

EXPERIMENTAL AND IMPROVEMENT OF SERVICE PROCESS WITH LEAN CONCEPT: A CASE STUDY AT SALAYA HOSPITAL.

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ABSTRACT

This research aims to Experimental and Improvement of Service Processes with Lean Concept: A Case Study at Salaya Hospital, Nakhon Pathom Province. This has a research procedure consisting of 6 steps. Step 1 Study and collect basic information related to the concept. Organization development with the lean concept and service efficiency. Step 2 Review literature or related research documents. Step 3 Bake developed a new process step 4 analytical performance legacy with a new type of service. And the sample group is 100 users and using Paired t-test. Step 5 Summary of research. The result of research found that Service process improvement can reduce the workflow from the original 27 work processes, the average time spent is 71 minutes, only 20 steps, the average time is 35 minutes, and the comparison of the efficiency of traditional work processes and new models By analyzing the satisfaction before-after the work process improvement, it was found that the average satisfaction of the users of the service to the overall service process after the improvement of the service process was significantly higher than before the service process improvement. Statistics at level 0.05

Keyword: Lean Concept, Service Process, Hospital, Process Improvement

INTRODUCTION

The hospital is an organization that provides services and a professional bureaucracy. The professional knowledge is used as a base for the development by using lean integrated organizational characteristics. This propose is aim to the development of quality services, safety, fast delivery service, low operating costs, emphasizing morality and ethics, emphasize the value from the client's perspective, review existing standards and develop sustainable services, in which the goal remains the same and will be improved.

Regarding to the research in 2018 that study the work process of the hospital "The service process improvement using lean concept a case study of Salaya Hospital ", in which the research is the first phase of the research to improve the service process using the lean concept. (Martusron, 2018) The objective is to study the service process and to set the framework for improving the service process of Salaya Hospital. Lean concept is used for analyzing work processes and join the framework to improve new service processes. The sample is related with 1 hospital director, 2 doctors, 5 nurses and 3 staff. Data were analyzed by using descriptive statistics and analyze the process according to the lean concept framework. The result shows that the new work processes have been laid out to improve the methods with those involved which can reduce from 27 work processes. Each service has been delayed due to the analysis of the service process. Therefore, service delays are an important issue encountered with the process classification, in which the various obstacles in

the working process cause delay with redundant work procedures. As a result, the researcher and relevant parties have made plans to improve the work process by eliminating the wastage that is hidden in the patient service process. From previous work process analysis, it helps planning process improvement to make the process flow continuously in the same direction and consistent, shorten the time, reduce obstacles and eliminate waste that cause delay. Moreover, this process analysis will be a guideline to improve work processes to be more effective as shown in Figure 1 which has been improved by using lean concepts that able to support process analysis to reduce losses and reduce processes in order to make the work processes more efficient. In the process improvement methodology, the time can be reduced by 36, representing 49.30% of the work duration, resulting from the improvement by redundant work processes, reduced waiting, reduced movement that does not needed by the worker. Integrating consistent work processes into one process any process that does not create value is eliminated. This was able to manage service problems that were wasted. The study results of the hospital service process improvement that make it necessary and provide basic information that needs quality management and the efficiency of the service system to be suitable and valuable with the lean concept. The researcher and related persons can set the framework for improving the service process of Salaya Hospital to be concise, to be effective and suitable for the context of the organization.

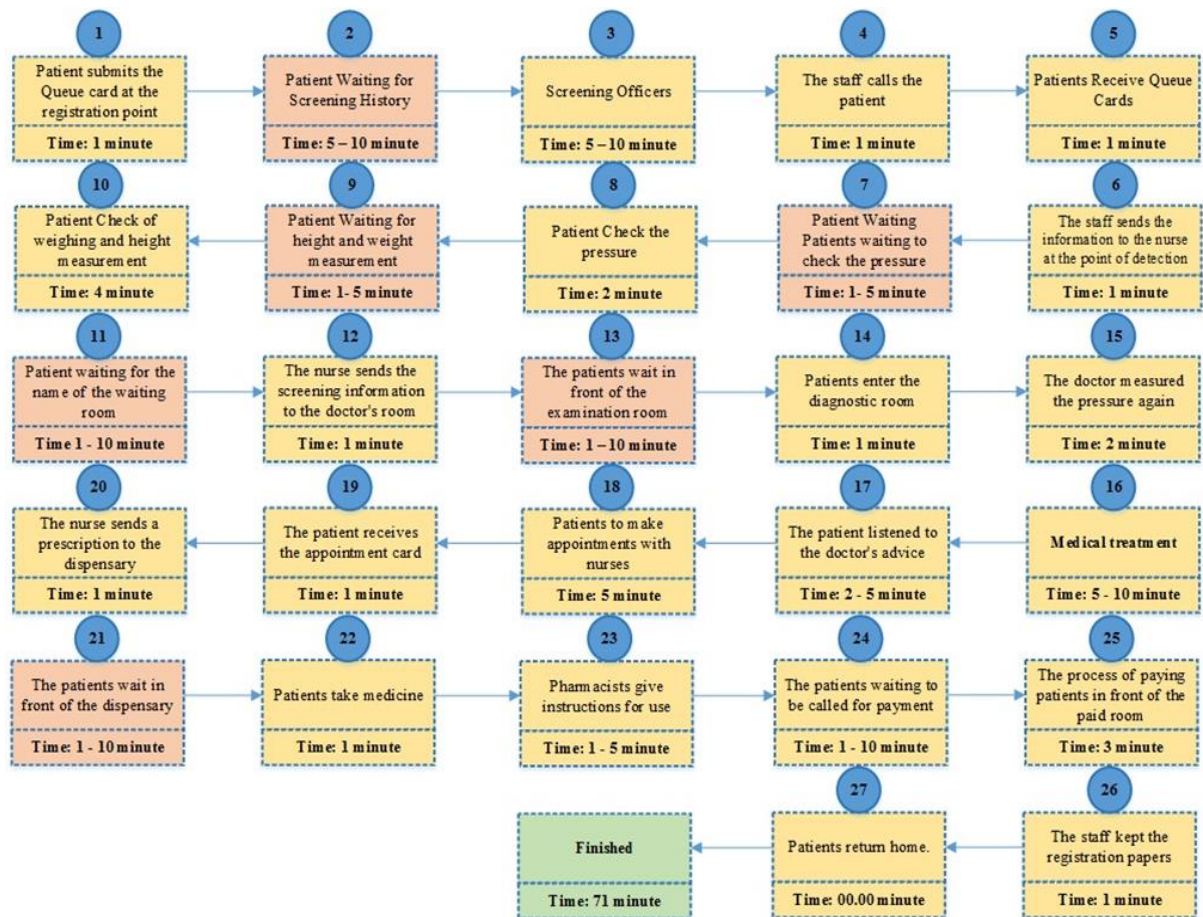


Figure 1.1 Showing the Out Patient Department (OPD) of Salaya Hospital before the improvement guidelines by using lean concepts.

Source: According to the data collection of the researcher, by interviewing the related parties at Salaya Hospital

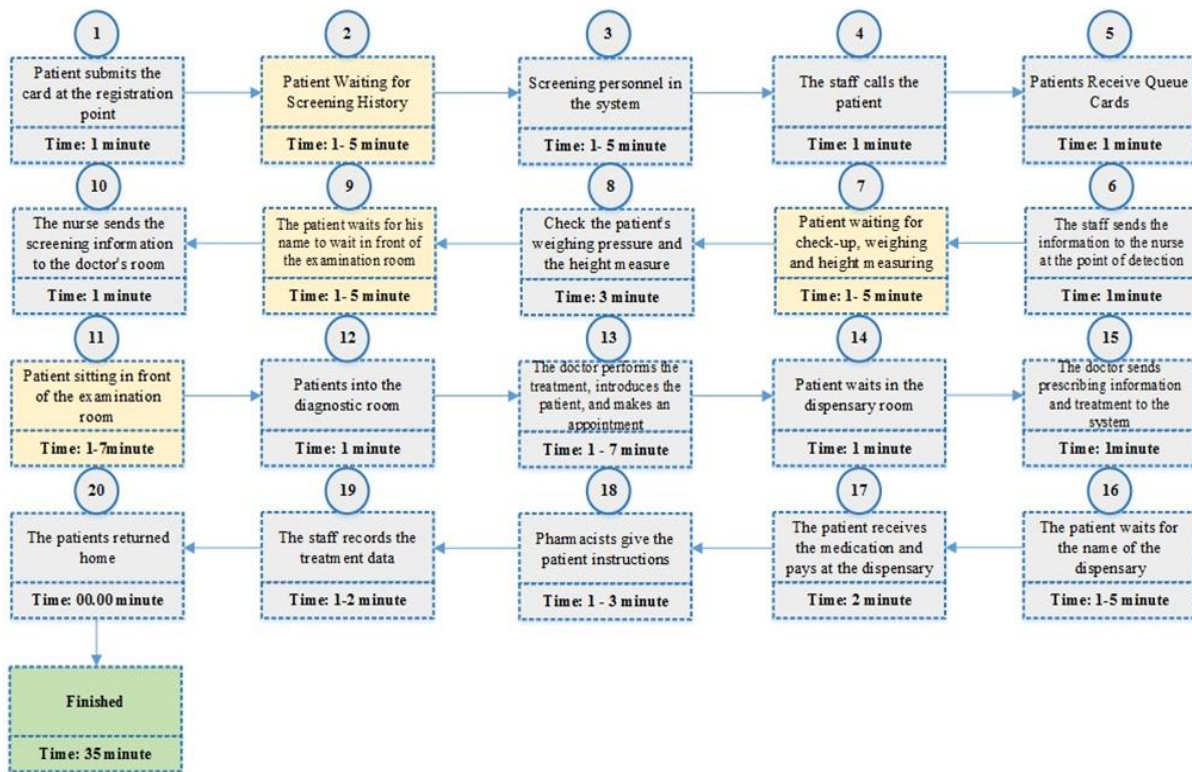


Figure 1.2 Showing the Out Patient Department (OPD) of Salaya Hospital after the improvement guidelines by using lean concepts.

Source: From the data collection of the researcher by interviewing and putting together the ideas with those involved in Salaya Hospital

The new work processes that align the process improvements mentioned above can reduce the previous workflow from 27 processes to 20 processes, which take an average about 71 minutes. According to Figure 1.2 the new workflow takes an average about 35 minutes, which used lean concept to reduce losses and reduce processes in order to make the work processes more efficient. In this process improvement process, the time can be reduced by 36 minutes or 50.70% by reducing the redundant work processes and combine consistent work processes. In addition the work process is able to reduce more time because of using the information technology to manage documents and data of patients and share information to another department. In order to the speed of data transmission, reduce the process of documentation and reduce the cost of office paper. Therefore, the director of Salaya Hospital realizes the importance of applying technology in which the formal work has information systems, but was not fully implemented.

Regarding to the study of previous work on the service process of Salaya Hospital in which the conceptual framework has been set up in 2018. The new renovation process is just a prototype of the new process improvement plan of Salaya Hospital. In order to solve the service problems are slow, reduce the service time and redundancy of work processes. Thus, the hospital can provide patients faster and treat more patients by reducing procedures or managing new service processes. However, the quality standard has maintain as the same quality, safety for patients and continuously reliable.

In this research, it is considered as a continuation of research in 2018 " the improvement of the service process with lean concept: a case study of Salaya Hospital " To introduce a new working process that has been developed by lean concepts to apply and test the improvement of the work process of patient services at Salaya Hospital. In order to have a more efficient work process, use existing resources to create value for customers, add value and reduce waste by maintaining the concepts and goals of the hospital including, continuous

development by using lean systems. The objective is to reduce administrative costs and focusing on eliminating unnecessary duties, which has basic concepts that are maintaining process flow continuously for the customer satisfaction of the service at the hospital. Therefore, the lean concept will be a continuous management tool and the increase capacity tool by considering client responsible operations in the hospital, including patients. Lean systems will play a role in creating value in the service and reduces the waste processes. Resulting, to reduced service costs and good outcomes for the hospital while, the focus is on delivering quality service as well. After testing the new work process improvement, the measurement and evaluation will be performed to compare the old and new operating results of Sala Hospital. In order to use the results to plan for the further hospital development

RESEACH OBJECTIVES

- 1) Test the new service process improvements using lean concepts
- 2) Compare the efficiency of the new and old service processes.

Research methodology

The experimental and improvement of service process with lean concepts: A case study at Salaya Hospital " has a research methodology based on the concept of research which is a summary of research characteristics divided into 3 main parts as follows

- 1) data collection
- 2) research and analyze
- 3) summary and utilization

This research will be studied to experimental and the improvement of the service process with a hospital case study. The lean concept is applied. There are 6 research steps which will be explained in the following

Step 1: study and collection basic information related to organizational development concepts with a lean concept and service efficiency.

This step will study, research and collection information that related to organizational development using lean concepts. Including, lean process planning, various lean methods and the lean concept are used in the organization to improve work processes for quality and efficiency. Therefore, it will be concept guidelines for efficient work design including the lean concept development which will be applied into step 4. That is the analysis process of the hospital in order to improve the service further in which lean concepts will analyze the hospital's work processes. In order to, development and improvement the new work processes and to study the concept of service efficiency for the efficiency concepts of analysis then the improvement results are compared.

Step 2: literature review

Study the research on lean concepts (LEAN) as a system to identify and reduce waste or things that don't add value within the value stream of the process. By relying on the customer's needs or the pull system for flowing, smoothing and continuous improvements to create value in the system all times. Therefore, to study the p0rocesses and methods used in considering the design of the organization development model based on the lean concept, which is an important basic knowledge that must be studied before conducting a hospital service or work process study. In order to develop and design a new work process using lean concepts as tools. In the this step, reviewing the research to determine the methodology framework for the selection of the development and improvement of the hospital's work processes, especially the service segment, which is the most important segment that will enable the organization to have potential. It must also study concepts and review literatures and research related to the service efficiency. The service is the main importance of the department that affects the response of the customers to be satisfied whether government,

agencies or the private sector. The expected results of research studies on lean concepts and service efficiency provide insight into procedures and methods, including organizational development processes or creating corporate values to be used in the design. To development and improvement of hospital work processes and in order to apply the concepts that have been applied to the research in step 4.

Step 3: experimental and improvement the hospital's service process base on the new style of process improvement

After studying the information of patients with the hospital and the traditional service processes analyzed and planned the development of a new service process. This step is therefore to exam the new service processes in accordance with the framework set out.

Step 4: analyze, improve the service process of the hospital.

From the previous steps, an overview of the work processes occurring in the hospital supply chain and from the study of various theories related to research regardless of the principle or various methods that will be used to improve and develop the work process of the hospital's service section. Including other relevant information, the working process that will improve and redesign in which the manager and 3-5 persons that involved in this process are interviewed. In this step, the experimental and improvement of the service process are analyzed to measure efficiency and compare the old and new work processes that there is more quality and efficiency or not. The related parties evaluate the result that is satisfactory and in accordance with the guideline after that, the results are compared.

Step 4 will be divided into

4.1 Population and sample groups

4.1.1 The population are staff and clients at the Salaya Hospital that related to the service provision.

4.1.2 Sample group, used the convenience sampling group which was divided into 2 groups as 10 staffs and 100 users at Salaya Hospital. Due to budget and time constraints, the number of samples is small.

4.2 Research tools

Interview form is used for collecting work processes and questionnaires as a tool for collecting user satisfaction data before and after the process improvement.

4.3 Data collection

The researcher collected data through in-depth interviews with staff and users at Salaya Hospital.

4.4 Data Analysis

The researcher conducted the data analysis as follows:

4.4.1 Check the completeness of the returned questionnaires of each respondent

4.4.2 The data analyzed from the questionnaire part 1 preliminary data of the respondents analyzed using percentage statistics (Pannee Leikitwattana. 2011: 235) with the following formula

$$PCT = \frac{N_i}{N_t} \times 100 \quad (3.1)$$

when	PCT	stand for	Percentage of studies
	N _i	stand for	Number of subsections studied
	N _t	stand for	Number of total

4.4.3 Data analyzed from the questionnaire part 2 in order to obtain satisfaction about service quality first and after improving the process with lean concepts by following statistics

1. Mean : \bar{X} (Boonrong Khachornsin. 1999: 27) formula;

$$\bar{X} = \left(\sum fX \right) / N \quad (3.2)$$

When \bar{X} stand for Mean
 fX stand for The product of the score and the frequency
 N stand for Number of total

2. Standard Deviation : S (Boonrong Khachornsin. 1999: 44) formula;

$$S = \sqrt{\left(\sum f(X - \bar{X})^2 \right) / (N - 1)} \quad (3.5)$$

when S stand for Standard vision
 f stand for Frequency
 X stand for Score of each data
 \bar{X} stand for Mean
 N stand for Number of data

Define the interpretation criteria, the average level of opinion about perception and expectations of the quality of logistics services by adapting from Best and Kahn (1993) as follows

- The average of 4.50 - 5.00 shows that the service satisfaction is at the highest level.
- The average of 3.50 - 4.49 shows a high level of satisfaction with service quality.
- The average of 2.50 - 3.49 shows that the service satisfaction is at a medium level.
- The average of 1.50 - 2.49 indicates a low level of satisfaction in service quality.
- The average of 1.00 - 1.49 indicates the satisfaction towards the service is at the lowest level.

RESEARCH RESULT

The results of the study on "experimental and improvement using lean concept: a case study in Salaya Hospital Nakhon Pathom Province " Mix Method Research is used which consists of qualitative research and quantitative research by using the survey method in parallel to get information that can answer the research objectives completely. The researcher has collected the data and analyzed the data to meet the objectives. 1) Test the improvement of the new service process with the lean concept. 2) Compare the efficiency of the new and the old service process. The research results are as follows:

1. General information and service satisfaction of Out Patient Department (OPD) at Salaya Hospital as shown in Table 1

Table 1
The analyze result of number and percentage of Out Patient Department (OPD) at Salaya Hospital, classified by gender

Gender	Number	Percentage
Male	39	39.00
Female	61	61.00
Total	100	100

Table 1 show that the Out Patient Department (OPD) at Salaya Hospital was 61 female or 61.00%.

Table 2
Analysis result of number and percentage of Out Patient Department (OPD) at Salaya Hospital, classified by age

Age (year)	Number	Percentage
15-29	14	14.00
30-44	27	27.00
45-59	29	29.00
60-74	24	24.00
Up to 75 year	6	6.00
Total	100	100

Table 2 shows that 29 Out Patient Department (OPD) at Salaya Hospital aged between 45 - 59 years, representing 29.00%.

Table 3
Analysis result of number and percentage of Out Patient Department (OPD) at Salaya Hospital, classified by occupation

Occupation	Number	Percentage
Famer	29	29.00
Trading / personal business	13	13.00
Contractors	21	21.00
Students	16	16.00
Housewife/part time job	7	7.00
Government employees	3	3.00
Employee	11	11.00
Total	100	100

Table 3 shows that the Out Patient Department (OPD) at Salaya Hospital, most of them were 29 farmers, representing 29.00%.

Table 4
Analysis result of number and percentage of Out Patient Department (OPD) at Salaya Hospital, classified by the number of times the service during January-May, 2019

The number of times the service	number	percentage
1 – 5 times	60	60.00
5 – 10 times	23	23.00
11 – 15 times	11	11.00
16 – 20 times	3	3.00
Up to 21 times	3	3.00
Total	100	100

Table 4 gives that most Out Patient Department (OPD) at Salaya Hospital during January - May 2019, visiting about 1-5 times, 60 customers or 60.00 %

The results of the satisfaction analysis before and after the service process improvement. The results of the satisfaction analysis before and after the service process improvement for Patient Department (OPD) at Salaya Hospital

Table 5
gives the results of the satisfaction analysis before and after the service process improvement for Patient Department (OPD) at Salaya Hospital

Service quality		Average before modification	Level	Average after modification	Level
1. Process/service process					
1.1	Notification of service procedures and duration	4.00	High	4.87	Highest
1.2	Ranking of services	3.25	moderate	4.56	Highest
1.3	Speed of service within the specified time	3.27	moderate	4.30	High
2. Service personnel					
2.1	Impressed with the service personnel in providing advice and answering questions clearly and correctly.	4.53	Highest	4.53	Highest
2.2	Willingness to service with politeness and friendliness	4.00	High	4.25	High
2.3	The service is equal without discrimination.	3.87	High	4.25	High
3. Facilities and responding to the client's needs					
3.1	Sign /Public relations service points	4.51	Highest	4.53	Highest
3.2	The availability of equipment for service recipients, such as waiting seats to provide drinking water.	4.23	High	4.25	High
3.3	Service points are appropriate Clean and accessible	4.00	High	4.23	High
3.4	Open to comments on services such as comment boxes, questionnaires	4.03	High	4.53	Highest
4. Satisfaction on the service quality of					
4.1	The service is complete, accurate, and fast	3.53	High	4.75	Highest
4.2	Overall satisfaction in service	4.20	High	4.67	Highest
Total		3.95	High	4.48	Highest

Table 5 shows that the results of the satisfaction analysis before and after the service process improvement for Out Patient Department (OPD) at Salaya Hospital

3. The comparison of satisfaction levels before and after the service process improvement

3.1 The comparison of satisfaction before and after improving the Out Patient Department (OPD) at Salaya Hospital and statistical analysis and Pair Sample T-test are used at the confidence level 95. %

Table 6

shows mean standard deviation and the statistics used in the satisfaction comparison test before and after the improvement of the Out Patient department (OPD) at Salaya Hospital.

Comparative issues	Scores before update		Scores after update		t	P
	\bar{x}	s.d.	\bar{x}	s.d.		
The Out Patient Department (OPD) satisfaction	3.95	0.64	4.48	0.67	-6.61	.000*

Regarding to table 6, the statistical assumptions show that:

Ho: $\mu_{\text{post}} - \mu_{\text{pre}} = 0$ is the Out Patient Department (OPD) satisfaction before and after the improvement at Salaya Hospital are not different.

H1: $\mu_{\text{post}} - \mu_{\text{pre}} \neq 0$ is the Out Patient Department (OPD) satisfaction before and after the improvement at Salaya Hospital are different.

P (probability) = 000, alpha (significance level) = 05, so

Table 6 gives the P-value is less than the alpha value at significant level, then rejecting H1, accept H0. Therefore, the Out Patient Department (OPD) service satisfaction before and after improving service process at Salaya Hospital was significantly different at the 0.05 level of 05 (indicating that service process improvement causing an increase in the number of Out Patient Department (OPD) at Salaya Hospital)

SUMMARY AND DISCUSSION

The study on "experimental and improvement using lean concept: a case study in Salaya Hospital Nakhon Pathom Province " mix method research is used which consists of qualitative research and quantitative research by using the survey method in parallel to get information that can answer the research objectives completely. The researcher has collected and analyzed the data to meet the objectives. Service process improvement can reduce the workflow from 27 processes to 20 processes, which can reduce the time process from 71 minutes to 35 minutes. The comparison of the efficiency between old processes and new process by using pre-post-service satisfaction improvement, it was found that the average service customer's satisfaction towards the service process as a whole after the service process improvement was significantly higher than before the service process improvement. The statistics at 0.05 level were consistent with the research of Chutipon Rattanapan who studied on service process improvements to reduce waiting by using lean concepts and simulation: a case study of a dental clinic Khon Kaen Province. The objective of this study is to improve the service process and organize the queue system to reduce the waiting time of the clients in the case of a dental clinic. From the study using the questionnaire, pareto charts and cause and effect charts. The result found that the majority of users 51.4% want to improve the waiting time. Therefore, 2-step solution is used for solving problem, including the implementation of ECRS technology, which consists of 4-step analysis, cutting unnecessary work processes, integrating workflows, job ranking and the improvement of work or equipment to make it easier, which can support 49.15% of Monday to Friday orthodontic services. The general treatment services on Monday, Wednesday and Friday can support more customers about 34.78. Tuesday and Thursday during the period can support more customers about 61.6%. The application of Anylogic 7.1.2 in the simulation of the service situation to set up a new client appointment system able to appoint customers 15 minutes per 1 person, which will reduce wait time by 34.59% and general treatment services should appoint customers 35 minutes per 1 person, resulting in a 50.69% reduction in wait time.

SUGGESTION

1. In this study, it was found that the limitation of the duration of the visit to the doctor depends on each patient and the severity of the symptoms. The exact time cannot be determined for each patient's treatment. In this study, therefore, look at the overall services such as service times as an average time. If anyone wants to study the lean system in providing health services regarding the matter of reducing the duration of the service faster, it can be reduced as much as. They may be able to conduct a study to determine the duration of the service by studying the patient's medical history file.

2. Organization or other hospitals that have a lean system that applied to improve work processes or provide services periodic satisfaction of patients should be assessed. In order to use the evaluation results to continuously improve the service process and make work processes more efficient by using lean concepts to analyze problems further.

3. Importance of lean systems to be used to improve the process regardless of working in any department should be promoted and train for all staff who involved in the work process to have knowledge and understanding in the lean system. In order to work in the same direction and allow everyone to participate in the planning and decision-making in solving problems that should not plan or do only for management. It will cause in departments and organizations having quality work processes and more powerful

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