International Journal of Research and Review
Vol.8; Issue: 1; January 2021
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Evaluation and Proposed Improvement of IT Service Management Based on DMAIC Method Using IT Infrastructure Library (ITIL) v.3 Framework at PT XYZ

Andi Kurniawan[1], Rosalendro Eddy Nugroho[2]

[1]Postgraduate Student, Master Management, Mercu Buana University, Jakarta, Indonesia
[2]Postgraduate Lecturer, Master Management, Mercu Buana University, Jakarta, Indonesia

Corresponding Author: Andi Kurniawan

ABSTRACT

The development of information technology (IT) in the era of globalization in today's business development plays a very important role in helping companies achieve the vision and mission that have been formulated in the business strategy. One of the indicators of achievement in 2019 related to IT service user satisfaction is illustrated by the IT service user satisfaction index which is still below the established standard. These factors are the basis of the poor performance of IT organizations in the services provided. Conducting a Focus Group Discussion (FGD) as a data collection technique using a saturated sample of the entire population in the company, amounting to 20 employees from IT organizations. This research was conducted with the aim to find out in more detail what things are the main factors of the poor IT service user satisfaction index so that it gets the right improvement for its improvement by evaluating the service operation process in IT organizations, then the results obtained are analyzed using the method. DMAIC uses ITSM standard reference standards, the ITIL v.3 framework. The results of this study conclude that some of the factors causing the poor satisfaction index of IT service users are due to the absence of SLM on OLA for all services, the non-integration of the problem management process with service desk function services, and the lack of identification of the service desk team.

Keywords: *IT Service Satisfaction, ITIL Framework, DMAIC, Service Desk.*

INTRODUCTION

Information technology (IT) in the era of globalization in today's business development has very important role in helping companies achieve the vision and mission that have been formulated in the business strategy. Utilization of information technology (IT) as a whole in its use can increase productivity and make business processes more effective and efficient. If previously many organizations or companies only focused on technical issues in the information technology (IT) section, nowadays more and more IT organizations have changed and focused on improving high-quality IT services, and this has become a challenge for all IT organizations. chief IT manager in an organization. An IT organization within the company is required to be able to contribute optimally and ensure that information technology (IT) services run without any problems that can hinder the running of business within the company.

IT organizations also provide services in the form of handling any IT problems that occur in company operations. However, from the results of the survey to users of the services, the IT team has not received the best satisfaction from the services that the IT organization has provided to users. In 2019, management has set a target of achieving user satisfaction of 85% for the IT services provided and an evaluation process will be carried out every

quarter. The results found that the realization of user satisfaction with the services IT provided in 2019 was always below the target expected by management.

In getting an overview of what causes the poor achievement of user satisfaction with the IT services provided, PT. XYZ, especially the IT Corporate division as the IT department, has to carry out further analysis of each problem that occurs each month to find out how many problems it faces. The following is data on the number of problems in 2019.

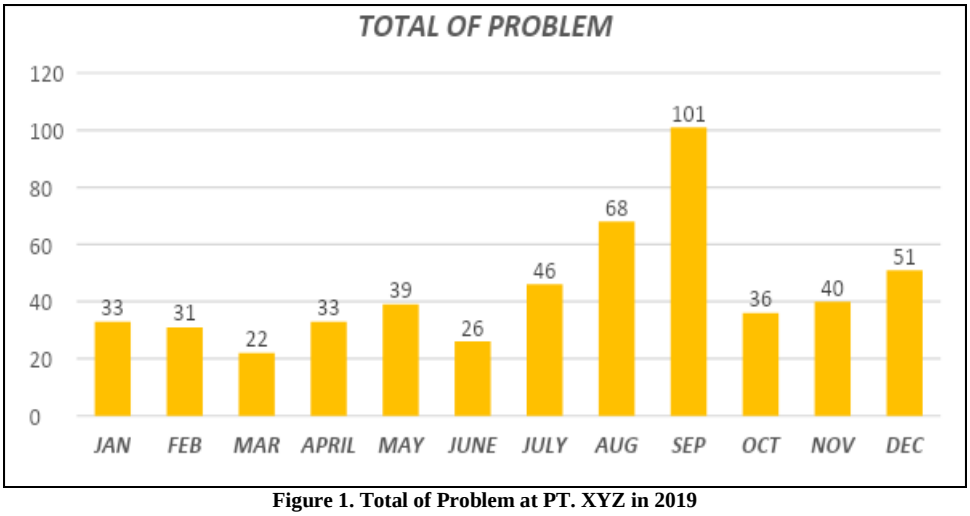

Figure 1. Total of Problem at PT. XYZ in 2019
Source : IT Corporate Division, 2019

Figure 1 it can be seen in general how many problems faced by users (users) to be able to solve these problems quickly and precisely with optimal service by the IT department. The IT Department additional assessments related to the above, regarding the causes / reasons for users of IT services at PT. XYZ is not satisfied with the IT services provided.

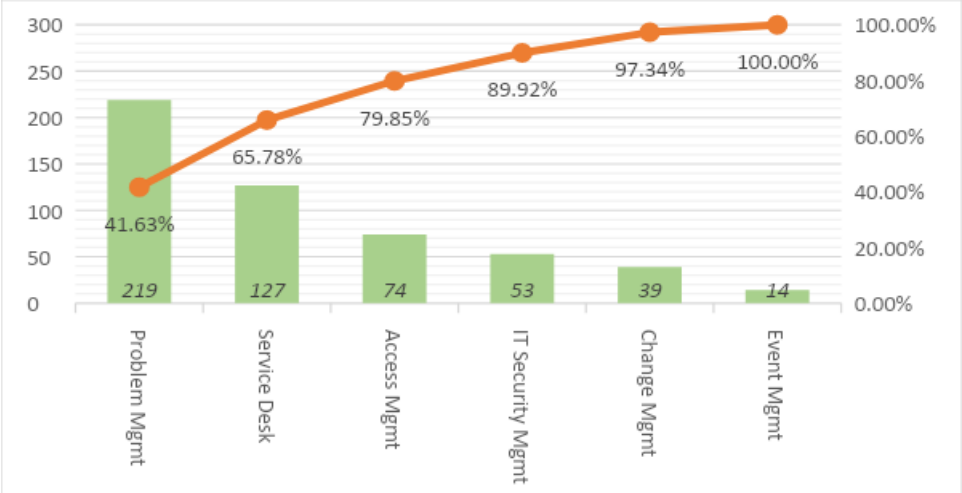

Figure 2. Pareto Cause Ranking Chart IT Services User Satisfaction in 2019
Source : IT Corporate Division, 2019

Based on Figure 2 the causes of not achieving management targets in terms of user satisfaction with the IT services provided, in general can be viewed from the IT Department's IT Performance. The results of the Pareto above show that the biggest pareto 2 is part of a continuous service operation which is the cause of the problem of poor performance of the IT department in handling IT service

disruptions to its use, namely Problem Management and Service Desk function. Without good problem management, the priority scale is neglected. Cannot monitor the status of the repair process. There is no documentation of handling, so when the problem is repeated the handling cannot be faster than the previous one.

Evaluation needs to be done to find out to what extent the quality of service desk services in dealing with a problem that occurs. In this research, so that problem handling can be better, then using standard references (tools), namely IT Operation & Service Management Self-Assessment, ITIL (Information Technology Infrastructure Library) v.3 framework to define and measure maturity levels related to conditions or procedures. Currently, there has been progress on problem management processes and service desk functions compared to standard literature.

From the measurement results of two IT Maturity, the recommendations / suggestions on what things need to be done and improved in order to improve IT Performance services. And to get the appropriate improvement process for solving the above problems, the writer uses the DMAIC method (Define, Measure, Analyze, Improve & Control) to define the problem, measure the level of the problem, analyze, and make improvements as needed. By analyzing the process at each stage of DMAIC, a framework, namely ITIL v3, is needed, as a basic reference in the implementation of Information Technology governance to provide effective services so that ultimately it can meet service user satisfaction targets.

In this study, regarding the evaluation and proposed improvement in governance services management using the DMAIC method and the ITIL framework as a standard reference in ITSM, there are different results between one researcher and another. The results of research by Idra Maita, Sapri Akmal (2016) and Talla, Valverde (2013) stated that IT service management and process improvement to provide optimal results using the standardized reference framework from ITIL in the identification process and the results can have a significant effect on increasing the satisfaction of IT service users in an organization. The results of research by De Waal et al (2014) and Marko Jantti, Aileen Cater (2017) state that the improvement process towards increasing IT service user satisfaction by combining the Six Sigma sub-methodology, namely DMAIC and the ITIL framework, can provide more significant results in helping to remove obstacles in the process of handling disruptions that occur and visualizing the process to be applied to operational services that are already running in an organization. The results of research by Aradea (2012) and Idra Maita, Sapri Akmal (2016) state that in improving the quality of information technology governance management services, apart from using the DMAIC sub-methodology and the ITIL framework, it also requires proper management of IT infrastructure aspects, to be able to produce design of the appropriate SOP (Standard Operating Procedure) as an improvement process in improving the quality of the process.

LITERATURE REVIEW

IT Service Management and Governance

IT Service Management (ITSM)is a method of managing information technology activities that focuses on providing excellent service to its users or customers. The main goal of ITSM is to align IT services with user needs, improve the quality of IT services, and make efficient use of costs for IT management. IT service management is an IT management, where IT is seen as a service that must create value for its customers. The purpose of IT Service Management is to ensure that IT services are in line with business needs and actively support the business.

IT management focuses on things that are strategic (long term), including IT management principles, IT architecture and infrastructure, application needs analysis,

and IT investment. IT governance is about determining and prioritizing what plans should be done. Meanwhile, IT service management is about how to carry out all these plans optimally. Governance is controls, policies, and guidelines for how an organization / system is managed properly and transparently so that there is no mismanagement or abuse (Susanto, 2016). The governance process starts from determining company goals, where the company's goals will be aligned with all existing activities in the company. After determining the company's goals, the next step is to provide aligned direction to support the activities of the IT division. In the process of comparing, providing direction and measuring activity performance, a cycle will take place continuously to evaluate and measure the performance of the IT division.

ITIL V.3

ITIL v.3 (Information Technology Infrastructure Library) is a general framework that describes best practices for IT Service Management (ITSM). ITIL provides guidance for service providers (Service Providers) in supporting the provision of quality IT services and processes, functions and other capabilities required. ITIL v.3 aims to provide support from the information technology aspect of the services provided in order to provide satisfaction to customers and companies in terms of cost, time and decision making. The approach used in the ITIL v.3 process is based on aspects of people, process, and technology.

ITIL is part of a best practice publication for ITSM which was formed by the OGC (Office of Government Commerce) organization which has now turned into a cabinet office. According to Brooks (2006), ITIL is designed to align IT with business needs, similar to the COBIT or Six Sigma method. Together for the needs of business objectives, the needs of various stakeholders and part of the role of IT in providing services to common goals.

ITIL V.3 Domain

The ITIL v3 service lifecycle consists of five stages. The initial stages in the cycle begin with the initial definition and analysis of the business demand for service strategy and service design. After that, enter into an active environment in service transition until active processes and improvements in service operations and continuous service improvement. Each stage has a direct impact on service performance.

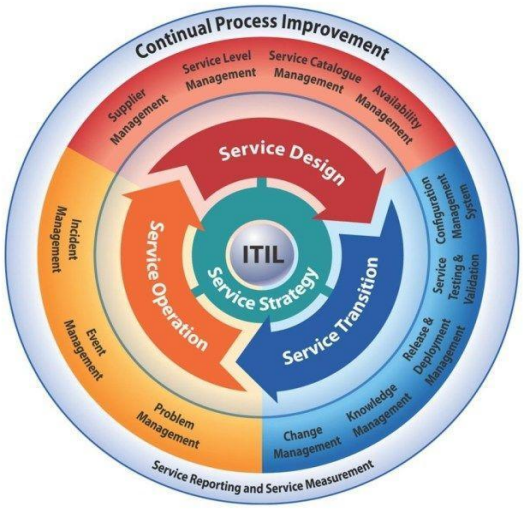

Figure 3. ITIL v3 Service Lifecycle (Hendershott, 2014)

In the research, focused on the service operation domain which is a guide in achieving effectiveness and efficiency in providing and supporting services to meet value for customers, users and service providers. This stage also provides guidance on how to maintain the stability of operational service delivery, approve changes to design, scale, scope, and service level. The purpose of service operations is to coordinate and carry out the activities or processes required to provide and manage services at a service level that has been mutually agreed upon with users and customers, as well as to manage technology that supports the implementation of services.

Problem Management Process in Service Operation

Problem management is a process that is responsible for managing the life

cycle of all problems, starting from early identification, further investigation, documentation and problem solving (Talla, et al, 2013). Problem management has the objective of minimizing the impact of incidents and problems on the business caused by underlying errors in the IT infrastructure, and proactively preventing the recurrence of incidents related to these errors (Talla, et al, 2013). Problem Management works together with Incident Management and Change Management to ensure that the availability and quality of IT services can be improved. When a problem has been successfully resolved, all kinds of information are recorded in the form of documentation.

Framework ITIL v.3 (2011) reviews problem management, there are two important concepts that need to be understood:

Table 1. **Process Concepts in Problem Management**

Concept	**Explanation**
Reactive problem management	Detecting the cause of one or more incidents conducted by the service desk, followed by registering the problem
	Automatic detection of infrastructure or application failures using alerts or event tools that automatically generate an incident ticket that may proceed to a problem ticket
	There are notifications from suppliers or contractors that there are problems that need to be resolved
	Look at incident ticket history to find one or more causes that, if removed, can prevent similar incidents from recurring
Proactive problem management	There are activities to improve service, which accidentally come across a problem that needs to be isolated. Automatically generate incident tickets when a failure occurs and is detected by one of the tools of the event management process.

Source: Best Practice Implementation of ITIL v.3 E-book, 2012

Service Desk Function

Service Desk is a single point of contact for the user when there is a disruption in IT services, or when the user needs a service request or request for change. The Service Desk has an important role for an IT organization, with the main objective of acting as a single point of contact between IT services and IT service users, which is in charge of managing incidents, service requests and communication with users (Feras Al-Hawari, et al, 2019) . A good and effective service desk performance can detect the lack of efficiency of other parts of the IT organization, while a poor service desk can give a bad impression to the entire IT organization. The main task of the service desk is to provide IT services to users or customers and ensure the availability and accessibility of the company's IT in providing various assistance to users.

Problem solving in the service desk uses the principle of escalation where first, the solution is carried out by staff at the basic level in the service desk and if the basic level staff is unable to do it, it is forwarded to a higher level, for example the specialist level or the 2nd level. If the specialist level is not able to do it, then continue to the higher level until it finds a solution to the problem. The problem is stored and monitored for its development until the status of problem is solved.

ITSM Self – Assessment

ITSM self-assessment developed by OGC as a tool to measure the maturity level of the functions contained in the ITIL process. This self-assessment ITSM consists of a collection of questions that can show which areas need to be considered in an effort to improve the overall ITIL process. The assessment of the maturity level at ITSM self-assessment uses 9 levels of maturity models:

Table 2. ITSM Self-Assessment Maturity Level

Level	Explanation
1	***Prerequisite***, ascertain whether the minimum level of items on the existing prerequisite is in place to support the process activities.
1.5	***Intent Management***, determine whether there is a statement of organizational policy, business objectives in meeting both the objectives and guidance in the transformation process or the use of items at the prerequisite stage.
2	***Process Capability,*** examine activities that are being carried out or that have been running. The questions are aimed at identifying whether a minimal set of activities is being carried out.
2.5	***Internal Integration,*** trying to ascertain whether the activities that have been integrated are sufficient to meet the purpose of the process.
3	***Products***, Checks the actual results on the output of the process to ask if all the relevant products are being produced.
3.5	***Quality Control,*** relating to the review and verification of process results to ensure that it is of appropriate quality.
4	***Management Information***, relating to the governance of processes and ensuring that adequate and timely information is generated from the processes in order to support the necessary management decisions.
4.5	***External Integration,*** check whether all external interfaces and relationships between discrete processes and other processes have estabilished in the organization. At this level, for IT service management, a complete use of ITIL terminology can be expected.
5	***Customer Interface,*** especially with regard to the ongoing external review and validation of the process to ensure that it remains optimized to meet customer requirements.

Source: Best Practice Implementation of ITIL v.3 E-book, 2012

Six Sigma Method

The concept of Six sigma as a method for measuring the quality of products and services was first used by Motorola and followed by various well-known companies such as Allied Signal and General Elecric. One of the company's efforts to have a competitive advantage is to build a competitive advantage over its business processes. Six Sigma is a concept or method to be able to build competitive advantage through improving business processes by reducing or eliminating deviations from existing business processes.

Six Sigma is a methodology for identifying, reducing and eliminating processes that are underperforming and potentially creating errors that impact customers (Aileen Cater,et al,2017). The goal of Six Sigma is to reduce the number of processes that result in defects in either the production process or business processes. Aileen Cater (2017) states that a defect is a customer's experience of a process, service or product that is beyond the customer's expectations or needs.

DMAIC Stages in the Six Sigma Method

Six sigma follows a model known as DMAIC (Define, Measure, Analyze, Improve, Control). DMAIC is a systematic six sigma project management practice inspired by the PDCA (Plan, Do, Check, Action) cycle. This process consists of 5 stages, known as define, measure, analyze, improve, and control. DMAIC is used to improve existing or ongoing processes.

Define

Mandahawi (2012) states that in the define stage, the project outline, metrics, and objectives must be clearly identified. This stage focuses on forming a project team, determining project objectives, mapping processes, identifying customer needs, identifying the greatest impact of the characteristics of CTQs (Critical to Quality Characteristics).

Measure

The measure stage consists of finding and executing the data that has been collected to measure CTQs as a process target (Mandahawi, 2012). To begin this stage, the required information must be gathered for analysis in a later stage. Data collected during the measure stage can be displayed in the form of histograms, steam-and-leaf diagrams, run charts, stocking charts, and pareto charts.

Analyze

At this stage, the factors that affect the process are determined by analyzing and determining the root cause of a defect or failure. Through both statistical and qualitative analysis, begin to formulate and test hypotheses regarding the main causes of the problem. In Analyze, data from the measure stage is used to find the causal relationship in the process and to understand the different sources of variability (Montgomery, 2009). This stage looks for potential causes of reject, quality problems,

customer issues, cycle times, or the waste and inefficiency of a process.

Improve

Mandahawi (2012) states that the improve phase focuses on identifying solutions, suggesting alternative solutions to improve performance and implementing some of these solutions based on the available budget and cost expectations for each alternative solution. To find various solutions, a brainstorming session can be conducted by evaluating the cost of implementing the solution, the ease of implementing the solution, and the possibility of achieving targets during implementation.

Control

Control of the process or product that has been improved is carried out to ensure that the predetermined targets can be achieved. Once a solution solves a problem, development must be standardized and sustainable over time.

Relationship between the ITIL Framework v.3 and Six Sigma

According to Chan (2009), ITSM uses ITIL best practices that direct IT management about what needs to be done and how to solve it from a process perspective. However, when handling an ITSM project that implements ITIL, ITIL cannot provide a method for measuring quality or identifying and completing a process performance improvement project. Through the application of the Six Sigma methodology, IT management will have methods and tools to measure quality and how to improve a process. The adoption of Six Sigma principles also helps IT managers focus on proactively managed business and customer strategies and can enhance or strengthen cooperation in the company.

RESEARCH METHODS

Data Analysis Methods

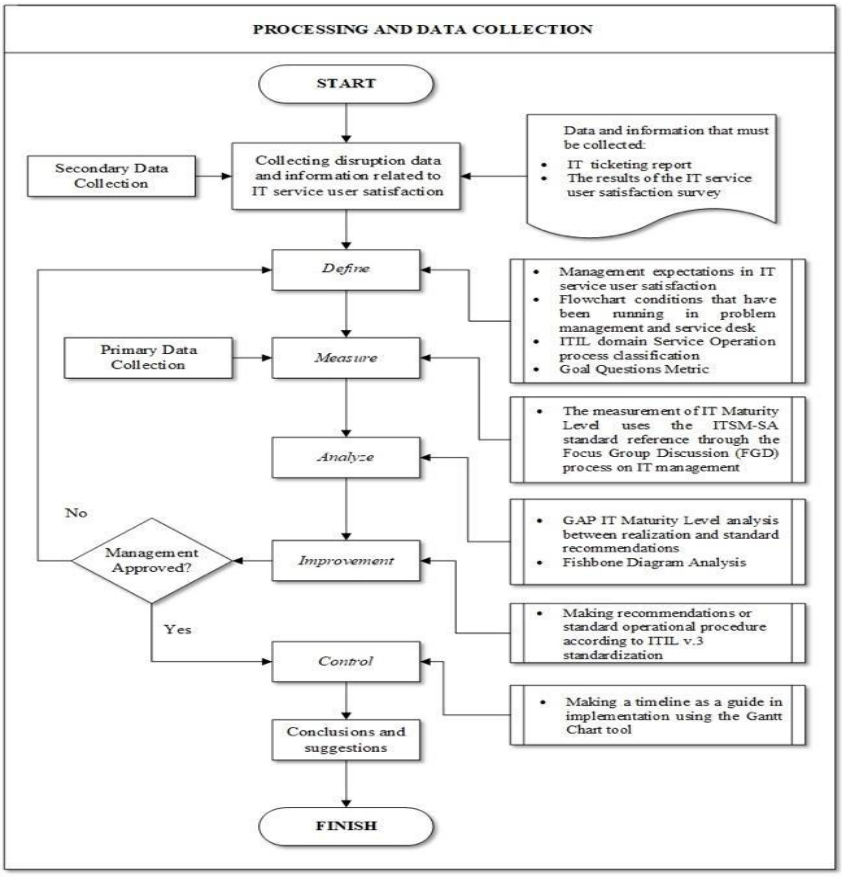

Figure 4. Flowchart Data Analysis, *Source: Data Processed, 2020*

The data processing and analysis stage to simplify the data into a form that is easy to read for presentation. One of the Six Sigma sub methodologies will be used, namely DMAIC, as a process flow which consists of define, measure, analyze, improve, and control. By combining the best practice concepts from ITIL V3 as a standardization of ongoing IT service management development. Described the flowchart in Figure 4.

Population and Research Sample

In this study, the population were employees in the IT division organizational structure consisting of levels *managerial*, engineers in related fields, as well as the service desk or helpdesk team that functions as a single point of contact are used or used as objects of research in obtaining information in the form of optimal or non-optimal indicators of IT organizational performance through IT Maturity measurement using the standard reference concept from ITSM Self Assessment. While the sampling technique used is nonprobability sampling with the technique taken is saturated sampling because the population is relatively small, so the sample used in this study amounted to 20 employees in IT organizations.

The sample in this study aims to obtain data on IT Maturity Level conditions that have been running to date and identify management expectations regarding user satisfaction with IT services. All populations that are used as chili sauce will be involved as informants in a focus group discussion with the aim that the information data obtained can be used as a reference in the process of improving the performance of IT user services so that they can achieve the targets of management.

Data Collection Methods

Primary data used were obtained by conducting direct field studies to companies using methods or data collection techniques through Focus Group Discussions (FGD) to measure IT Maturity Level and determine target levels in IT service user satisfaction according to management.

Secondary data is data in the form of company documentation in the form of a detailed recap report of disturbances or problems that occurred during the period early 2019 to the end of 2019 as supporting data in research.

RESULT AND DISCUSSION

Survey Results on Causes of User Dissatisfaction

Based on the results of surveys throughout 2019 which were carried out on a quarterly basis, it shows that the realization of user satisfaction with IT services compared to the target given by management has still not been achieved. Figure 5 shows that there is a phenomenon that changes every quarter.

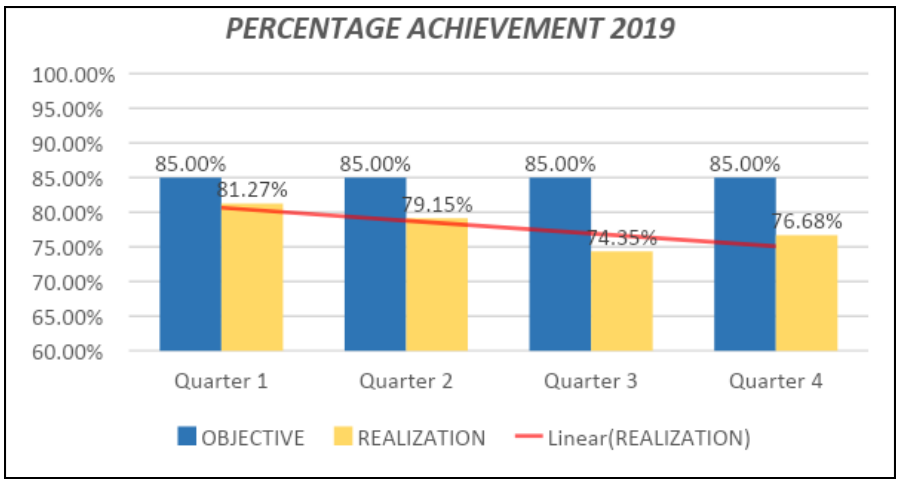

Figure 5. Objective vs Realization Achievement
Source: Data Processed, 2020

The cause of not achieving management targets in terms of user satisfaction with the IT services provided refers to IT Performance. Two major things that underlie the need for proper repair, namely Problem Management and Service Desk Function.

Maturity Level Measurement Results Using ITSM Self-Assessment

From the results of data collection from the research sample (n = 20) at a meeting with management, engineers in related fields and also the helpdesk team that functions as a service desk through focus group discussions (FGD), the following results are obtained regarding the level of maturity level current state functions and processes using ITSM self-assessment.

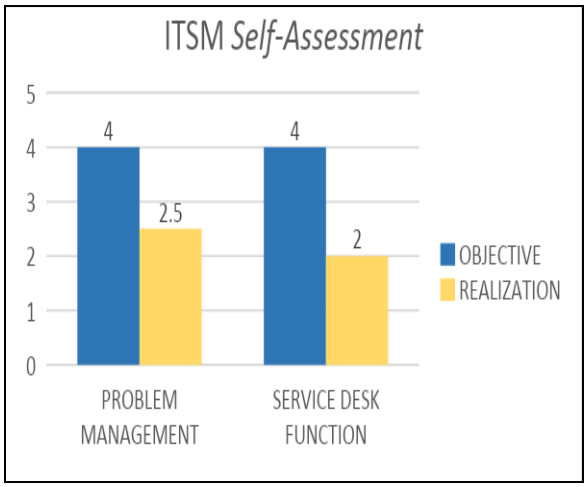

Figure 6. Maturity Level Measurement Results Using ITSM Self-Assessment, *Source: Data Processed, 2020*

In Figure 6 shows the results of the level of maturity levels of functions and processes from the dimensions of problem management and service desk functions currently achieved by IT organizations. The level in this dimension is the result of a recapitulation of meetings with sources based on the questions that were used as the topic of discussion in the focus group discussion (FGD). Detailed results of the ITSM - Self Assessment for each dimension carried out in the assessment and measurement are available in the attachment.

Define

The results of the evaluation carried out on not achieving the target of user satisfaction for IT services are caused by poor organizational performance in the IT Performance aspect, which includes a problem management process that is still below the maturity level standard. Then, the function of the service desk has not been maximized in carrying out its duties as a single point of contact which is also still below the maturity level standard expected by IT management. The identification process of the as is and to be conditions obtained in the study is described in Figure 7.

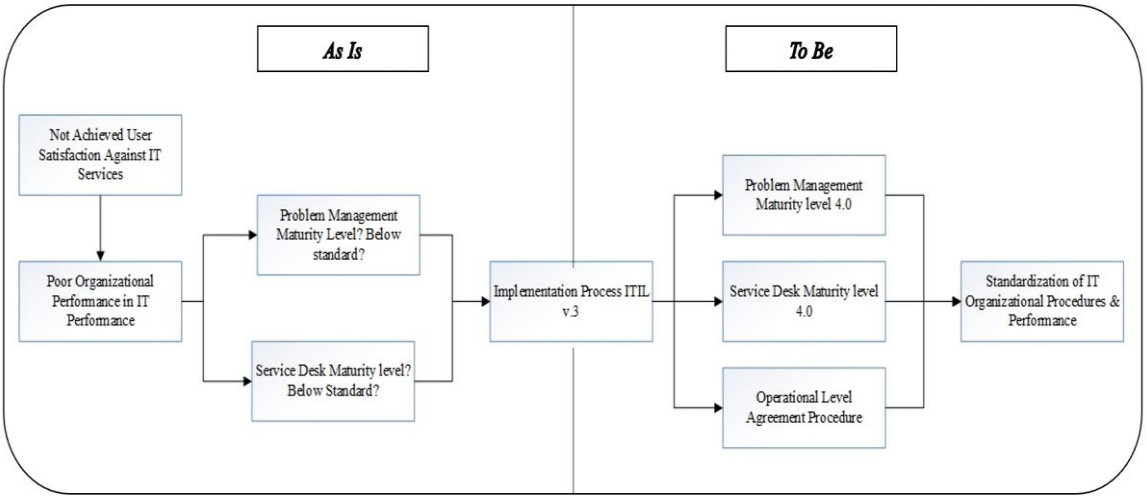

Figure 7. Define Results As Is and To Be, *Source: Data Processed, 2020*

Goal Question Metric (GQM) used to determine metrics as measurement standards that are directed and in accordance with the main problems in the services provided by IT organizations to users of these services. The GQM results for this study are described in table 3 below:

Table 3. Goal Question Metric (GQM)

Goal	***Purpose***	Increase Service Performance Targets
	Issue	Operational Performance
	Object (Process)	IT Organization
	Viewpoint	User Services
Question 1		Maturity Level of the Problem Management process
		In IT Organization?
Metric		Maturity level based on the results of ITSM - SA
Question 2		Maturity Level of the Service Desk Function
		In IT Organization?
Metric		Maturity level based on the results of ITSM - SA
Question 3		How good is the operational performance in terms of problem handling time efficiency?
Metric		Problem solving based on SLA

Source: Data Processed, 2020

Measure

The results of the measure stage in the form of the level of maturity of functions and processes currently running, namely 2.5 for problem management and 2.0 for the service desk function process, will be used at a later stage to analyze and identify factors that cause mismatches in service performance. The process of collecting data through a Focus Group Discussion (FGD) was carried out by researchers with informants (resource persons) in identifying current functions in terms of problem management and service desk functions which refer to the ITIL v3 framework. The first stage is a discussion related to the phenomenon that occurs as well as a discussion of the IT Management reference concept used and measuring IT maturity from 2 dimensions of known problems and making it a priority for improvement. The second stage is an in-depth discussion of the service desk function and problem management process descriptions as well as guidelines for how service desk functions and problem management processes are in accordance with IT Management standards, analysis of the maturity of the GAP service desk function and problem management processes between current conditions and expected standards, suggestions and input regarding the improvement of the process. And in the final stage, discussing improvements in research in the form of as well as suggestions and input related to the improvement of the process. And in the final stage, discussing improvements in research in the form of as well as suggestions and input related to the improvement of the process. And in the final stage, discussing improvements in research in the form of Proposed procedures for improving information technology governance (IT) management in achieving management targets for IT service satisfaction.

Analyze

The analysis stage uses data obtained at the measure stage against the ITSM Maturity Level on the functions and processes of problem management and service desk functions. Identify GAP Analysis between the conditions of as is and to be based on the results of the ITSM self-assessment, to find out the current main shortcomings in achieving the target maturity level 4.0 in tables 4 and 5. Then, continue the analysis using the cause and effect diagram in Figure 8.

Table 4. Results GAP Analysis of Service Desk Function

Lv	Questions	Category	Existing Conditions
2.5	Does the service desk responsible for completing all incident documentation and actual incident documentation used for monitoring and controlling the incident?	*Configuration Management*	Not Applied
3.0	Does the service desk operators to standardize incident report systematically?	*Configuration Management*	Not Applied
3.0	Is the function of the service desk able to provide information to management for review of new requests?	*Problem Identification*	Not Applied
3.5	Are there standards and criteria for improving quality that can be applied every time new incident registration and call handling have been submitted to the service desk operator?	*Problem Identification*	Not Applied
3.5	Does the organization set and review either targets or objectives for the Service Desk?	*SLA Management*	Not Applied
4.0	Do you provide management with information concerning trend analysis in incident occurrence and resolution?	*Problem Identification*	Not Applied

Source: Data Processed, 2020

Table 5. Results GAP Analysis of Problem Management Process

Lv	Questions	Category	Existing Conditions
2.5	Is the nature of the problem always documented as part of the problem record?	*Problem Management*	Not Applied
3.0	Are standard reports concerning problems produced regularly?	*Problem Identification*	Not Applied
3.0	Are the services provided from problem management clear and in accordance with the functions and other support for the delivery process provided?	*Problem Management*	Not Applied
3.0	Do problem management reports comment on the results of proactive problem management?	*Problem Management*	Not Applied
3.5	Are the standards and other quality criteria made explicit and applied to problem management activities?	*Problem Identification*	Not Applied
4.0	Does Problem Management provide management with information concerning analysis of problem records?	*Problem Management*	Not Applied
4.0	Does Problem Management provide management with information concerning recurring problems of a particular type or with an individual item?	*Problem Management*	Not Applied

Source: Data Processed, 2020

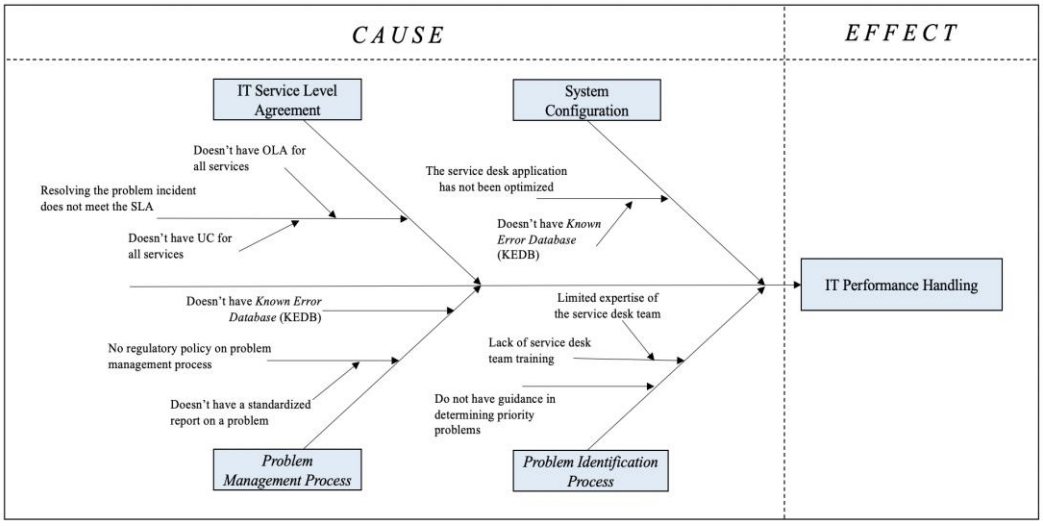

Figure 8. Cause and Effect Diagram (Fishbone)
Source: Data Processed, 2020

Improve

Table 6. Summary of Improvement

Steps	Improvement
Guidelines of handling user complaint	Making a proposal for a phone script guide to get information when receiving a complaint report from a user by telephone, regarding the problems experienced.
Define priority of problem	Create guidelines in determining the priority of an incident report
Process Improvement and Development	Designing a process adjustment proposal in the service desk function service workflow
	Designing proposed process adjustments to problem management workflows
	Developing of KEDB features
Technology Development	Developing an IT support portal application

Source: Data Processed, 2020

Proposed recommendations for process development and improvement of IT service performance are summarized in the table 6, to improve IT user service satisfaction in accordance with ITSM standard reference using ITIL v.3 as a framework.The matrix of urgency and impact is described in table 7, value 1 is high priority, value 2 is priority of medium, and value 3 represents low priority. Table 8 describes the deadlines given for resolution based on priority.

Recommendations for improvements to the service desk service workflow are described in the flow chart in Figure 9. Improvement of problem management process workflows to achieve IT service user satisfaction which refers to the standardization of the ITIL v.3 framework outlined in the flow chart in Figure 10.

Table 7. Priority Matrix

PRIORITY MATRIX		URGENCY		
		HIGH	MEDIUM	LOW
IMPACT	HIGH	1	1	2
	MEDIUM	1	2	3
	LOW	2	3	3

Source: Data Processed, 2020

Table 8. Service Level Aggreement

PRIORITY	DESCRIPTION	RESOLUTION TIME
1	HIGH	2 hours
2	MEDIUM	8 hours
3	LOW	24 hours

Source: Data Processed, 2020

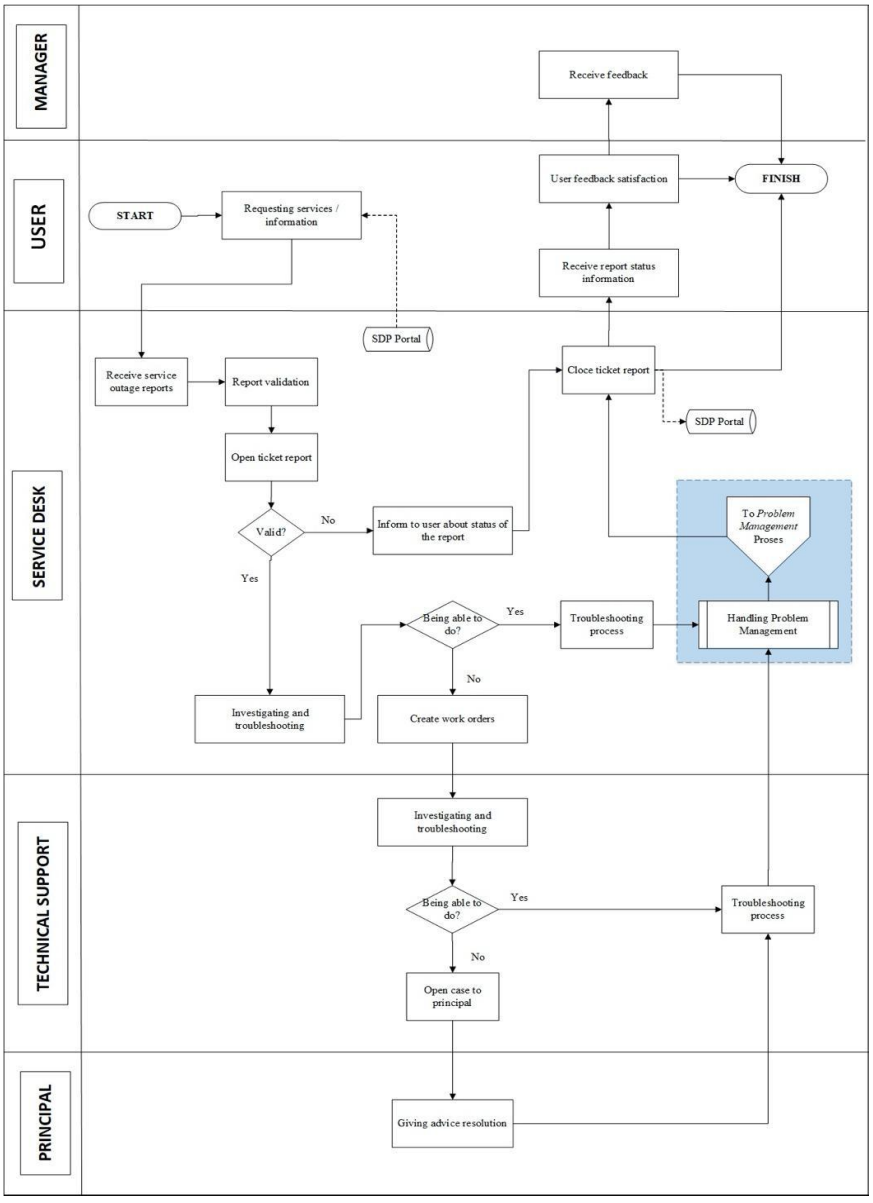

Figure 8. Flowchart Improvement of Service Desk Function, *Source: Data Processed, 2020*

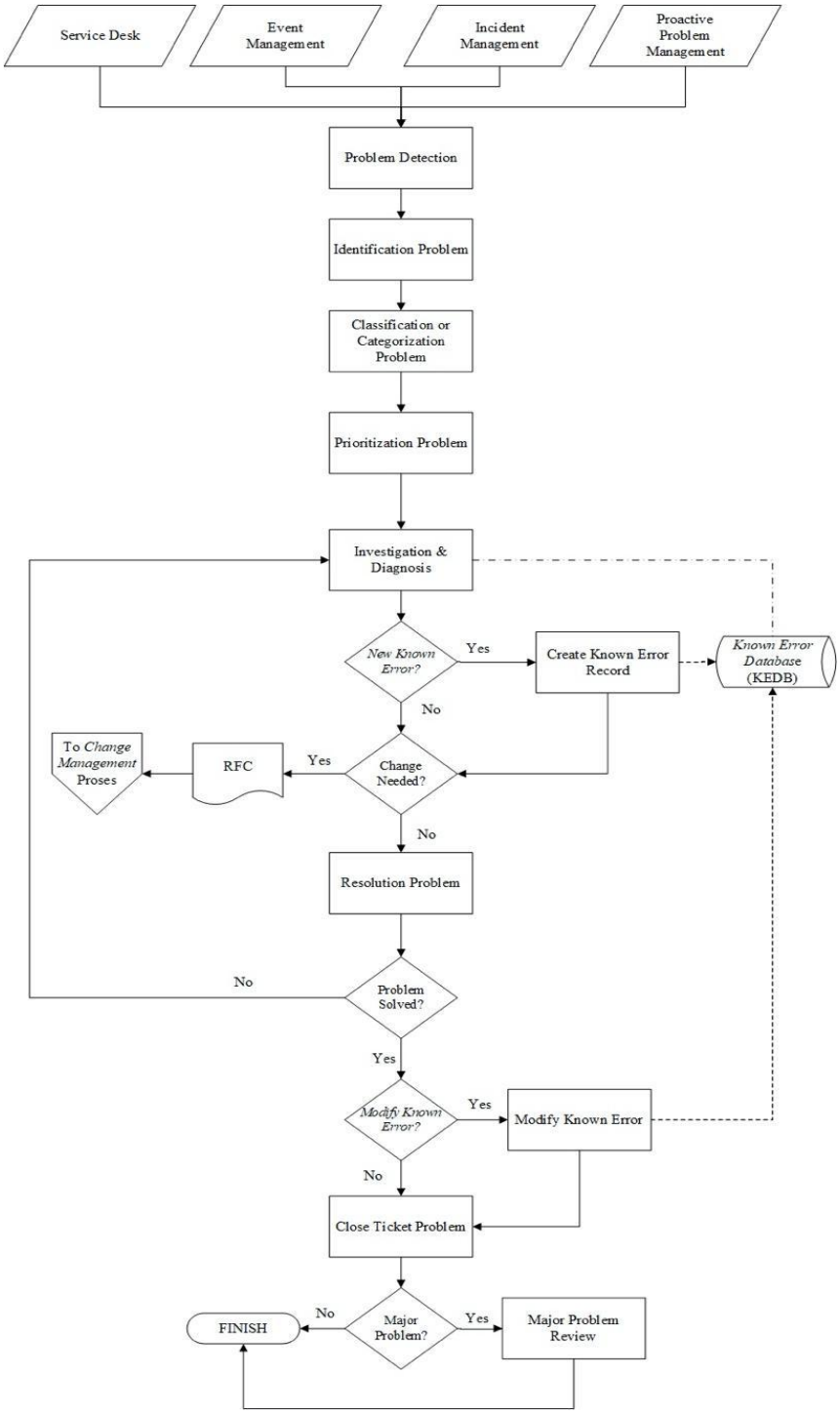

Figure 9. Flowchart Improvement of Problem Management
Source: Data Processed, 2020

Before the proposed improvement recommendations were produced, the problem management workflow process and service desk function in IT organizations were still not in accordance with the existing standard reference standards (ITIL framework v.3) so that they did not provide significant results in terms of the flow of problem management at hand. In the case of the Known Error Database (KEDB) module, IT organizations do not yet have a KEDB to accommodate the results of errors where the resolution is already known. The addition of the Known Error Database (KEDB) module which can be integrated with the Problem Management module can optimize the functions of the service desk service.

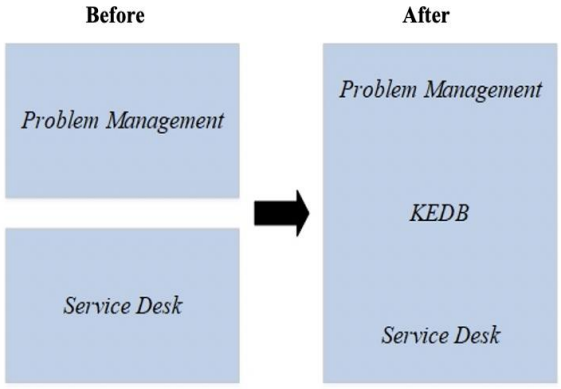

Figure 10. Improvement Module of IT Support Portal Application

Source: Data Processed, 2020

Control

The control stage is the last stage of using the six sigma DMAIC method. At this stage, after the improvement process is carried out, a control and monitoring function is carried out on proposed recommendations for improvements and process development to ensure that the goals and expectations for improvements can be achieved in accordance with the expectations of the management. Due to time constraints in research, at this stage the researcher will only provide a project timeline using a gantt chart as a guide in the implementation process to the IT organization management for improvement planning and process development activities. In Figure 11, the initiation process and design have been completed simultaneously with the research conducted by the researcher, but the implementation process for the improvement takes longer and is expected to be completed within five months.

Task Name	Duration	Start	Finish
ITSM PROJECT TIMELINE	**175 days**	**8/10/20**	**4/9/21**
Initiation	**16 days**	**8/10/20**	**8/31/20**
Development Planning	3 days	8/10/20	8/12/20
Business Strategy Planning	3 days	8/12/20	8/14/20
Research Framework ITSM	8 days	8/17/20	8/26/20
Selection of the ITIL Framework as a reference for ITSM	3 days	8/27/20	8/31/20
Design	**44 days**	**9/1/20**	**10/30/20**
Identify IT Service Processes	4 days	9/1/20	9/4/20
Planning New SOP on Service Desk Services	10 days	9/7/20	9/18/20
Making Target Resolution Time in Problem Management Process	8 days	9/21/20	9/30/20
Planning for Making Features in the New IT Support Portal Application	7 days	10/1/20	10/9/20
Process Integration between Service Desk and Problem Management	15 days	10/12/20	10/30/20
Executing	**85 days**	**11/2/20**	**2/26/21**
Application of Workflow SOP in Problem Management Process	20 days	11/2/20	11/27/20
Socialization of Workflow from Problem Management Process	5 days	11/30/20	12/4/20
Implementation of handling user complaint procedure	15 days	12/7/20	12/25/20
Planning for the Implementation of the New IT Support Portal Application	5 days	12/28/20	1/1/21
Deployment and Testing of New IT Support Portal Applications	35 days	1/4/21	2/19/21
Socialization and Training of the New IT Support Portal Application	5 days	2/22/21	2/26/21
Monitoring & Controlling	**23 days**	**3/1/21**	**3/31/21**
Performance Evaluation of the New IT Support Portal Application	10 days	3/1/21	3/12/21
Service User Satisfaction Survey on the New IT Support Portal	5 days	3/15/21	3/19/21
Measurement of Service User Satisfaction Levels Before and After Process Improvement	8 days	3/22/21	3/31/21
Closing	**7 days**	**4/1/21**	**4/9/21**
Conclusion of New Process Improvement and Development	7 days	4/1/21	4/9/21

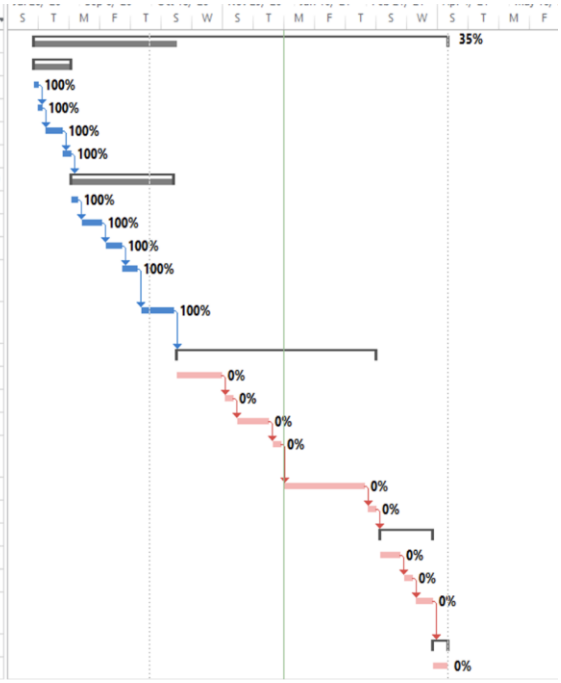

Figure 11. Gantt Chart Implementation

Source: Data Processed, 2020

CONCLUSION

The evaluation carried out at PT XYZ in the operational domain (service operation) on the management of information technology governance services based on the DMAIC method uses the ITIL v.3 framework which causes poor handling of IT service disruptions to its users due to the absence of Service Level Management (SLM) that should be having an OLA (Operational Level Agreement) priority for all services that experience disruption, the absence of a configuration management that includes the KEDB (Known Error Database) feature, the inadequate function of the service desk and problem management process, and a lack of training

for the service desk team in identifying incidents received by telephone.

The results of the assessment of the maturity level of the IT organization as a benchmark for indicators of good and bad handling of IT service disruptions to its users in terms of problem management processes and service desk functions are sequentially at levels 2.5 and 2.0 using international standard measuring instruments, namely ITSM Self-Assessment. Meanwhile, the management target for IT disruption handling services is at level 4.0. This maturity level shows that in its implementation, PT XYZ still needs improvement in terms of procedures and work processes which are used as a reference in all operational activities.

Recommendations for improvement proposals are, first, by providing guidance regarding handling user complaint by telephone in the form of a script to help identify problems appropriately and effectively. Then, making disturbance priority provisions to assist in the process of designing the proposed adjustments to the service desk service workflow, improving the work flow in the process and the Known Error Database (KEDB) which is integrated with the service desk service which of course is also supported by developments in terms of technology in the form of features on IT Support Portal application.

REFERENCES

1. Aradea. (2012). Kombinasi IT Infrastructure Library dan Six Sigma Untuk Peningkatan IT Service Management. Jurnal Ilmiah Bidang Ilmu Teknologi, Vol. 4, No. 2.
2. Feras Al-Hawari, H. B. (2019). A Machine Learning Based Help Desk System for IT Service Management. International Journal of King Saud University – Computer and Information Sciences.
3. G. A. De Waal, A. M. (2014). A Conceptual Framework for Guiding Business Transformation and Organizational Change in Innovative ICT Projects. International Journal Of Organizational Innovation, Vol. 7.
4. Idria Maita, S. A. (2016). Analisis Tata Kelola Tekhonologi Informasi Dengan Best Practice ITIL v3 Service Operation. Jurnal Rekayasa dan Manajemen Sistem Informasi, Vol. 2, No. 1.
5. Malleswara Talla, R. V. (2013). An Implementation of ITIL Guidelines for IT Support Process in a Service Organization. International Journal of Information and Electronics Engineering, Vol. 3, No. 3, 334-340.
6. Noor Nashriq Ramly, L. K. (2012). Six Sigma DMAIC: Process Improvements towards Better IT Customer Support. International Journal of e-Education, e-Business, e-Management and e-Learning, Vol. 2, No. 5: 359-364.
7. Office, C. (2011). ITIL Service Operation. London: The Stationery Office.
8. Office, C. (2011). ITIL Service Design. London: The stationery Office.
9. Office, C. (2011). ITIL Continual Service Improvement. London: The Stationery Office.
10. Office, C. (2011). ITIL Service Strategy. London: The Stationery Office.
11. Office, C. (2011). ITIL Service Transition. London: The stationery Office.
12. Steel, A. C. (2017). Proactive Management of IT Operations to Improve IT Services. International Journal of Information Systems and Technology Management (JISTEM), Vol. 14 No. 2.

How to cite this article: Kurniawan A, Nugroho RE. Evaluation and proposed improvement of IT service management based on DMAIC method using IT infrastructure library (ITIL) v.3 framework at PT XYZ. *International Journal of Research and Review*. 2021; 8(1): 531-545.

******