

## Improvement of Postal Service by Analyzing Service Time and Applying Information Technology: A case study of Muangtai Post Office, Sisaket Province

Adisak Pangmala<sup>1\*</sup>, Sanon Chimmanee<sup>2</sup>, Kritsada Sriphaew<sup>3</sup>

<sup>1</sup> Faculty of Information Technology, Department of M.S.ITM-Online, Rangsit University, Pathumthani 12000, Thailand

---

**Abstract :** After observing the existing process of Muangtai post office, it is found that service time for customers' questions was very long. This means that most customers do not understand clearly about the postal service. Therefore, this research aims to develop an information system to support postal service for enhancing service performance.

The proposed "postal service introducer" is designed to guide customers by providing essential information about criteria and condition of each postal service. The objectives of this system are reducing service time for customers and designing a proper service process for post office. A concept of the proposed system is to apply a lean theory to reduce service time. Service time before and after using the information system and data from 400 questionnaires are used for measuring performance of the proposed idea.

Results show that the proposed system can help to improve understanding of customers by 62.10% and reduce the service time to 3.51 minutes per customer. This shows that an appropriate use of information system can enhance efficiency of postal service

**Keywords :** Information System Service, Postal Service, The Efficiency Service, Lean Theory

---

\*Corresponding Author: [muangtai33001@gmail.com](mailto:muangtai33001@gmail.com) Tel. +66-819991749

## 1. Introduction

Muangtai post office is a medium post office which has no delivery service for customers. There are 2 desks of “One Stop Service” for general and principal customers to operate their postal and currency affairs. The problems which always exist at Muangtai post office have many causes. One major cause is that customer does not exactly understand conditions of service, which include stuff packing, tracking number checking, speed of delivery term, and rate of compensation. These causes not only affect the officers in wasting their time to clarify and answer all the questions, but also suspend the service for people in waiting line. Thus, this paper tries to apply information technology in order to create more effective postal service. The researchers had studied the Deming cycle concept to enhance efficiency and quality of operation (Deming, W. Edwards.1993): plan, do, check, and act (PDCA) but this cannot reduce lost time and process of postal service. The concept of lean principles gives ways to reduce waste by changing and reducing the process. Information technology is managed to guide people about service conditions. The proposed system is designed, based on LEAN concept which decreases duration of service time and builds more complaisance for customers.


Wimolwan Pattamaratana (2545) studied and analyzed the waiting line for service at Samsen Post Office. After comparing the existing system with the new system, it is found that customers spent less time in getting service than the new system by the rate of 7.7 customers per 5 minutes. There was no significant difference between the 3 new systems: the holding time, the number of customers, and the officers’ free time. These indicate that the ex-system is more effective than the new system.


Prittipong Photiwaraphorn (2548) had researched about LEAN manufacture in steel industry. LEAN concept was used both in continuous and phase manufacturing which was called combined manufacture. They used LEAN tool to produce in the process. There was a value stream graph to differentiate availability of production process. An imitated situation was planned to analyze choices, to estimate, and to develop the value stream. This research used 23 factorial tests. There were three factors for analysis: manufacturing system, maintenance which involves everybody, and reduced time of engine transition. From experimental result, it could reduce the manufacturing term from 16.24 days to 8.56 days, or 47.30%, and decrease the cargo in warehouse during process from 96.35 tons to 10.62 tons per day, or could be estimated at 88.98%. These were used to build the value stream graph in future.


## 2. Analysis of the postal work system


This paper had used LEAN concept to analyze the existing operation by dividing the work into 7 steps in order to verify which step spent most time to process. Typically, there are 5 steps of processing for process analysis as shown in solid line in a service process.


**Table 1:** Result of the process






Operation is represented as 

Transportation is represented as 

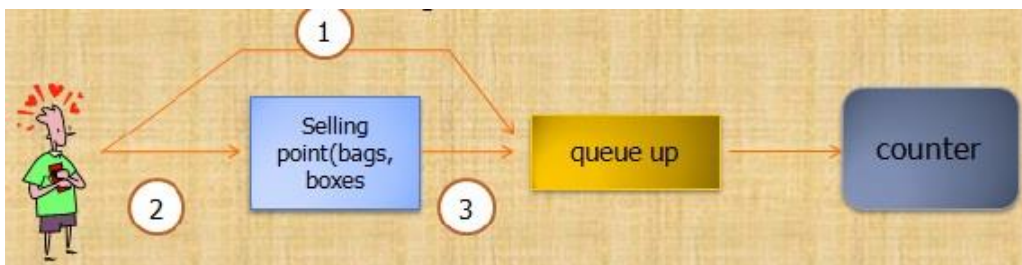
Delay is represented as 

Inspection is represented as 

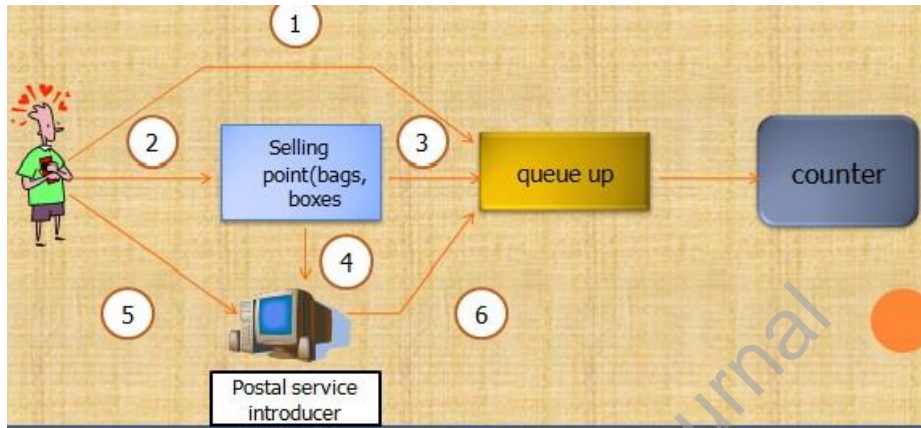
Storage is represented as 

Step	process	Mean	Type process					Note
								
1	A customer walks in	0						
2	The customer asks for service detail	1						
3	The customer buys package (boxes)	3						
4	The customer gets in a line	2						
5	The customer deposits his item	4						
6	The customer receives bill	1						
7	The customer completes his mission	1						
	Total	12						

In analysis of the above 5 steps from Table 1, it is seen that step 2 and 5 are information about the process of postal service e.g. asking for service detail. The average time used was 5 minutes for each customer in order to answer about the postal service condition. This paper proposed a new idea to reduce the service time by using information technology to improve as shown in Figure 3. The new type of operation will replace the former steps of working shown in Figure 1.

**Figure 1:** Existing steps of working process

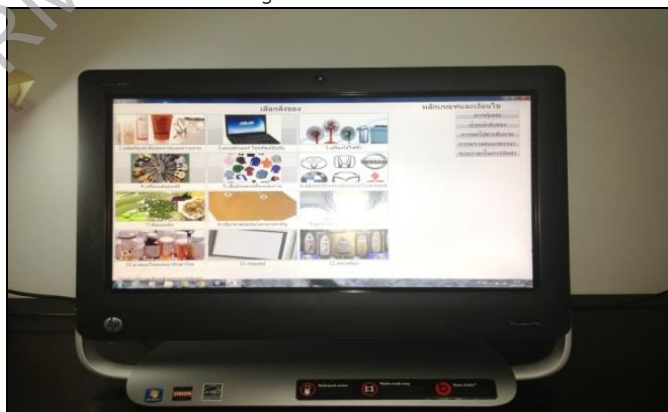
From Figure 1, there are 2 types of approaching service. In Type 1, the customer has already gotten their boxes or envelopes, so they can get the service immediately. In Type 2, the customer has no box or envelope, so the customer will have to get service in steps 2 and 3.



**Figure 2:** New steps of the working process

From Figure 2, the service type can be divided into 4 ways. In the first way, the customer has already gotten their boxes or envelopes and clearly understands the service condition. In the second way, the customer has no box or envelope, but they have already understood how to be serviced. In the third way, the customer has neither packages nor idea about the postal service. So, they will have to get steps 2, 4, and 6 of the service. In the fourth way, the customer has boxes and envelopes, but they have no idea of service condition. So they will have to go through the service steps of 5 and 6.

This paper has analyzed and designed informational system for both customers and officers. It focuses on helping people to understand the service conditions easily and conveniently with graphic communication as shown in Figure 3.



**Figure 3:** The proposed system used for introducing postal service for customer

From Figure 3, the computer screen was divided into 2 parts. Part one is a menu about term and conditions of the postal services in 4 areas: item packing, compensation, item tracking and speed of delivery. Part 2 is about the items to be sent which consists of 12 categories. This part will help the customers understand and determine the type of item they would like to send as shown in Figure 4.



Figure 4: The screen is divided into 2 parts

From Figure 4, the customers can choose from the menu about the terms and conditions in 4 areas as mentioned earlier. Each menu shows the information that enables the customers to understand and follow the procedure in sending their item.



Figure 5: The packing process

From Figure 5, after the customers choose category of item to be sent, the IT system for the postal services will show the packing process.

### 3. Results and Discussion

#### Results

There are two types of performance evaluation for the proposed system. First is to measure the duration of service time both before and after using the proposed system. The other is to survey customers' understanding about the condition and agreement of service in 4 aspects: item packing, compensation rate, tracking number and item's status checking, and speed of delivery. Moreover, it also investigates complaisance of customers who get these kinds of service: registered package deposition, express package deposition, and secured package deposition. A total of 400 people were surveyed for their satisfaction.

3.1 In terms of performance of the postal services before and after the use of IT to enhance understanding about the rules and conditions of all 4 postal services was measured. Before using the IT systems, customers' understanding about the 4 service principles and conditions was less than 50 percent. However, after implementation of the proposed system, it improves understanding up to 62.10%, as shown in Table 2.

**Table 2:** Comparison of customers' understanding of service terms and conditions before and after implementation of the IT system for postal services

Criteria and condition of each postal service	Before the IT system		After the IT system	
	percentage	Number of customer	percentage	Number of customer
1.The wrap of items sent	45.30	181	100	400
2.The rate of compensation	29.50	118	98.50	394
3.The tracking and monitoring inventory	46.30	185	98.50	398
4.The fast delivery of goods	28.50	114	100	400
Average	37.40		99.50	

From Table 2, results of the survey by questionnaires distributed to 400 respondents reveal that 37.40% of the customers understand the terms and conditions of the services before the IT system for postal services was implemented. However, after such system was implemented, number of customers who understand the aforesaid terms and conditions goes up to 99.50%.

#### 3.2 Customers' complaisance about informational system

The researcher divides customers' complaisance about informational system into 7 segments. The complaisance scores are estimated by Likert scale (Likert, Rensus A., 1969). The researcher finds out that the developing average is 4.32% from 5 which is the top scale of complaisance (Boonsom Srisa-ard, 2545) as shown in Table 3.

**Table 3:** Average satisfaction rate of customers using the IT system for postal services

Description	mean
1.Ease of program usage	4.07
2.Clarity of the information shown on the screen.	4.27
3.Appropriateness of the information about terms and conditions of the services in 4 areas.	4.37
4.Appropriateness of the background colour.	4.25
5.Appropriateness of the volume of information on each screen.	4.32
6.Appropriateness of the information layout	4.44
7.Appropriateness of the blanks for filling out the information.	4.55
Total (average)	4.32

### 3.3 Duration of service time

Results of service time analysis is estimated by reckon timer. It starts since the customers pass their item to the officers until the officers give receipt to the customers. It is found that, before using the information system, it takes 4.51 minutes for each person, but after using the information system, the time is reduced to only 1 minute. Thus, the information system is truly effective and helpful to decrease the time per person as shown in Table 4.

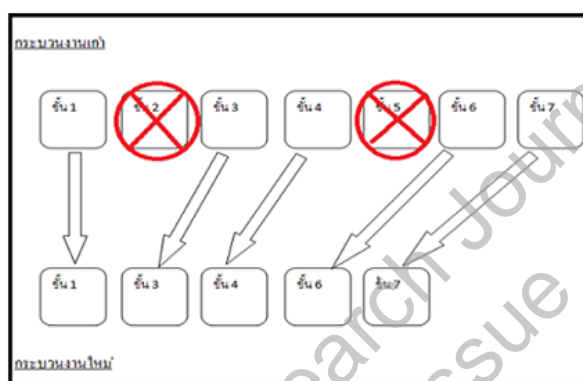
**Table 4:** Average time in using the service for each customer before and after implementing the IT system for postal services

description	Time spent in using the service		
	Time in using the service (minute)	Number of customer	Average time /person (minute)
Before the IT system for postal service was implemented	902.70	200	4.51
After the IT system for postal service was implemented	401.24	400	1.00
Reduced average time			3.51

From Table 4, number of respondents before and after the IT system for postal services was implemented is not equal. The respondents before the IT system was set up were interviewed about problems and average time in using the service. The latter group was chosen from the

sample group which consists of 5,068 customers. By using Taro Yamane formula, only 400 respondents were selected from the aforementioned sample group.

**3.4** Results of applying information system show that the proposed information system could promote customers' understanding of service condition to 62.10% and reduce the time of customers' query about item deposition. That is, each customer spends less service time from 3.51 minutes to only 1 minute. Therefore, if Meaungtai has the information system for postal service, it will be more convenient and faster to deposit items. Two from seven steps of service can be cut off to save time. This system is also helpful for the officers as well. The less time used to answer customers' query is shown in Figure 6.



**Figure 6:** Working process between old and new

From Figure 6, it can be seen that after using LEAN concept, the 7-step working process can be adjusted. This means that step 2 and step 5 can be cut off. Thus, the duration of the service could be reduced while the number of staff working in the post office remains the same.

## Discussion

The research indicates that the applied information system could guide people to understand the service condition up to 62.10% while reduce the time for customers' query about item deposition. That is, each customer spends less service time less from 3.51 minutes to only 1 minute. Therefore, if Muangtai has an information system for postal service, customers will be more convenient and faster to deposit their item. Two from the seven steps of service can be cut off to save time. This system is also helpful for the officers to spend less time to answer customers' questions.

These findings are consistent with Prittpong Photiwaraphorn (2548) who had researched about LEAN manufacture in steel industry. The LEAN concept was used in both continuous and phase manufacturing called combined manufacture. In the process, they used LEAN tool to produce a value stream graph to differentiate availability of production process, and used imitated situation plan to analyze choices, to estimate, and to develop the value stream. This research used 23 factorial tests. There are there factors for analysis: manufacturing system, maintenance which involves everybody, and reduced time of engine transition. From experimental result, it could

reduce manufacturing time from 16.24 days to 8.56 days, or 47.30%, and decrease the cargo in warehouse during process from 96.35 tons to 10.62 tons per day, or an estimate of 88.98%. Then, these were used to build the value stream graph in the future.

#### 4. Conclusion

1. In terms of performance of postal services before and after the use of IT to promote understanding of rules and conditions for four types of services, it was found that, before the IT systems, customers' understanding of service principles and conditions was less than 50 percent. However, after implementation of the proposed system, the understand goes up to 62.10%,

2. In terms of costumers' complaisance about information system, the researcher divided customers' complaisance about information system into 7 segments. The complaisance scores are estimated by Likert scale (Likert, Rensus A., 1969). The researcher finds out that the average of 4.32% from 5 is the top scale of complaisance (Boonsom Srisa-ard, 2545).

##### 3. Duration of service time

Results of service time analysis is estimated by reckon timer. It starts since the customers pass their item to the officers until the officers give receipt to the customers. It is found that, before using the information system, it takes 4.51 minutes for each person, but after using the information system, the time is reduced to only 1 minute. Thus, the information system is truly effective and helpful to decrease the time per person.

4. Results of applying information system show that the proposed information system could promote customers' understanding of service condition to 62.10% and reduce the time of customers' query about item deposition. That is, each customer spends less service time from 3.51 minutes to only 1 minute. Therefore, if Meaungtai has the information system for postal service, it will be more convenient and faster to deposit items. Two from seven steps of service can be cut off to save time. This system is also helpful for the officers to waste less time used to answer customers' query.

#### 5. Recommendation

Although the IT system for postal services is very effective in reducing service time used for each customers as well as helping them to have better understanding about service terms and conditions, this system still mainly focuses on mail delivery due to its high volume of work. The researcher suggests that the informational system should be continuously developed to be more perfect and to cover every part of service in order to provide more convenience for all types of customers. Another way of online service on website could be found soon in the future.

## 6. References

- Deming, W. Edwards. (1993). The New Economics. Cambridge, MA: MIT Center for Advanced Engineering Study.
- Likert, Rensis A. (1969). New Patterns of Management. New York : McGraw-Hill Book Company Inc.
- Pattamaratana, Wimolwan. (2002). Analysis of Service Line System at Post Office and Telegram Office. Thesis of Master Degree of Science. (Statistics.) Statistics Field. Bangkok. Kasetsart University.
- Photiwaphorn, Prittpong. (2005). The Applied of LEAN Concept in Combined Manufacture. Case Study: Steel Industry. Thesis of Master Degree of Engineering. Industrial Field. Bangkok. King Monkut's University of Technology North Bangkok.
- Srisa-ard, Boonsom. (2002). Basic Research]. (rev. ed.). Bangkok. Suveeriyasarn,