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Optimizing IT Service Strategies: A Performance Assessment through ITIL V3 in PT XYZ IT Operations Division

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Abstract

In building a system in an IT organisation, it is necessary to have the support of an IT Service that is able to adapt to business needs continuously. IT services mainly run and grow from within the company. The Information Technology Infrastructure Library (ITIL) is the most commonly adopted framework for IT service management. Starting the use of ITIL can be done by identifying areas that can be developed and measuring the current situation. This will help to know the desired future state and be the basis for finding solutions to improve performance based on ITIL. Maturity level measurement is one of the commonly used methods to define the current situation. The purpose of this research is to understand how well a team from a small company is doing business using maturity levels. ITIL's seven-step improvement process was chosen and adapted as a guide to carry out the entire research. The research was conducted by conducting maturity assessments and interviews at a small IT services company. Measurements were carried out twice. At first, it serves to determine the condition before measurement and improvement. Research in the IT Operations division of XYZ revealed that ITIL implementation can increase maturity levels in accordance with company management objectives. In the end, the implications of this research will provide company management with factors and solutions to improve performance based on ITIL implementation.

Keywords: Maturity Level, ITIL, ITSM, Performance.

1. Introduction

An organization's ability to handle information technology (IT) will impact the quality of its services. The current state must be analyzed before the organization can develop, manage, or identify necessary changes [1]. To assess the extent of the IT Support team's ability to master and execute its business processes, measurement using existing best practices is needed. In this case, references from the Information Technology Infrastructure Library (ITIL) are utilized. Subsequently, the performance measurements of the IT Support division at XYZ can serve as a basis and guide for improving service quality. "XYZ" is an IT service company involved in both software and hardware services. The majority of its clients are non-IT companies, such as manufacturing or production, and with fewer than 15 employees, XYZ can be classified as a small business. With an increasing number of clients without a proportional growth in the workforce, there is a need for increased work efficiency to maintain the quality of provided services.

So far, XYZ has not had established guidelines for its business processes. Handling issues, incidents, or implementing something new has not been standardized. Typically, small companies do not use frameworks to run their business processes. Therefore, measuring with ITIL can be beneficial for the company in making changes accompanied by increased efficiency and flexibility but at a lower cost [2]. ITIL, or the Information Technology Infrastructure Library, is one of the best practice frameworks for delivering services. It is widely used globally due to its flexibility in

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application to organizational size [3]. ITIL is considered highly suitable for implementation in the IT Support division of XYZ, given the relatively small team size and the diverse incidents and customer types within the industry.

The implementation of ITIL can have a positive impact on process management within IT functions and provide high-quality IT services [4]. Additionally, ITIL allows for partial or segmented implementation without requiring specific licenses or brands [5]. Regarding the specifications of the IT service design architecture model for small businesses where a systematic and stringent design is not necessary, the latest version of ITIL is not required for implementation [6]. Measuring the performance of the IT Operations division is considered crucial. This process affects procedures, systems, and the capabilities of IT staff, which can be observed when compared to measurements after improvements. This study examines the maturity processes applied in the IT Operations division, aiming to provide input for enhancing performance, efficiency, and service quality.

2. Research Methodology

2.1. Base Theory

Before conducting measurements, it is important to understand the overview of ITIL (Information Technology Infrastructure Library), which serves as the research tool in this paper. ITIL, or the Information Technology Infrastructure Library, is a set of concepts and techniques for managing the infrastructure, development, and operation of information technology (IT). ITIL provides a detailed description of several essential IT practices with a comprehensive checklist, tasks, and procedures that can be customized for all types of IT organizations [7].

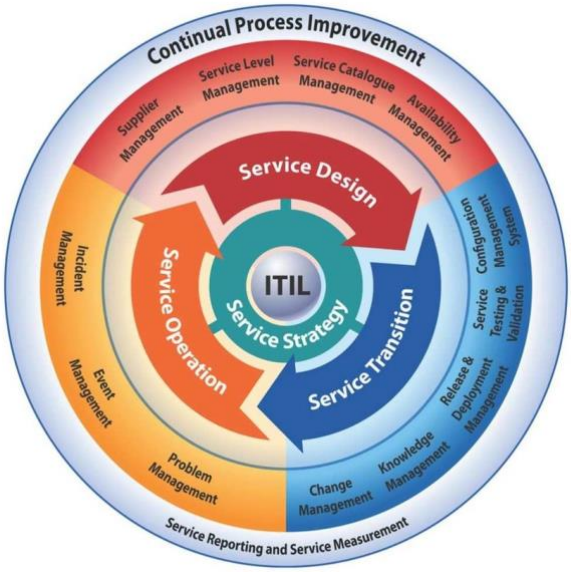

Figure 1. ITIL Lifecycle

The Office of Government Commerce (OGC) published the third version of ITIL (ITIL v3) in 2007, consisting essentially of five parts and placing greater emphasis on the management of the service lifecycle provided by information technology. These five parts are: Service Strategy, Service Design, Service Transition, Service Operation, and Continuous Service Improvement. These parts are also known as the ITIL Service Lifecycle or ITIL Lifecycle. In this paper, it is mostly related to one part of the ITIL Service Lifecycle, namely ITIL Service Operation. This is because Service Operation is highly relevant to the business process objects studied by the author. Service Operation is a Lifecycle stage that encompasses all day-to-day operational activities of IT service management. It includes various guidelines on how to efficiently and effectively manage IT services and ensure agreed-upon performance levels with customers. These guidelines cover how to maintain stable IT service operations and manage changes to the design, scale, scope, and performance targets of IT services [8].

When looking at the big picture of ITIL, it is evident that services are its main focus. This makes IT Service Management (ITSM) important and even a solution to some improvements made based on the ITIL framework. ITSM

built with the ITIL framework can maintain service quality while handling incidents [9]. The term IT Service Management (ITSM) refers to service management practices for IT as a service-oriented approach to managing applications, infrastructure, and IT processes [10]. In analyzing issues arising from research results, the Ishikawa diagram, or commonly known as the fishbone diagram, is used. The fishbone diagram is a visual tool [11] to identify, explore, and graphically depict in detail all causes related to a problem or event [12]. The basic concept of the fishbone diagram is that the fundamental problem is placed on the right side of the diagram or at the head of the fishbone framework [13]. The main goals are illustrated by the backbone, and major factors are represented as branches. Secondary factors are then added like stems from the branches, and so on [8].

In the results seen from this paper's research, maturity level is used. Maturity Level is needed to determine the extent of an organization's operational level. The higher the maturity level, the better the information technology management processes directly support IT support in the organization's goal processes [14]. It is expected that knowing maturity levels can help the research object company team to: (1) Restore services to users as quickly as possible. (2) Minimize negative impacts on operational activities. (3) Ensure the best use of resources. (4) Maintain and implement a consistent approach to incident management. (5) Analyze frequently occurring problems.

Table 1. CMMI Maturity Model

Maturity Level	Description
0. Non-existent	Nothing present
1. Initial	Concrete evidence of development
2. Repeatable	Some process documentation but some errors likely
3. Defined	Standardized and documented
4. Managed	Monitored for compliance
5. Optimized	Processes are considered best practices through improvement

There is literature explaining performance measurement using ITIL with different research objects. In general, literature can be used as a comparison and a benchmark for the measurements performed. ITIL and Lean are different frameworks but can be used together to achieve optimal results. The combination of Lean and ITIL is beneficial for companies that want to master the entire value chain of processes [15]. This indicates that the flexibility of ITIL has proven to be applicable in various scenarios, conditions, and can be combined with other frameworks. From the research titled "ITSIM: Methodology for Improving IT Services Case Study CNEL EP-Manabi" by [16], it is mentioned that performance measurement is essential for IT development and to demonstrate its results. This helps to understand, manage risks, and maximize IT benefits. Additionally, maturity level measurement is obtained by measuring ITIL elements. To improve the maturity level, regulations and limitations on IT service management are needed, such as documentation of regulations, standard operating procedures (SOP), and other documents. This is cited from the research titled "Evaluation of Information Technology System Services Based on ITIL at a Middle Tier University" by [17].

In the book titled "Evaluation of IT Service Management Based on the ITIL Framework in Industrial and Mining Banks (Service Operations Process)" by [18], factors that are the reasons for measurement are presented. These include (1) Service Management as a practice, (2) Service operation principles, (3) Service operation processes, (4) Common service operation activities, (5) Organizing service operations, (6) Consideration of service operation technology, (7) Performing service operations. A consideration is presented in the research by [19] titled "Evaluating a Quantitative IT maturity self-assessment approach: Is it give a good way of the as-is state?". It states that there is a deviation from survey results compared to the actual maturity. There is a tendency to give a higher maturity value than actually occurs. The assessment of maturity levels will be more accurate if respondents or all personnel involved in the assessment have ITIL knowledge. Alignment between business and information technology leads to cost reduction, increased organizational flexibility and responsiveness, value creation, competitive advantage, and optimal resource utilization [20]. According to [21] from the literature titled "Experiences and practice in the implement of IT Governance in Mexican Electric Utility," the implementation of frameworks can help achieve governance maturity goals: (1) Align IT and business goals, (2) Manage requests proactively, (3) Manage portfolios for maximum returns, (4) Measure

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performance, (5) Calibrate design and organizational resources, (6) Develop staff and leaders, (7) Minimize IT risks for business, (8) Manage resources efficiently.

2.2. Research Description

The overall research activities conducted in the IT Operations division of XYZ can be seen in Figure 2.

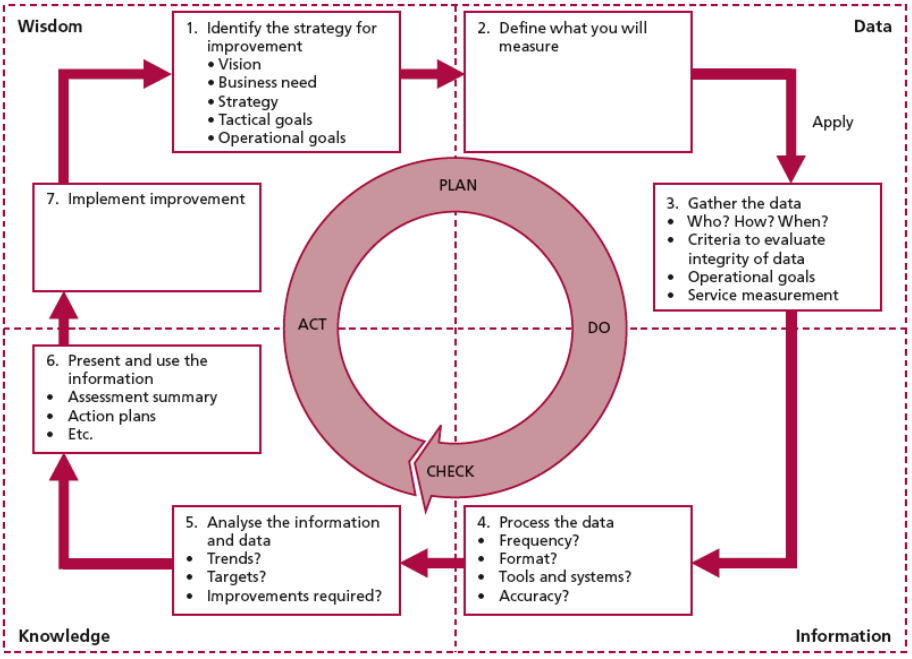

Figure 2. Research Step

The steps taken in this case study research include problem identification, literature review, ITIL CSI (Continual Service Improvement) seven-step improvement process, evaluation and recommendations, and concluding with conclusions and suggestions. The diagram or framework scheme below is adapted from the ITIL Continual Service Improvement (CSI) model. XYZ is a company in the IT services sector focusing on information technology, such as hardware provision and maintenance, software services, and network procurement services, both internet and local. Currently, XYZ has served more than 32 companies in Indonesia. The company is oriented towards Business to Business (B2B) and continually strives to meet the information technology needs of each customer.

Established in 2012 with 20 client companies, XYZ primarily supported growing companies at that time, so its scale was not as large as it is now. Over time, XYZ's clients have grown larger, attracting new companies from the same geographic region. In its operations, XYZ consists of various work groups. The first is the IT group, comprising IT Purchasing, Application Administration, Corporate Development, Business Support, and IT Operations. The second is the Non-IT group, consisting of Finance and Human Resource Development. Currently, XYZ lacks structured documentation and a business process system in providing services to client companies. Most activities are carried out using email as a medium, both in the process of handling issues or incidents and escalating problems. Apart from email, communication methods include phone calls, followed by manual recording on sticky notes by each team member.

2.3. Research Methodology

The seven-step ITIL CSI (Continual Service Improvement) process is a crucial part of the guidelines in conducting this research. By using these seven steps, it is possible to identify, define, collect, process, analyze, present, and implement improvements according to ITIL best practice guidelines.

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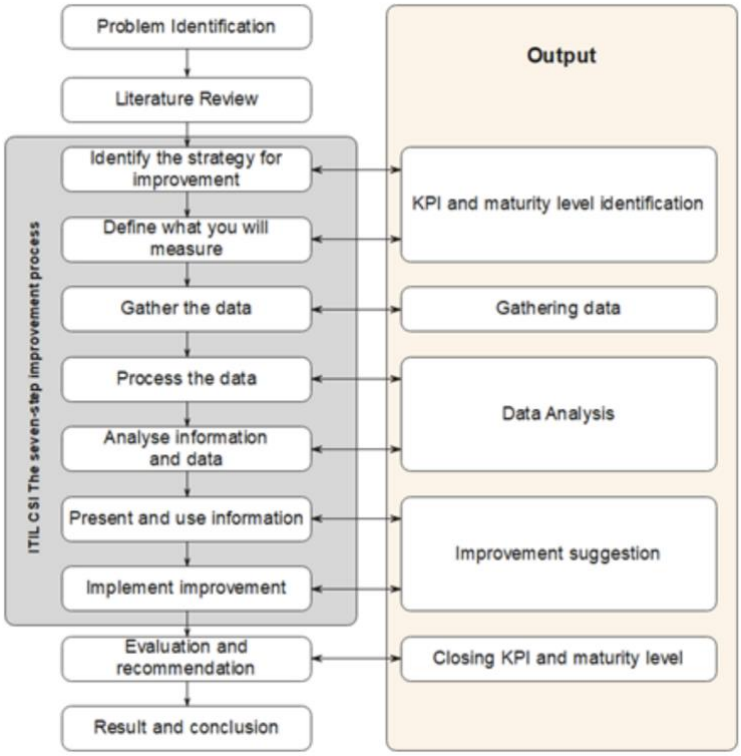

Figure 3. Output Framework

Figure 3 provides an overview of the output that will emerge during the process or activities as this research progresses. Problem identification is carried out as a step in finding ongoing issues. It is essential to determine the research objectives to contribute positively to the flow of processes within the company. A literature review is conducted to study and search for theories related to IT Service Management, Information Technology Infrastructure Library, maturity level, Ishikawa diagram, and previous research used to describe workflows in IT Service Management implementation processes and others. The researcher also uses sourced articles and online resources to gain insights not found in existing literature or previous research.

Next, we move on to the ITIL CSI part, the seven-step improvement process. The first step provides an overview of what will be done during this research. According to ITIL best practice guidelines, the main stage of the seven-step improvement is measured according to the established plan. After planning the measurement, the results are analyzed and presented, enabling the formulation of new strategies for the progress of the IT Operations division's performance. The measurement strategy used is based on the Maturity Level. To achieve excellence in service quality, the company relies on determining the desired attributes of services and levels [22]. Two measurement strategies are chosen because they align with ITIL best practice guidelines, with a primary focus on service operations for XYZ. Maturity levels are selected to describe performance descriptively with stages of initial, repeatable, defined, managed, and optimized. As a complement to the previous measurement method, interviews are conducted to understand the company management's direction and goals regarding the success of IT service implementation [23]. This becomes an output in the identification of maturity levels as shown in Figure 3. Data collection is done using a questionnaire method containing Maturity Level assessment points. Data collection through interview methods will be semi-structured with IT Operations managers at XYZ. The output of this data collection activity is the data itself, whether in the form of questionnaire results or interview notes.

Data processing is carried out by examining the results of the Maturity Level Questionnaire assessment. The Maturity Level questionnaire needs to be calculated first to become processable information. From the processed Maturity Level data, it can be determined what aspects are not running well in the IT Operations division. This information will be used to improve the performance of the IT Operations division by identifying the root causes using an Ishikawa or Fishbone diagram. Information delivery is done after analyzing the information and data. In its delivery, maturity can

be presented in the form of a radar chart to facilitate readers in understanding the focus of ITIL Service Operation that can still be improved. The information conveyed is adjusted to the interview results so that improvements can proceed in the desired direction of company management. Because management support is an essential component to achieve critical success factors (CSFs) [24].

Implementation of improvements is the final stage of the seven-step improvement process. Improvements are made based on the information from previously analyzed measurements, showing the desired results according to ITIL best practices. The implementation of these improvements will be carried out by the XYZ IT Operations team under the supervision of the relevant manager. After going through the seven-step ITIL CSI improvement process, it is expected that there will be an improvement in the maturity level. Subsequent re-measurements will be conducted to prove whether there is improvement and/or further improvements after implementing changes according to ITIL best practices.

2.4. Data Collecting and Preprocessing

Data collection is carried out using a questionnaire method containing Maturity Level assessment points. The questionnaire will be adapted from the Information Technology Infrastructure Library (ITIL) version 3, 2011 literature for the Service Operation section. This is because Service Operations are deemed to have areas that align with the work performed by the IT Operations division of XYZ. In measuring the maturity level, reference is also made to the ITIL Service Operation book, which outlines five main processes: Event Management, Incident Management, Request Fulfillment, Problem Management, and Access Management. Each process creates a table containing questions to describe the current performance condition of the IT Operations team. The questionnaire questions have been adjusted to fit the organization, ensuring that the scores indicate good organizational process performance [25].

Each question in the table is given a weight of 1. So, for a question with a "yes" answer, a score of 1 is given, and for a "no" answer, a score of 0 is given. After that, the result for each respondent is calculated for each table, with a range from 0 to 5 according to the CMMI maturity level. The formula for Maturity Level is as follows: Maturity Level = (Total score x 5) / (Questions in the table). After obtaining the maturity level for each table from the respondents as per the formula above, the average process is then calculated for all respondent data tables with the same Service Operation process. The average results obtained can be presented as information using a radar chart.

The interview method is conducted with the manager of the IT Operations division. The interview is semi-structured with a broad outline of prepared topic questions. The expected results of this interview are information related to the ongoing processes and an overview of the company's expectations in making improvements. Additionally, the interview is expected to complement the maturity level measurements and serve as a reference in conducting the research.

3. Result and Discussion

The collected data results are categorized into several sections. Firstly, there are the outcomes of interviews, followed by the results of maturity measurements, and then proceeded with data analysis. The analyzed data results, which include improvement information, are provided to the company for implementation. In the final stage, a final maturity measurement is conducted to test the impact of the improvement information provided.

3.1. Interview Data Result

The interview was conducted in a semi-structured manner, meaning that questions were prepared before the interview took place. These questions served as a foundation that could be spontaneously developed with other related questions based on the interviewee's responses. There were 16 questions covering topics such as examining the profile of IT Operations managers, the existing conditions of the company related to ITIL, and the company's expectations regarding the use of ITIL in the IT Operations division.

From the profile of the IT Operations manager, it was revealed that they are familiar with the basic concepts of ITIL despite their background not being in information system management. However, currently, ITIL has not been extensively implemented in the business processes of the IT Operations division. According to the manager, ITIL has

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been implemented but only to a general knowledge extent, such as the incident handling process for client companies. Despite the ongoing handling, ITIL is considered to provide more advantages, for example, when handling incidents, documentation allows for faster resolution if similar issues arise.

They believe that it is highly beneficial to implement a framework that can enhance performance efficiency. This is believed to help improve the quality of company services but at an economical cost. ITIL's event management has already been applied, although there are still shortcomings in the monitoring system used. Incident management, in practice, still relies on the individual capabilities of the IT Operations team members, with no standard records or procedures. The same situation also applies to problem management, which lacks procedures and often deals with recurring issues. Request fulfillment is considered not optimal as the communication has been primarily through email, and sometimes even by phone, leading to issues being forgotten to be executed. Access management is seen as reasonably good, with password settings and user grouping, but passwords are often too simple and can be accessed multiple times by unauthorized individuals.

They believe that a maturity level of 3 in all ITIL Service Operation processes is sufficient for a small company like PT XYZ. Maturity level 3 signifies standardization and documentation. Achieving this maturity level is believed to enhance the performance of the IT Operations team and bring positive economic value to the company without compromising service quality to customers.

3.2. Initial Measurement Result

The measurement of maturity levels was conducted on five respondents, all of whom are part of the IT Operations team, including the managers. The questionnaires were distributed and filled out in January 2022. These questionnaires aimed to capture the maturity level of the IT Operations division throughout the year 2021, which had not yet implemented ITIL.

Table 2. Initial Measurement

Service Operation Processes	Maturity Level
Event Management	0.5
Incident Management	0.3
Request Fulfillment	0.4
Problem Management	0.2
Access Management	0.8

Table 2 represents the results of the initial maturity measurement. It can be observed from the table that the current maturity level is below level 1, and some parameters of the Service Operation processes are approaching zero. According to Table 1 presented by CMMI, a maturity level of 0 means nonexistent. Many business processes are not controlled at all, and actions taken to do something cannot be predicted beforehand.

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Figure 5. Initial Measurement Radar

Figure 5 is a representation of the results of the initial maturity level measurement in the form of a radar chart. It is evident that the overall maturity level is still below level 1. However, there are two Service Operations processes, namely Event Management and Access Management, with higher levels than the other processes. In addition to the results of the initial maturity level assessment, Figure 5 also provides information about the expectations of IT Operations managers. As representatives of the company's management, the expected maturity level is at level 3, as depicted by the blue line on the radar chart.

3.3. Data Analysis

In analyzing the data, the Ishikawa diagram [26] or fishbone diagram is utilized. This method is a result of brainstorming activities [27] seeking multiple solutions to a problem. Problem-solving or factors causing the problem are viewed from various perspectives, such as manpower, technology, material, process method, environment, and so on. The offered solutions will consider ITIL best practices. The use of this diagram will reveal potential solutions applicable in the XYZ company environment and eliminate those that do not align with the main goal of management, which is to enhance efficiency and cost savings. To improve the maturity level of Event Management, it is possible to optimize the existing monitoring system. Monitoring software can be configured to detect more than just turned on or off devices, but also to the level of detecting Configurable Item (CI) deviations, such as problematic server hard disks. Automating this detection process will save time by eliminating the need for periodic checks and also maintain consistency in CI error deviations from the predetermined threshold [28]. Additionally, a process monitoring information method is required to classify incidents according to IT focus groups such as networks, servers, application software, and so on. This way, handling can be done by the right people promptly. Incident occurrence reports are also necessary for further evaluation of hardware or software issues that frequently occur within a specific time frame and to take corrective actions.

In Incident Management, in the initial process, incident prioritization should be conducted to improve team productivity and service quality [29]. Therefore, various incident handling procedures that might occur need to be prepared. This aims to facilitate and expedite incident handling if the team members have not dealt with such incidents before. Moreover, documentation can be established, starting from the Incident Handling Report to recording the details of each incident handling step performed by the IT Operations team. To transform and enhance the capability to handle incidents, one approach is to equip each IT Operations team with training and certification.

Request fulfillment can be improved by building an integrated platform or application for making requests, obtaining approvals from superiors, and also providing information on the request process status processed by the IT Operations team. For successful delivery, clear guidelines for delivering business requirements by customers and a clear understanding of what needs to be delivered are necessary [30]. Priorities are added in the application so that request handling can be completed effectively among different requests. Education related to this new process needs to be provided to all users in XYZ client companies. Improving the maturity of problem management is closely related to

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documentation since problems are recurring events. It is crucial to develop a system that includes documentation of previous issues, including how they were handled. If possible, these problems should be resolved, and their root causes should be identified to prevent recurrence in the future. The best application to build is IT Service Management (ITSM), which not only covers problem management but also other Service Operation processes. The access management level can be improved by facilitating access and existing user management. Many users use another user's account when switching computers. Procedures and computer user education can be implemented to prevent this. Additionally, each user needs to provide their own account to ensure that one account is not used by two people for maximum privacy and document control responsibility.

3.4. Final Measurement Level

The final maturity level measurement was conducted with the same respondents as the initial measurement. This measurement was carried out to assess the condition after implementing several improvements by the IT Operations team. The data for this measurement was collected from May to October 2022. The results of the maturity level measurement are presented in Table 4, represented by the radar chart in Figure 6.

Table 4. Final Measurement

Service Operation Processes	Maturity Level
Event Management	2.6
Incident Management	2
Request Fulfillment	1.8
Problem Management	2.2
Access Management	1.6

Table 4 displays the results of the maturity level measurement conducted after implementing improvements based on the ITIL framework. Three Service Operation processes achieved a maturity level above 2, namely Event Management, Incident Management, and Problem Management. The other two processes, Request Fulfillment and Access Management, have not yet reached Maturity Level 2.

Figure 6. Final Measurement Radar

The radar chart in Figure 6 illustrates areas reflecting higher maturity levels in certain Service Operation processes, such as Event Management. It is also evident from the chart that the process with the maturity level furthest from the company's expectations is Access Management.

3.5. Discussion

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As seen in Figure 6, there is a significant improvement compared to the measurement results in Figure 5. Event Management indicates an increase in the desired maturity level as envisioned by the company's management. This improvement is supported by the enhanced and integrated software monitoring application. Consequently, notifications for incidents or issues can be directed to the appropriate personnel for prompt response.

Furthermore, Incident Management, Problem Management, and Request Fulfillment have all shown improvement, which is a significant outcome of the establishment of the ITSM system. Although it hasn't reached the desired maturity level for the company, the increase of approximately 2 maturity levels is considered quite positive compared to the initial measurement results. ITSM plays a crucial role in enhancing these three service operation processes by integrating standardized methods, business processes, documentation, notifications, and reporting.

The Access Management process achieved a maturity level of 1.6. In the improvement process, this area proved to be the most challenging. Access management is closely tied to end-users in their daily operations. Changing long-standing habits takes more time. This differs from introducing an ITSM system, which can be built, implemented, and operated by the IT Operations team itself. Managing access has a significant impact on personnel from XYZ's client companies who may not necessarily have backgrounds in IT/IS.

4. Conclusion

In conclusion, the implementation of ITIL can enhance the performance of the IT Operations team, as measured by the maturity level. As team performance improves, it contributes positively to the company, aligning with management expectations of cost efficiency and effectiveness. In the performance measurement process, it was found that the use of IT Service Management has a broad impact on several ITIL Service Operation processes. In other words, the adoption of IT Service Management can elevate the maturity level. However, the implementation of IT Service Management based on ITIL Service Operation should be tailored to the company's specific needs.

Here are the limitations of this study and suggestions for further research. The research sampled only one company in a specific field, namely IT services, limiting the generalization of the study results. Future research should consider collecting performance data from various companies across different industries. In this study, the measurements were conducted twice to verify the success of the improvements within the company. Each measurement required an equal and longer time frame, ensuring a more balanced and precise comparative analysis of measurement data.

5. Declarations

5.1. Author Contributions

Conceptualization: K.P.S. and T.; Methodology: T.; Software: K.P.S.; Validation: K.P.S. and T.; Formal Analysis: K.P.S. and T.; Investigation: N.D.Y.A.; Resources: S.N.R.H.; Data Curation: N.D.Y.A.; Writing Original Draft Preparation: N.D.Y.A. and T.; Writing Review and Editing: N.D.Y.A. and T.; Visualization: T.; All authors have read and agreed to the published version of the manuscript.

5.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

5.3. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

5.4. Institutional Review Board Statement

Not applicable.

5.5. Informed Consent Statement

Not applicable.

5.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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