Utilizing ITIL V3 To Improve Quality of Application In Software House

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Abstract—Kreavi Informatika Solusindo is a software company engaged in the development and development of software. This company has created and developed customs software and one of them is Purimedika software which is software that will be examined in this research. This software is engaged in the field of health, the services provided in this software are in the form of patient registration, doctor selection, medical examination, patient track record, payment and also recording patient data documents. To maximize the company's objectives regarding this software, it is necessary to evaluate the software developed by the company. This research was conducted to evaluate existing governance using the ITIL version 3 frameworks, with the domain of service operations and also using a prioritization approach. The purpose of this study is to measure the level of maturity of the software being developed by the company and also to get the results of the rating assessment based on the results of the analysis of the company by conducting the observation and interview process.

Keywords—ITIL V3, Software House, Quality of Application**.**

1. INTRODUCTION

Currently the world is dominated by a variety of technological sophistication that is so diverse and greatly influences the activities of human life today. These technological advances affect human daily activities from various aspects that make the way or lifestyle of this generation far different from the years before today's sophisticated technology. All operational activities in the company began to be transformed based on technology or computerized. Thus, all of the company's assets are located and dependent on existing technology. The good impact is, there are so many business process activities that used to take a long time, require more energy and are so complicated, now they are faster, simpler and do not have to require as much labor as before. Work done by employees also becomes less complex and more structured and well-documented and accurate.

At present, various companies are starting to develop artificial software to be sold to clients. To carry out development and software development is certainly not easy and must have the ability in the field. Many companies engaged in making software as an asset to get profit. Because more and more companies are engaged in making software, each company must be able to carry out various strategies to survive and not lose competitiveness with other companies and still be able to provide satisfaction for customers.

Several guidebooks guide companies to evaluate corporate governance, one of which is the ITIL framework which is also used in this study. The company cannot evaluate without guidance. Everything needs standards so that biases know the extent to which achievements are obtained. Therefore, the framework is a very important thing that must be used by companies to help improve performance on IT governance owned by the company. That is why the evaluation process is needed, so that the company can survive and not lose with existing competition and develop sustainable governance of the IS is consistent with real issues [1], [2].

Nowadays everything related to business processes is becoming simpler and easier to run because it can be transformed into computerized or technology-based bias. In line with technological developments, customer demand began to increase and increasingly unique which makes companies compete with each other so that companies can adapt to current conditions [3].

The current situation forces the company to improve the quality of the company to achieve competitiveness and strong adaptability. Company services become the basis for customers to value the company. That is why the quality of service must continue to be evaluated and must be followed up so that it can plan future strategies for a better company future [4]. Most companies have implemented various frameworks to evaluate corporate governance for the future of the company. One framework that is often used to evaluate corporate governance is the ITIL framework which aims to improve IT governance services in their companies and for the Information Systems bearing [5], [6].

ITIL (Information Technology Infrastructure Library) v3 is one of the best frameworks that are widely used for evaluating governance which consists of a series of technical concepts regarding infrastructure management, development, and operation of information technology. ITIL consists of several domains namely service strategy, service design, service transition, service operations, and continuous service improvement [7].

This software is software developed by Kreavi Informatika Solusindo. This software aims to simplify business processes, especially in the health sector, namely to facilitate operational activities in clinics and hospitals. The following are the services provided in this software, which are the registration process, the medical examination process, the determination of doctors for patients, recording of medical routes and the payment process.

To optimize the use of this information system, an evaluation process needs to be carried out to be able to measure the level of maturity of the application so that it can be ascertained whether the software that is in the development phase can be according to plans and objectives. Therefore, the research or audit process is carried out on the software using the ITIL Version 3 framework, specifically in the operation of domain services. The domain that will be used in this evaluation process is the service operation.

2. LITERATURE REVIEW

2.1 Information Systems Audit

An information system audit is a process used to ascertain whether the information system applied to the company has implemented an adequate internal control system. In addition, by doing this process we can ascertain whether the processes in the information system in the company have guaranteed data integrity or still need to be improved again. Activities undertaken in this information system audit process are by gathering and evaluating available evidence in order to see the performance of the information system going well, to maintain data integrity, protect assets, achieve corporate / organizational goals effectively, and use resources efficiently [8], [9].

2.2 ITIL

ITIL (Information Technology Infrastructure Library) is a framework that is a collection or set of best practices related to service management that are related or implemented based on information technology. ITIL contains guidelines that can help auditors evaluate IT governance in the company. Using the ITIL framework, auditors can use various guidelines to make it easier for auditors to determine the results of evaluations. This framework was developed by the Office of Government Commerce (OCG) [10]. This framework is one of the most widely used frameworks in conducting audits in companies or organizations throughout the world. ITIL provides a framework that can identify, plan, provide, and also support IT services in business processes [11], [12].

Based on the research that has been done, several researchers have concluded that there are two main reasons in defining steps towards implementing the ITIL framework, one of which is about increasing focus on customer service [13], [14]. This framework guides organizations or companies on ways or guidelines to get maximum value from existing services, especially in the IT field, namely as a tool to facilitate business change, transformation, and growth. One of ITIL's goals is to help corporate or organizational decision-makers make better decisions, in addition to ensuring whether IT is adequate or not so that it can support decision-makers to make decisions for the next steps in dealing with existing deficiencies. The ITIL framework meets ISO standards: ISO / IEC 20000 [11], [12]. Besides ITIL, several other frameworks have the same goal, which is to improve the quality of corporate governance. The set of guidelines contained in ITIL has a focus that is almost the same as other frameworks, namely reorganizing work or business activities rather than employees or staff [14], [15].

2.3 Service Operation

This service operation is the life cycle stage that covers all of the company's operational activities, namely the management of IT services found in the company. In this domain, there are various guidelines on how to manage IT services efficiently and also effectively and can guarantee the level of performance previously promised by the company and its customers. The guidelines in this domain cover how to maintain the operational stability of IT services, including managing changes in the design, scale, scope, and performance targets of IT services. This stage is needed to get a more responsive and stable service [5]. Service Operations are daily operational activities to manage IT services [17].

Process in Service Operations:

1.) Event Management: Events about changing circumstances that have significance for IT services. Is a response to an event, Event Management has the goal to detect the event and decide what approach needs to be taken for the event.

2.) Problem Management: Analysis is carried out to find out the main cause and resolve the cause of the incident permanently. The aim is to minimize the negative effects of an event and also to avoid incidents.

3.) Request Fulfillment: A step where users can make requests so they can develop existing services. Fulfilling Requests has utilities to provide quick and certainly effective access to the standard services it has.

4.) Access Management: The process of granting authorizations to users so users can use this service.

5.) Incident Management: The process of handling all incidents, including failure. The purpose of this is to be able to make returns to normal service activities as fast or as fast as possible and also minimize the influence on business activities while ensuring that it is regulated regarding the stages regarding the quality and availability of the best service [16], [18].

2.4 Maturity Level

The maturity level is used as a tool for more efficient comparison and self-assessment by IT management. Maturity Model is assessed by the principles of each attribute, which will be measured to see the level of each attribute [7], [19].

Table 1. Maturity Level [19], [20]

| Maturity Index	Maturity Level	Explanation
0 - 0,50	0 – Non Existent	There is no visible process at all; the company has not yet realized that there are problems that must be examined.
0,51 – 1,50	1 – Initial/AdHoc	There is evidence that the company has realized there are problems that exist and must be studied, but there is no standardization.
1,51 – 2,50	2- Repeatable but intuitive	The process has been developed at the stage where similar procedures have been followed by various people who carry out this task. There is no formal training or communication understanding of standard procedures.
2,51- 3,50	3- Defined Process	Procedures have been standardized, documented and communicated through training.
3,51 – 4,50	4- Managed and measurable	Management monitors and measures compliance with procedures and takes action where the process does not appear to be effective.
4,51- 5,00	5- Optimized	The process has been designed to a good level of implementation.

3. RESEARCH OF METHODS
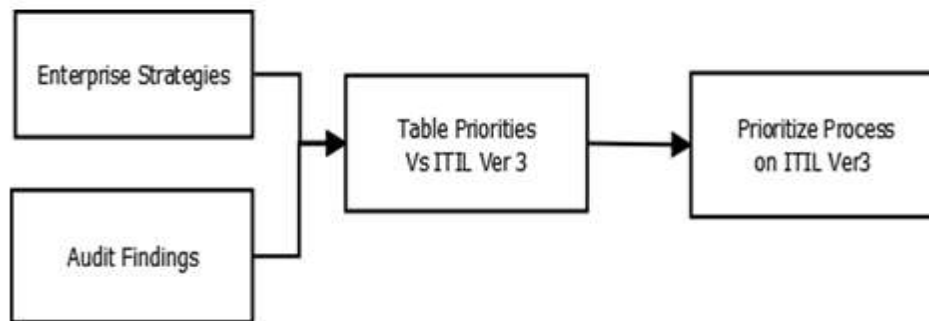
Figure 1 Steps of Research [21]

3.1 ENTERPRISE STRATEGIES

This section defines the strategic objectives of a company before the research is carried out. Software house itself has a goal related to the Purimedika application that they developed, which is to provide satisfying services for health agencies that use the application by continuing to innovate products and improve services to users.

3.2 AUDIT FINDINGS

The next stage is the search for audits, in which at this stage the authors find the findings obtained by observation of company-owned applications and interviews with Management & Staff of software house. Questions given to companies are related to sub-domains of Service Operations, such as event management, incident management, problem management, request management and access management. Domain Service Operation is chosen because the domain is the daily operation stage of an application and the authors feel the domain is suitable in this study.

3.3 TABLE PRIORITIES VS ITIL VER 3

Furthermore, after data collection, mapping the sub-domain in the Service Operations to the Quality Improvement Table, where the table contains quality indicators that can be used to help improve the quality of a service. The Improvement Quality table itself is illustrated in table 1, and then for the mapping of ITIL Version 3 in table 2.

3.4 PRIORITIZE PROCESS ON ITIL VER 3

After completing the mapping between the Service Operation sub-domain and the Improvement Quality that has been presented in table 2. Then, the next step is to calculate the maturity level, this is done to find out whether the Service Operation domain has successfully developed the quality of the quality of the application they have it or not.

4. RESULT AND DISCUSSION

4.1 Audit Finding

The research activity began with defining the strategic goals of Kreavi Informatika Solusindo. Defining this goal is obtained by conducting interviews with the company. Based on the results of the interview, it was known that the company's objectives were related to the application they developed, a health service application named Purimedika. The company's goal related to the Purimedika application is that the company wants to provide satisfying services for health agencies, so the company continues to innovate their applications, and improve application services to users by finding out what the wants and needs of their customers are.

The stages of the audit are carried out to evaluate whether the application has succeeded in meeting the objectives of the company or not. The author's audit findings obtained from direct observation of the application process that runs like how the application works from the beginning of entering data to finally get an output containing transaction reports for agency use, and print out the results of medical examinations for patients. Here are some of the errors found by the author:

Table 2 Audit Findings

No	Audit Findings	Risk
1	Failure to display customer form.	These problems can hamper the patient's examination process because the 'customer form' is used for registration before the examination.
2	Error writing patient data on medical print sheets.	A patient's personal data on their medical print sheet must not be wrong, because the sheet can be used for their work needs
3	Cannot display the printed sheet of patient medical results	After the patient has finished the examination, the employee can process the medical print sheet
4	Access failure on the Purimedika application.	Failure of access in the application can cause disruption of existing processes in a health agency
5	Unclear status of patient payments.	The ambiguity in question is not known whether the patient has paid or not, the unclear status makes the patient unable to conduct an examination because he must make payment in advance
6	Failure to edit employee data in the application.	Failure to perform edit functions in employee data, making health agencies difficult to manage employee data
7	Failure to add master data.	Failure to add to the master data makes it difficult for health agencies to update the data
8	Failure to delete master data	Health agencies generally can perform the function of erasing data on the master data if the data is no longer needed.
9	Unable to print transaction report	Failure of the application to print a transaction report can affect the director of the health agency who cannot see the report.
10	Error message appears when registering a patient	When the patient registration is complete, the employee will get a message that says 'Registration successful'.

The audit findings described above are errors in applications related to daily operations, such as entering and editing data and printing documents. These errors often occur when observations are made. Therefore, companies are deemed necessary to improve the quality of their applications so that repairs can be made immediately and errors such as those in table 2 will not occur in the future.

4.2 Table Priorities Process vs ITIL

To achieve the company's goals, before that it is necessary to improve the quality of the Purimedika application, especially after previously knowing that the application still has some problems when used in daily activities, so the quality improvement process needs to be done. The quality improvement process itself is carried out using the help of the Quality Improvement table, which illustrates 17 priorities that need to be done to improve the quality of a product. . This research uses Priority Improvement as in the table below:

Table 3 Improvement Quality [21]

Improvement Priority	
ES01	Product Innovation
ES02	Improve customer service
ES03	Improve portfolio performance
AF01	In order for IT projects to have comprehensive cost and benefit analysis
AF02	To create an IT human resource development plan
AF03	In order to make BCP for the entire holding group company
AF04	To create an IT Risk profile with risk management division
AF05	To make post implementation review periodically
AF06	In order to make SLA adjustment with KPI company
AF07	In order to do system continuity testing on a regular basis
AF08	In order to be formalized IT security framework company
AF09	In order to be monitored unauthorized logs and expected IT security incident
AF10	In order to be provided the Competency Dictionary of IT personnel
AF11	In order to evaluate the training activities in accordance with the needs of the company
AF12	In order to be reviewed all procedures related to the customer
AF13	To be implemented IT risk profile
AF14	To be carried out by independent external party governance assurance

Thus there are 17 priorities that must be adjusted to the existing processes in ITIL service operations with the aim of getting an increase in the level of maturity in a company. The step that must be taken after knowing about the priorities in Quality Improvement is to map the existing priorities with each process in ITIL version 3 of the Service Operations domain.

4.3 Prioritize Process on ITIL Ver 3

The table above illustrates the mapping between Service Operation domains and Quality Improvement, in the first sub-domain, namely Event Management, Improvement Quality that goes into this sub-domain is ES01, innovation of a product and in this study is the application; ES03, changing circumstances also means an increase in a portfolio; AF01, changes made must have an analysis of the costs and benefits of these changes, why should changes be made; AF02, making plans rather than developing IT human resources, such as conducting training for workers in health agencies regarding the use of the application; AF05, after a change has been made it is necessary to review the implementation of the application, whether it is running effectively or not; AF06, made SLA contract adjustments between Kreavi Informatika Solusindo and related health agencies. For Problem Management Sub-domain there is AF04, because the function of Problem Management is to find the cause of an incident it is necessary to create a profile of IT risks that might occur in the application; AF09, checks unauthorized logs to improve the security of the application; AF11, there needs to be an evaluation of a training activity on the use of the application to know that the application can be used properly by the health agency; AF12, a review of all procedures is performed to users who use the application, in this case employees in health agencies; then AF13, the risk profile that has been made is implemented to prevent risks from happening in the future.

The next sub-domain Request Fulfilment is ES01, the company innovates the product in accordance with the wishes of the user, in this case the health agency; ES02, companies must continue to improve their application services so that customers are satisfied when using them; AF06, the company made adjustments to Service Level Aggregation (SLA) for health agencies related to the application service; AF10, a competency dictionary is provided so that IT personnel know and have the competencies that IT personnel should have. For the Access Management sub-domain, the Improvement Quality is ES02, improving services by providing different accesses for each employee in the health agency accessing the Purimedika application; AF02, making development plans of human resources by mapping user authority rights in the application; AF08, formalizing the framework of the application security by granting authorization rights to those involved with the application; AF12, a re-review of the authorization rights procedure for users in health agencies.

Then for the Incident Management, Improvement Quality sub-domain that includes, AF04, because it aims to address the problems that occur in the application, it is necessary to do an IT risk profile first, regarding any problems or failures that occur in

the Purimedika application; AF05, a review of the application is carried out to prevent a problem from occurring or when a problem occurs can be dealt with immediately; AF07, periodically testing application continuity; AF13, IT risks that were previously created are handled by implementing the application.

Table 4 Priority Goals Vs ITIL Service Operation Process

ITIL Ver3 Service Operation Process	Priority Goals																
	ES01	ES02	ES03	AF01	AF02	AF03	AF04	AF05	AF06	AF07	AF08	AF09	AF10	AF11	AF12	AF13	AF14
Event Management	•		•	•	•			•	•								
Problem Management							•					•		•	•	•	
Request Fulfilment	•	•							•				•				
Access Management		•			•						•				•		
Incident Management							•	•		•						•	

Mapping prioritizing processes on ITIL needs to be done to determine the relationship between priorities in each Quality Improvement table with the domain in the ITIL Service Operation, where the Service Operation domain will be used to assess maturity. The next thing to do is to assess the level of maturity in the Operations Services domain, the domain was chosen because the authors felt it was appropriate to measure the quality of the Purimedika application. Domain Service Operations itself includes all operational activities in application services, which are in line with the goals of companies who want their applications to provide satisfying services for customers.

Determination of the level of maturity is obtained by conducting interviews with related parties from the company software house, where the results are presented in the table below.

Table 5 Maturity Level Gap Analysis

Sub Domain	Maturity Level			
	Current Maturity Index	Current Maturity Level	Expected	Gap=(Expected-Current)
Event Management	2,31	2	5	5 – 2= 3
Problem Management	1,92	2	5	5 – 2 = 3
Request Fulfilment	2,17	2	5	5 – 2 = 3
Access Management	2,18	2	5	5 – 2 = 3
Incident Management	1,92	2	5	5 – 2 = 3

Maturity level gap analysis is done by first calculating the maturity index obtained from the interview process and then determining the level of maturity. Companies usually have a maturity level expectation on their application, this expectation is useful as a benchmark for them where the higher the level the better the service that their application has and this is in line with operational activities that run well.
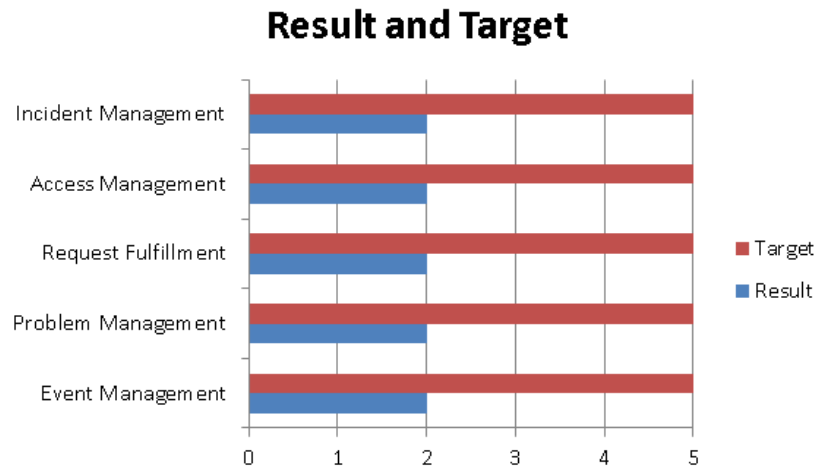
Figure 2 Results and Target of Maturity Level

Figure 2 shows the results of the measurement of service maturity level that is presented using a diagram. Following the results of the analysis on the process of operating domain services with several existing sub-domains, it can be seen that all existing sub-domains are at level 2 with the desired target is 5. This means the gap between the results obtained with the target for each sub-domain is 3. Level 2, which shows that the application is in an iterative but intuitive stage, where a process has been recognized that there is a procedure for using the application but there is no good communication between individuals regarding standard procedures. After knowing the level of maturity and gaps, the company needs to take action. For example in the Incident Management domain, a company can increase the level of maturity using priority mapping from the previous Table 4 Improvement Quality, such as by creating an IT Risk profile with the risk management division and then reviewing post implementation periodically to check services.

5. CONCLUSIONS

Based on the results of research and analysis conducted at Kreavi Informatika Solusindo on the application, the conclusions obtained are as follows:

1)   The results of Improvement Quality for the Event Management sub-domain are ES01, ES03, AF01, AF02, AF05, and AF06; for Problem Management are AF04, AF09, AF12, and AF13; For Fulfillment Requests are ES01, ES02, AF06 and AF10; for Access Management are ES02, AF02, AF08, and AF12; and finally for Incident Management AF04, AF05, AF07, and AF13.

2)   From the results of interviews and observations conducted to determine the maturity level in each sub domain in the Service Operation, each sub-domain with level 2 is obtained, namely repeatable intuitive. The author provides several recommendations related to increasing the level because there is still a large gap, which is 3. The following are recommendations for each sub-domain in Service Operation:

-Event Management: There are already operators tasked with monitoring the running of the application, and managing logs, but the results of these logs or findings are not well communicated to related parties.

-Problem Management: There is already a procedure regarding the task of analyzing the problems that occur in the application, but the problems that occur are not classified and put together.

-Request Fulfillment: software house listens to the wishes of the health institutions related to their application function, to understand what is desired from the agency. However, it has not been recorded in more detail about the wishes of the user.

-Access Management: the company has mapped access rights for each user, determined what they can access and do to the application, but in practice there is no monitoring of violations of access rights and there are no detailed procedures regarding it .

-Incident Management: All incidents and failures that have occurred in the application have been recorded and updated if they have been successfully handled, but no classification has been made of the incident.

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