

# **The Exploration and Investigation of Logistics Processes and Barriers for Medical Supplies Department: A case of Thai Public Hospital**

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## **Abstract**

In the present, logistics management becomes an important strategy for reducing costs and improving the efficiency of all processes in many industries. The healthcare industry is one of the industries that applied logistics concept to improve their processes to meet with the standard and requirement of the organization but the implementing of logistics management in healthcare industry still faced with many barriers which make the applying of logistics concept difficult in the practical. Therefore, the medical supplies department in Thai public hospital was selected to be the case study in this research. The main aims of this research focus on the exploration and investigation of all logistics processes and barriers in the medical supplies department of Thai public hospital which comprise inbound processes, operations, and outbound processes. The unstructured questionnaire was used to collect the data from the experts in the hospital and the workers of the medical supplies department. The results of this research, the logistics processes, and the barriers are found. And the finding proposed in this research can help the researchers, top management, practitioner, and other related people understand more about the situation of the logistics processes and the main barriers which happened in the case study. The result can be the guideline for further research of other departments in the hospital and other related industries.

## **Keywords**

Logistics process, Logistics barriers, Medical supplies department, Public hospital, and Healthcare industry.

## **1. Introduction**

Logistics management becomes an important concept in every industry in the present which the main proposes of this concept aim to reduce the cost of the organization and increase the service level for their customers. Logistics management also helps the businesses to have a more competitive advantage than their competitors in the violent and unpredictable market in the current situation under Covid-19 pandemics. For healthcare businesses, the principle of logistics management and process are the same as other businesses. But there is one thing that needs to add in the logistics management process which is “patient safety” because the failures in the logistics management for the medical supplies will put the patient at risk. The management of logistics activities will be different from the traditional process of physical flows and services flows. It is focused more on the patients through the care chain. (Blandine et al. 2018).

The hospitals worldwide also tried to use the concept of logistics management to increase the efficiency of their activities, increase profits, increase customer service, reduce costs, while continuing to meet the customer requirements and expectations (Fouad et al. 2018). Hospital is a place that has a more complex system for managing people, medical supplies flow, materials flow, food flow, linen flow, etc. It is not only related to the medical but also related to non-medical support as well which can help each other to drive the success of the hospital. The integration and coordination of all logistics activities could help every operation in the hospital run smoothly, meet the standard and the quality of the organization. Landry and Beaulieu (2004) presented that hospital logistics related to the design, planning, implementing, and controlling of all activities in the hospital.

The medical supplies department is one of the important departments for supporting many activities in the hospital. Logistics management was applied to improve the efficiency of managing the flow of the medical supplies in the hospital to meet the requirement of users. Medical supplies are very important to saving a person's life or performing any procedure. The medical supplies must also be sterile and made to specific standards for patient safety. The logistics management for the medical supplies is not related only with the managing of flow but also related to the controlling of inventory of medical supplies and other processes which can help the hospital reduce costs, risks of excess or shortage supplies, wastes, obsolete items, etc., (Sirisawat et al.2019).

However, the implementation of the logistics management concept will help the hospital to improve the efficiency of their operations, increase customer satisfaction, reduce cost, etc, but there are a lot of barriers that make the implementation of logistics management difficult to operate in the hospital. Therefore, the medical supplies department of Thai public hospital has been selected to be the case study in this research which the objective of this study aims to explore and investigate logistics processes and barriers of the medical supplies department. The result of this study will be proposed in section 4.

## 2. Literature Review

### 2.1 Logistics management and Logistics barriers

Logistics management is the process of managing all activities include planning, implementing, and controlling the process of the products and services flow from the original point to the destination follow the customer requirement which can help the organization get maximize profits, reduce cost and increase customer level (Christopher, 1998). Lambert et al., (1998) categorized logistics activities into fourteen key activities which include procurement, demand forecasting/planning, inventory management, warehousing and storage, plant and warehouse site selection, material handling, logistics communication, packaging, parts, and service support, order processing, return goods handling, reverse logistics, traffic and transportation and customer services.

For logistics management, several studies applied the concept of logistics management to improve the efficiency of their operation and also used it to solve the problems related to logistics management problems. Natasha et al. (2017) studied the impact of logistics management practices on a company's performance which the result found that the success of managing all logistics activities could increase business efficiency, competitive advantage, and customer satisfaction. Huajun (2020) applied the concept of logistics and inventory model with the internet of things and 5G network which finding found that logistics management especially standard communication structures and logistics management system can increase the efficiency of using internet of things and 5G network in the case study. Jarett (1998) studied the logistics in the health care industry which this study tried to focus on the applying of just in time (JIT) for the cost reduction in the logistics system of the health care industry. Catarina et al. (2020) studied the topic of logistics reorganization and management of the ambulatory pharmacy of a local health unit in Portugal which the main aim of this study focuses on the inventory management under logistics management concept to improve the efficiency of replenishment stock which can reduce stock out and overstock rate which happened in the case study. Pan and Pokharel (2007) studied the logistics activities in the Singapore hospitals. The finding of this study presented that the implementation of logistics made the inventory policy performed very well for both medical and non-medical items.

For logistics barriers, even logistics management can be the important strategy of many industries for improving the efficiency of their operations but the implementation of the logistics management still faced a lot of barriers which make the applying of this concept cannot reach the ultimate goal of the organization. Many kinds research have been studied for the barriers of logistics implementation in various industries. Sirisawat et al. (2017) studied the logistics barriers for exporting eggs which in this study they proposed the main logistics barriers such as customers barriers, cost barrier, transportations barriers, etc. Yu (2011) studied logistics barriers by using the case study of a Japanese firm in China that focuses on international operations and it also found that quality, cost, and the delay of the delivery are the main logistics barriers in this case. Almutairi et al. (2021) applied lean management to prioritize the solutions for overcoming logistics barriers in the healthcare industry from the Saudi perspective.

From the literature reviewed, many types research that applied the concept of logistics management with various industries and fields but there are a few pieces researches that studied the logistics processes and the barriers which focus on the medical supplies department. Therefore, this research will use the concept of logistics management to explore and investigate the whole logistics systems and processes in the medical supplies department and also identify the key barriers for implementing the logistics concept. The results of this study will be presented in section 4.

### 3. Methods and data collection

This study focused on the exploration and investigation of logistics processes and barriers for the medical supplies department in a case study of a Thai public hospital in which primary data and secondary data were used for this research. For secondary data, this research applied the concept from many sources such as journals, textbooks, articles, case studies, etc. related to logistics management in the hospital for creating the conceptual framework and the guideline for the data collection in the primary data process. The data collection at the primary data phase used the in-depth interview with the experts in the hospital and the staff who are in the medical supplies department of ABC hospital.

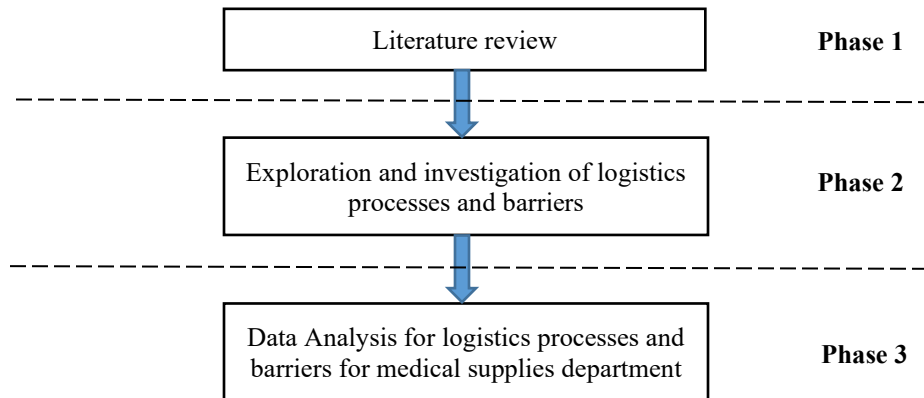


Figure 1 Research methodology

From figure 1 research methodology, there are three main phases for the exploration and investigation of logistics processes and barriers for the medical supplies department of the case study which are:

#### **Phase 1: A literature review**

In this phase, the concepts of logistics management have been reviewed for creating the framework of the exploration and investigation of logistics processes in the department of medical supplies. The barriers to implementing logistics management have been identified from the previous research.

#### **Phase 2: Exploration and investigation of logistics processes and barriers**

The framework from phase 1 was used to explore and investigate the current situation in the logistics processes and barriers of logistics management implementation in the medical supplies department which can be divided into 3 main logistics processes comprise of inbound processes, operations, and outbound processes.

#### **Phase 3: Data Analysis for logistics processes and barriers for medical supplies department**

After collecting data and investigated the wholes processes from phase 2, in this phase is the process of the data analysis which presented the current logistics processes and the barriers from the applying logistics management concept in the department of medical supplies of the case study.

#### 4. Results and Discussion

For data collection, the medical supplies department of ABC hospital was selected to be the study. The logistics flow and processes will be started when the orders of the medical supplies have been requested to the vendors which the lead time of the delivery process from the vendors to the hospital will be different depending on the type of products, condition, specification, etc. After vendors sent the medical supplies to the hospital, it will be the process of medical supplies operation then prepare for supporting the request of the users. The logistics processes of the medical supplies department presented in figure 2.

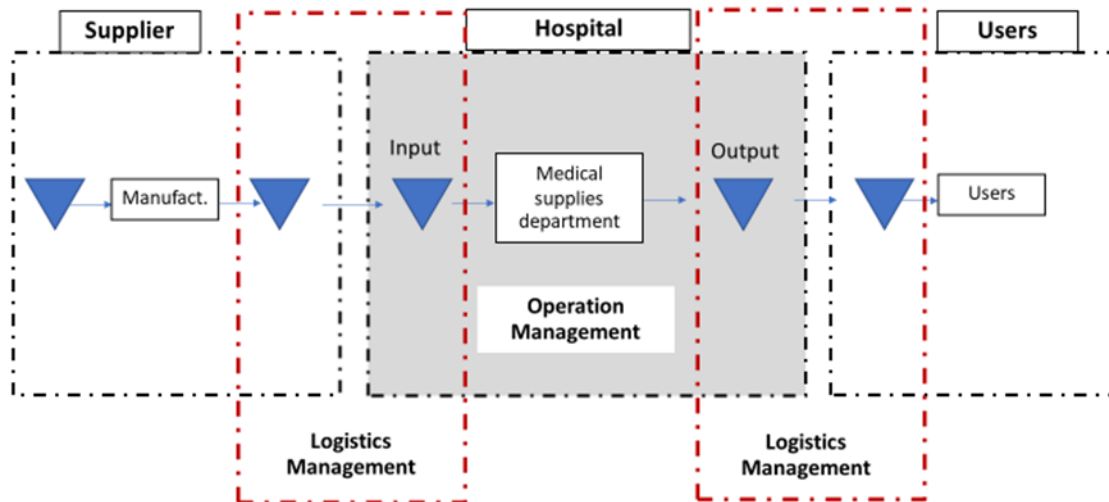


Figure 2 Logistics processes of medical supplies department

From the exploration and investigation of the logistics processes of the medical supplies department, there are 3 main processes which are inbound processes, operations, and outbound processes which the result will be illustrated below.

##### Inbound processes

The medical supplies department collected the requirement from the users in the hospital and prepared the documents for purchasing process with the vendors who are the partner of the hospital. The inbound processes will be started when the vendor received the order from the medical supplies department through the process of the hospital after that the vendors will prepare the products to follow the orders of the hospital. Due to there are a lot of vendors and the products which delivered to the hospital. Therefore, the medical supplies department will coordinate with all vendors and determined the date and time for delivery. The vendors will responsible for delivering their products to the warehouse of the medical supplies department. The inbound processes are illustrated in figure 3.

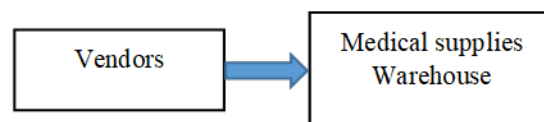


Figure 3 Inbound processes

### Operations

After vendors delivered their products to the warehouse of the medical supplies department, there are four main processes in medical supplies operation: receiving, storing, picking, and dispatching. The first process is receiving process. The staff will monitor the quantity, type, condition, etc. of products with the order and bill of lading before transfer all products to the storage area and update the information of the products in the system. The second is storing process. After accepted all products, the staff will transfer all products to the storage area and identified the products with the appropriate stock-keeping unit (SKU) but some products will be delivered directly to the users. In this process, the staffs have to manage and monitor inventory level. The third process is the picking process. When the staff received the order of the users, they will pick and select the products out of the location follow the requirement from the users, and prepare all products for the users which is the last process in the medical supplies operation. The medical supplies operations are illustrated in figure 4.

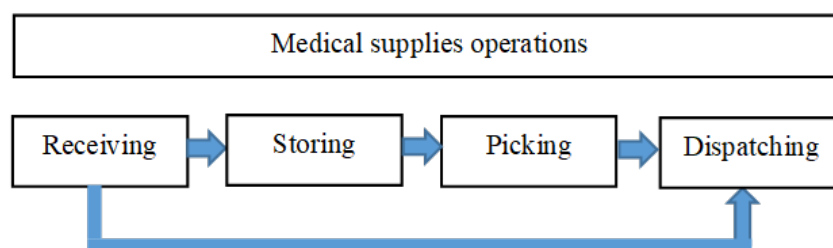


Figure 4 Medical supplies operations

### Outbound processes

In this process, the products will be prepared for the users with the type and quantity of the products follow their request, and the medical supplies department will determine the date and time for the users and wait until the user come and take them back to their division. In this process, it might be different from other hospitals due to the hospital in this case study is a new hospital and they have the limitation of the staff for delivering all products to the users. The medical supplies department must support and service all users such as out-patient department (OPD), in-patient department (IPD), operating room (OR), emergency room (ER), cardiac catheterization lab (Cath Lab), intensive care unit (ICU), etc. In the last process, after the users receive their products the staff of the medical supplies department will record the data in the system. The outbound processes are illustrated in figure 5.

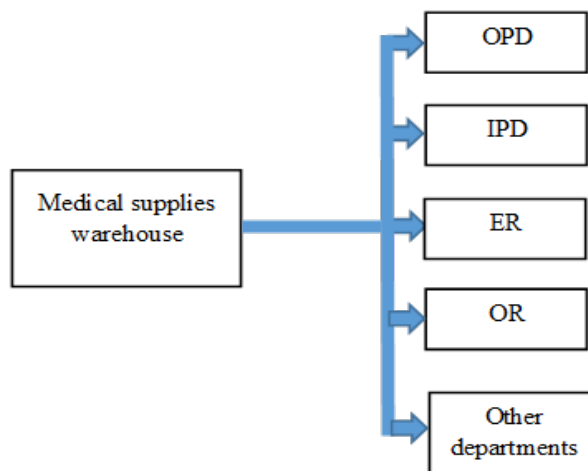


Figure 5 Outbound processes

### **Logistics management barriers of medical supplies department**

Based on the finding of this research, the barriers of logistics management implementation in the medical supplies department of ABC hospital are:

1. Lack of expertise in logistics management in the medical supplies department.
2. There are long processes of documentation.
3. Lack of sharing information in the hospital.
4. The different lead time of delivering products from the vendors.
5. Excess of inventory at the stock of the users.
6. Excess of inventory and shortage of inventory in some items in the main warehouse
7. Limitation of the number of medical supplies department staff.
8. Inventory level mismatch with data in the system.
9. Lot sizing of ordering process unstable.
10. Uncertainty of the demand from users.

## **5. Conclusion**

This research aims to explore and investigate the logistics processes and barriers of the medical supplies department of Thai public hospital and the ABC hospital has been selected to be the case study. The results of this research found that in the logistics processes of the medical supplies department, there are three main processes include inbound processes, operations, and outbound processes. The inbound processes will be started when the vendor received the order from the medical supplies department until the hospital receive the products from the vendors which the locations and the lead time of delivery from each vendor will be difference. For operations, there are four main processes comprise of receiving, storing, picking, and dispatching. It is started when the vendors deliver the products to the hospital. The vendors delivered all products to the medical supplies warehouse then the staff of the warehouse monitored and received them. The products from the receiving process will be transferred to the storage area and wait for the order of the users. After the orders came, the staff picked the products out of their locations and prepared for the dispatch process. For the outbound processes which is the last process of the medical supplies department. The products were ready to dispatch to the users which are out-patient department (OPD), in-patient department (IPD), operating room (OR), emergency room (ER), etc. Even the logistics management can improve the efficiency of the medical supplies department of the case study but there are some barriers for logistics management concept implementation such as lack of expertise in logistics management in the medical supplies department, lack of sharing information in the hospital there are long processes of documentation, the uncertainty of the demand from users, lot sizing of ordering process unstable, etc.

For future research direction, due to there are some barriers that made the implementation of the logistics management concept difficult and cannot operate smoothly. Therefore, it should use the multi-criteria decision-making methods for prioritizing the barriers to support the decision of the top management such as fuzzy AHP, best- worst methods, etc., or finding the solutions for solving these barriers.

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## Biographies

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