting to communicate progress in solving the problems that occur.

This company will compare incident data with existing data in the database to identify the problem and it will be associated also with the configuration case (hardware, software, or human error). There is no reporting for communicating progress, but there is a status to see whether the problem is already done or not. *DSS03.02* Investigate and Diagnose Problems attribute process reaches a value at 3.2 Process Deployment, and is at capability level in level 3 that is established the process, because process standards are implemented effectively.

The recommendation is to improve capability level of this sub domain by produce reports to communicate the progress in resolving problems and to monitor the continuing impact of problems not solved and monitor the status of the problem-handling process throughout its life cycle, including input from change and configuration management.

3.2.3 DSS03.03 Raise Known Error

Make a mistake note that has been identified and the appropriate solution after the cause of the problem is known and identify potential solutions based on business cost-benefit and impact on business and urgency.

The company already has in-house application to record the problem and provide the solution but has not been routinely used. And there has been solution development to deal with new problems. DSS03.03 Raise Known Error attribute process reaches a value at 3.1 *process definition* and is at capability level in level 2 that is Managed Process, because the process has been defined and has procedures that support the implementation process.

The recommendation is to improve capability level of this sub domain by Identify, evaluate, prioritize and process (via change management) solutions to known errors based on a cost-benefit business case and business impact and urgency. And accustom user to use the in-house application.

3.2.4 DSS03.04 Resolve and Close Problems

Identify and create sustainable solutions to address the root cause. Communicating with related parties regarding success in eliminating the problem and fixing the problem scheduling. Ensure regular reports of progress in resolving issues and errors.

In solving the problem, the company identifies, prioritizes and directly resolves the problem that has an urgency level. There has been reporting when the problem is already solved. But there has no periodically monitoring on the impact that can cause the problem. Also, there is no percentage reporting on progress, it only has status to see if the problem already solved or still in progress. DSS03.04 Perform Operational Procedures attribute process reaches a value at 2.2 Work Product Management and is at capability level in level 2 that is Managed Process, because the process has been correctly identified and controlled.

The recommendation is to monitor the continuing impact of problems and known errors on services. Review and confirm the success of resolution of major problems. Make sure the knowledge learned from the review is incorporated into a service review meeting with the business customer. And add the feature that can show the percentage reporting on the progress.

3.2.5 DSS03.05 Perform proactive problem management

Collect and analyze operational data (especially incident records and changes) to identify what might be causing the problem. The problem log records are used for the assessment.

The action was taken to optimize resources already exist. And there has reported on the cost to be incurred in solving the problem. There is also regular communication with related parties to solving the problems. But there is no identification of emerging trends that may indicate problems. DSS03.05 Perform proactive problem management attribute process reaches a value at 2.2 Work Product Management and is at capability level in level 2 that is Managed Process, because the process has been correctly identified and controlled.

The recommendation is to improve capability level of this sub domain by optimize the use of resources and reduce workarounds, track problem trends. Identify and initiate sustainable solutions (permanent fix) addressing the root cause and raise change requests via the established change management processes. So this company can reduce and also overcome the problem better than before.

Table 3. Process Capability Domain DSS03. Manage Problem

Domain	Description	Process Attributes	Capability Level
DSS03.01	Identify and Classify Problems	3.2	3
DSS03.02	Investigate and Diagnose Problems	3.2	3
DSS03.03	Raise Known Error	3.1	2
DSS03.04	Resolve and Close Problems	2.2	2
DSS03.05	Perform Proactive Problem Management	2.2	2
Average			2.4

From Table. 2, it can be concluded that the average level of capability of domain DSS03. Manage Problem same as DSS01. Manage Operation i.e. on level 2.4. Where there are 3 subdomains reaches level managed process, and 2 subdomains reach level established process. Overall the company already running well but still has to improve the resolve and close problems.

3.2 Gap Analysis

Based on the analysis of capability level that produces the average capability level of each process, then compared the expected level obtained, the gap is the distance from the average level of capability with expected level. The company expects an expect level above one level of capability level. The gap analysis of each process is shown in Table 4. Gap Analysis

Table 4. Gap Analysis

Domain	Average	Expected Level	Gap
DSS01	2.4	4	1.6
DSS03	2.4	4	1.6

The result of gap analysis on process DSS01. Manage Operation and DSS03. Manage Problem has a gap of 1.6 to reach expected level. They are still lacking on documentation, to achieve capability level 4 the implemented processes should be able to achieve organizational goals. The recommendation for process DSS01. Manage Operation is to maintain and improve capability level of this domain by applying Cost-Benefit Analysis to estimate whether the IT investment is directly proportional to the benefits gained. The recommendation for process DSS03. Manage Operation is to maintain and improve capability level of this domain by improving the system management on solving problem and accustom user to use the in-house application.

4. CONCLUSION

Based on the results of this research analysis, the conclusion obtained is that the information system has been running well. Almost The whole process has been effectively implemented. The operational maintenance and problem management are already well executed. They know how to addressing and overcome the problems that occur. Infrastructure assets already well managed, they conduct maintenance regularly to keep things undesirable happen. But the company still needs to make some improvements to application system to improve company performance in operational activities and manage problems. The average level of capability of domain DSS01 and DSS03 is at level 2.4. Where there are 3 subdomains reaches level managed process, and 2 subdomains reach level established process.

5. SUGGESTION

After an evaluation of the company's information system, it is expected that the company to implement the recommendation from each sub-domain in order to improve company performance in operational activities and manage problems. And for other researchers, it is expected to evaluate the effectiveness of this information system by using different domains in order to give better results and can build an existing company information system

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