

The ICT Maintenance Evaluation In Mahkamah Konstitusi Republik Indonesia

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Abstract Mahkamah Konstitusi Republik Indonesia is an institution that has the authority to adjudicate constitutional examinations in Indonesia. In a government administration, every institution has the responsibility to manage its governance based on Information and Communication Technology (ICT). This work aims to evaluate the current maintenance flow in managing the video conference for the examination of petitioners, witnesses and remote experts. The evaluation result will be used to give recommendation to improve time, budget, and availability aspect of ICT Maintenance.

Index Terms— IT Services, ICT Maintenance, change management, IT Maintenance, DPMO, Six Sigma

I. INTRODUCTION

Mahkamah Konstitusi Republik Indonesia is one of the state institution that performs an independent judicial authority to hold a court order to enforce law and justice. It was implement a modern and trusted court since 2007. Mahkamah Konstitusi Indonesia was established on the amendments of constitutions 1945 in 2003, clause 24C, has 9 judges. Modern and trusted justice which has been the vision of the Mahkamah Konstitusi since it established in 2003 is divided into several fields including court services, operational support infrastructure for trials and offices, and integrated information systems. Information technology-based justice services are known as Information and Communication Technology (ICT) System. ICT Mahkamah Konstitusi has the aim to convey all information related to trials conducted by the Mahkamah Konstitusi to the community, the activities of the high court institutions, to the collection of laws and government regulations. To support the implementation of the duties and authorities of the Constitutional Court, of course there must be an adequate ICT device. ICT devices held are located in the Jakarta, Mahkamah Konstitusi Building which is currently the main data center.

In 2007, the Mahkamah Konstitusi first carried out modern and trusted justice by implementing video conference services for the examination of Petitioners, witnesses and remote experts. This video conference

service in collaboration with the Law Faculty of State Universities in 42 cities across Indonesia is presented in Figure 1.



Fig. 1. Video Conference coverage area in 42 cities

The video conference equipment in 42 cities is operated by embracing technical administrators and operators from each Law Faculty to operate the video conference every time there is a trial and replace the broken equipment with the new one. This work aims to evaluate the current maintenance flow in time, budget, and availability aspects.

II. METHODS

IT Services is a service that is used to meet the needs of consumers with the aim of increasing effectiveness and efficiency in providing services to consumers. Information technology has now become the primary need of the company in carrying out its business operations due to the efficiency of the company's expenses and of course its relation to customer satisfaction. Therefore, there are three things that determine the success of companies in implementing information technology, namely:

1. People, it called customers, service / product users, information technology managers, company management including the owner;
2. Process, the methodology which used to be standard operational procedure and business;
3. Product, it's a part which consumed by customers and users.

IT Services is located in the process because it covers the company's business processes, operations, services to consumers, improvements and evaluations. There are many methodologies used in the IT Services process, but this thesis will focus on Six Sigma. The main thing that becomes the focus of analysis is the process that is currently running compared to the proposed method that will be used. Of course the parameters in the current conditions and proposals must be determined so that the calculation is done right. Explanation of the process outlined must be clear because it is related to the supporting data used to calculate. The main objective is to deliver the proposed method to meet company objectives. Of course all stakeholders involved in IT Services have their respective roles and responsibilities that are interconnected with the company's business processes. In addition, it also needs to be considered whether there is an involvement of the external party of the company in the running business process so that the calculation is done right.

Information and Communication Technology (ICT) Maintenance is a method that deals with change management, which is a process that has the responsibility to control the cycle of every change (change) that occurs. The main objective is to implement better operations and services by minimizing disruptions. Change Management is divided into two:

1. Proactive, the goal is to get the benefits that are used to support the company's business interests including improving services to stakeholders in it and making IT services more effective and efficient;
2. Reactive, for this reason the goal is to solve the problems that occur including adapting to a changing environment. Examples of organizational change (organizational restructuring) certainly make some services change business processes.

ICT Maintenance process includes maintenance of all IT equipment both inside the data center and outside. There are two types of equipment maintained, namely infrastructure (hardware) and license (software). Both types of equipment are interrelated and will hamper IT operations if one does not go well.

Six Sigma is a method that measures the current system to see its operational effectiveness and efficiency carefully and compared the results with the proposed system [1]. This methodology is often used by companies to improve production quality and operational efficiency. The fundamental idea behind Six Sigma philosophy is to continuously reduce variation of process and aim at the elimination of defects or failures from every product,

service, and transactional process [2]. The emphasis is placed on improving business processes, reducing operational and production costs, cutting the redundant business process flow, and measuring the level of customer satisfaction. Six Sigma can be defined in both statistical and business term [3]:

1. In the term of Business, Six sigma is a business improvement strategy to improve profitability, quality, efficiency, and effectiveness [4].
2. In Statistic term, Six Sigma measures the standard deviation of the dataset that is processed to get the middle value. There are two types of statistical limits Upper Specification Limit (USL) and Lower Specification Limit (LSL) [5]. A process is said to be defective if the standard deviation is outside the two ranges. A level 1 Six Sigma in statistical view refers to 3.4 Defects Per Million Opportunity (DPMO).

In the implementation, six sigma has several main components that are used as business strategies. First, the implementation is focus on evaluating the current business processes of the company. Second, the variables used are data and company facts. Third, the successful implementation of six sigma depends on the support of the company management. Fourth, it takes collaboration from all stakeholders of the company, so the analysis of business process improvement produces quality output. Fifth, the analysis is always sustainable and does not stop at the improvements that have been made. Sixth, the implementation of six sigma has the main objective of prioritizing customer satisfaction [6]

In day-to-day operations of the data center and all devices cannot be separated from maintenance activities. The maintenance flow for ICT services is described in Figure. 2. The flow is begun with the user's complaint to the IT center. The IT center will ask the operator representatives to identify the condition and the root cause of the problem. Based on the report, there are 2 possibilities:

1. The IT center will send the IT engineer from the headquarter to solve the problem on site.
2. The IT center have to contact the principal if replacement parts are needed. Then, the principal will send required engineer to replace the broken parts.

Both of steps above are done without a clear standard procedure and the decision depends on Head of Information Technology. If the IT Engineer who sent to the location couldn't solve the problem, they will contact to the principal's engineer especially when the parts should be replaced. Principal's engineer will be sent to the location solving the problem and if it need to change the parts, they will request to their office sending the parts to the location and they will come again to change the parts after its arrive. So, it takes many times waiting the replacement parts from order to arrive to the location. It doesn't comply the availability in IT Services [7].

The ICT Maintenance cannot be done on the data center which began operating in 2006 due to the absence of human resources who have technical knowledge about ICT, the Standard Operating Procedure (SOP) has not done yet, and the unavailability of state maintenance budgets.

The hardware devices in the data center of The Mahkamah Konstitusi are grouped as follows:

1. Network appliances (Cisco Router and Cisco Switch);
2. Server and Storage appliances (eSXi vMWare vSphere 6, IBM x3850, and IBM v5000 StoreWize);
3. Communication appliances (Cisco Unified Communications Manager, Cisco Jabber, vBrick, and Cisco Tandberg Video Conference);
4. Security appliances (Cisco ASA, Cisco IPS Sourcefire, and Bluecoat).

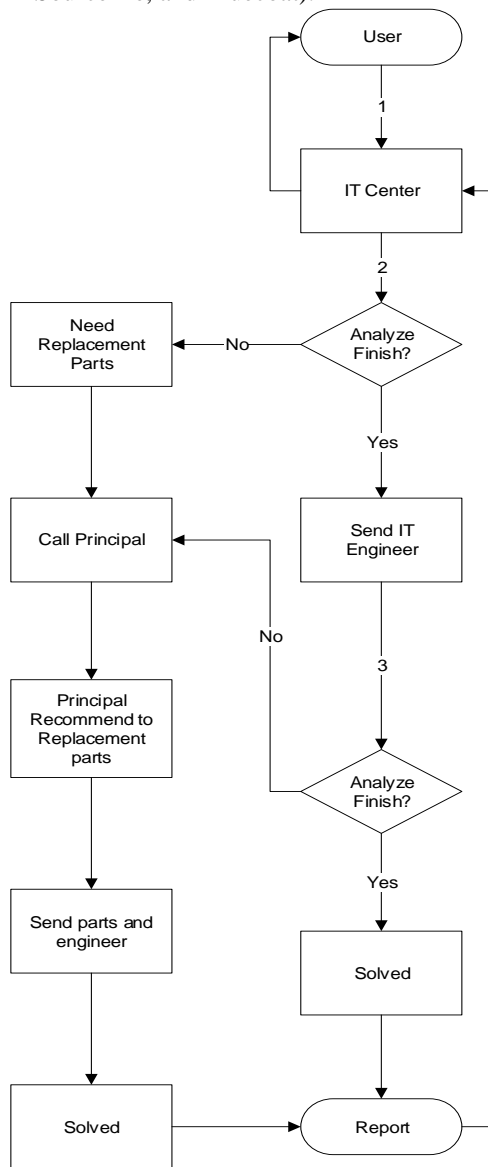


Fig. 2. Maintenance Flow

III. RESULTS AND DISCUSSION

The Six Sigma methodology is used to evaluate the current maintenance process flow. There are 5 aspects that are measured:

1. IT center helpdesk’s response time
2. Service engineer’s diagnosis time
3. Part replacement time
4. The video conference service’s availability
5. The budget used in a maintenance flow

The time and availability criteria are compared to the SLA, which are 30 minutes for both IT center helpdesk's response time and service engineer’s diagnosis time, 4 days maximum for part replacement, and 99.9% availability (8.77 hours maximum downtime per year).

Every response from IT center helpdesk or diagnosis from engineer that violates the SLA will be counted as a defect. However, the budget has no SLA. The defect in budget aspect will be counted if a redundant cost has to be spent in a maintenance flow based on the scenario in Figure 3. The defect in budget flow will happen if the engineer which is sent by the IT center can’t resolve the issue and they ask the principal to send an engineer to the location. After the principal’s engineer arrive, it turns out that a part replacement is needed, so the principal will go back and come again when the new part is arrived. Here, the budget will be wasted on the transportation and accommodation of the IT center engineer and the time will also be affected.

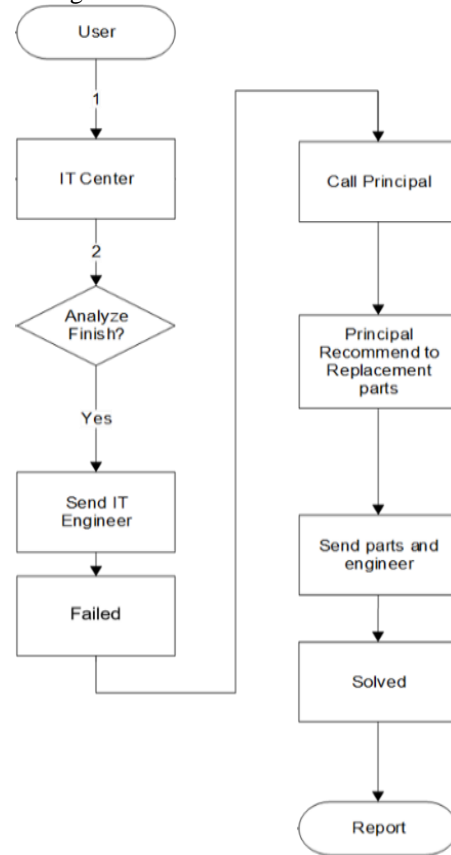


Fig. 3. Redundant cost in maintenance flow

The Six Sigma level is calculated based on the Defect per Million Opportunities/DPMO. The DPMO is calculated

from Defect per Unit/DPU. The DPU is shown in equation (1), meanwhile the DPMO is presented in equation (2) [8].

$$DPU = \frac{\text{number of defect}}{\text{number of production units}} \quad (1)$$

$$DPMO = \frac{DPU \times 1.000.000}{\text{no. of defect opportunity per unit}} \quad (2)$$

The evaluation result of time, availability, and budget for current maintenance flow is presented in Table 1.

TABLE I
DPMO EVALUATION RESULTS

Aspect	DPMO
IT center helpdesk's response time	450.000
Service engineer's diagnosis time	410.000
Part replacement time	380.000
The video conference service's availability	520.000
The budget used in a maintenance flow	470.000
Average	446.000

Every measured aspects' DPMO is calculated using 200 user's complaint events. Every event is compared to the SLA (for time and availability) and the redundant cost flow in Figure 3 (for the budget). Based on the DPMO to Six Sigma table conversion in Table 2, the current maintenance flow in ICT Maintenance is between sigma level 1 and 2.

TABLE II
DPMO TO SIX SIGMA CONVERSION

Aspect	DPMO
3.4 defect/million	6
233 defect/million	5
6210 defect/million	4
66807 defect/million	3
308.537 defect/million	2
690.000 defect/million	1

IV. CONCLUSION

Current maintenance activities have inefficiency in budget, time and availability. There are no good Standard Operation Procedure/SOP about who should solve the issue, the IT center or the principal. The time which is spent due to current flow also affects the availability of the video conference service. The worst scenario is the engineer from IT center cannot resolve the problem and ask the principal engineer to help, but it turns out the part needs replacement. So, the user will have to wait for another days, maybe weeks until the new part arrives and the principal engineer replace the old part. Not only affecting time and availability, the cost is also doubled due to sending the IT center engineer. The cost includes transportation, accommodation, food, service fee from the principal engineer, the cost of the new part itself and its delivery fee. Usually, the maintenance that bring the service down takes several days if there are no temporary replacement items/should be imported.

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