STORAGE SPACE OPTIMIZATION USING ABC ANALYSIS CASE STUDY: CONVENIENCE STORE IN NAKORNPATHOM

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ABSTRACT

Abstract—The objective of this research is 1) to study the storage process in storage area, 2) to analyze the storage process in storage area, and 3) to propose a guideline for improving the efficiency of the storage space of the convenience stores in Nakornpathom province. The method of operation and data collection was conducted by questionnaire and interviewing the 18 convenience store managers in Nakornpathom province. Then the prototype convenience store is designed. The tools used for data analysis are the Ishikawa diagram. The ABC Analysis concept was then applied to the analysis to improve the placement of goods in the storage and used the application of symbols in visual controls. The measuring the efficiency of logistics in picking in the storage, it was found that the operating time after process improvement took time of 10 minutes decreased from 5 minutes. On the cost of labor, staff picking up goods after process improvement was 7.50 baht per person per minute. The labor cost was decreased 3.75 baht. The reliability was measured from the customer standing and waiting for the staff to pick up the product after the renovation by 75% overall. It showed that reliability has increased to 20%. In addition, convenience stores should have expanded storage space for merchandise.

Keywords—Optimization, Storage Area, ABC Analysis, Ishikawa diagram

INTRODUCTION

Storage within the convenience store's reserved area is a medium-sized retail store that sells consumer goods. Consumers that are necessary for daily life, including selling food and beverages such as ready meals and snacks can be eaten quickly, convenience and clean. It located in a residential community, open every day and 24 hours. It is emphasizing convenience and speed in buying products. Most of the products are sold are convenience goods and at present, the lifestyle of urban people has changed from the original. The rush and demand for convenience has resulted in a shift in the eating patterns of people in urban areas, such as eating from the rush make it impossible to eat food immediately or unable to sit and eat at various restaurants, thus causing consumers to tighten the time to be shorter (Soonasuan, 2016). Buyers who can adapt their convenience store business and compete in the market sustainably by changing the convenience store style to look bright and provide fast service. Selection of products meet the needs of consumers and customers placing products in the store. It should look clean and tidy and modern to create value in service. Bringing modern technology into the store Improving the modern store environment to suit today's consumers, including safety in the convenience store as well as product quality control and service to be international. Therefore, the convenience store model has evolved to adapt to meet the needs and behaviours of consumers. The current situation is an important stimulus that causes new forms of convenience stores as well as other environments that drive retail business operations to change (Dejthamrong, Manokham, Santhisarn, & Surapongsakorn, 2019).

The reserved space of convenience stores plays a role in distributing products to consumers. And when considering the management within the reserve area, it can be seen that there are various small shops. They have problems in managing the backup space. Whether it's an area for storing products collection of goods separation of goods (Pichamon Kalong, 2021). The problem of storing goods within the reserve area is important that should be improved. There are complex work procedures that cause business organizations to have problems with storage systems within the reserve area, which greatly affects consumers, delays in searching for products Inconvenience while operating, including mistakes in the backup area. From the problem it found that there is damage. Since convenience stores must have products that can be replenished according to customer needs, all types of products

need to be stocked. Moreover, each category has multiple SKUs, which leads to a surplus of inventory. It affects the cost of storage because some types of goods have slow movements (Jantarvinit & Thongprasert, 2013). Convenience stores that sell consumer goods that are necessary for daily life have about 1,500-2,500 SKUs. When there are a lot of products, there is a reserve of storage space in the convenience store, it is necessary to manage the space to be sufficient to meet the storage needs. Convenience stores need to adapt the use of space to store products. Resulting in the employees take a long time to pick up the product and there are many customers who come to buy products during the farm, must queue up to pay for the product. For this reason, the customer is the main factor that affects Develop and improve processes within convenience stores. In order to be able to complete the business and the stability of the business.

From the importance of storing goods within the reserved area of a convenience store, the researcher study on increasing the efficiency of storage space by using the concept of ABC Analysis. It increases in storage space into categories for ease of picking and reduces wastes time for customers and the use of visual control theory that helps divide reserved areas into proportions by using labels working symbol. Moreover, It will help to provide good customer service as part of creating quality for the highest customer satisfaction. Therefore, it is considered that having a spare space to store products makes products in convenience stores never run out of stock and can always support the needs of customers.

OBJECTIVE

2.1 to study the storage process in storage area,

2.2 to analyze the storage process in storage area, and

2.3 to propose a guideline for improving the efficiency of the storage space of the convenience stores in Nakornpathom province.

SCOPE OF THIS RESEARCH

This research aims to study the process of optimizing reserve space in product storage of a convenience store, Nakornpathom province. The content of the study covers the storage of goods within the reserved area of a convenience store and picking. The study period is from 21 December 2020 – 14 September 2021.

METHODOLOGY

This research operation is action research. The researcher designs the research process into 3 phases in order to cover the research objectives.

Phase 1: A study of the storage process within the reserved area of a convenience store. By using a data collection tool, in-depth interviews are tools in this research. There were inquiries about reserved space and picking in convenience stores. By studying the environment of the reserved space in convenience stores, including various factors including picking, and using all the collected data to analyse the flow chart to find problems in the work process.

Phase 2: An analysis of the storage process within the reserved area of a convenience store, the data in Phase 1 was analysed using the Ishikawa Diagram to find factors that would cause problems in reserve area management.

Phase 3: Proposing guidelines for increasing the efficiency of reserved storage space in convenience stores used the concept of ABC Analysis to align products in each category. Then measure the efficiency of logistics with indicators in all 3 aspects: 1) Time 2) Cost and 3) Reliability.

RESULTS

From the research on optimizing reserve space in product storage using the concept of ABC analysis, a case study of a convenience store in Nakorn Pathom province. The results of the research can be summarized by dividing the operation steps of all 3 items as follows.

A study of the storage process within the reserved area of a convenience store. The researcher collected data through in-depth interviews with convenience store managers. And there were inquiries about information and

factors of reserved space in convenience stores. The researcher studied about reserved space in convenience stores and analysed the Flow Process Chart as follows:

    1) Employees checking products in the product placement area took 5 minutes.

    2) Employees walked to the area. It takes 1 minute for stocking,

    3) it takes 7 minutes for staff to find products,

    4) it takes 10 minutes for picking staff,

    5) it takes 3 minutes for staff to bring products to the storage area.

From the flow chart of the picking process, It was observed that the work process before improvement was observed in the search for goods and the picking process took 17 minutes to complete, resulting in a large number of customers queuing to pay for goods. as shown in Table 1.

Table 1 Flow Process Chart (Before)

Description (Process)	No.	Time (Mins)	○	→	■	D	▽
Staff checks products at reserving area	1	5			■		
Staff walks to space storage	1	1					
Staff search products	1	7	○	→			
Staff picks up products	1	10	○				
Staff brings products to store in storage area	1	3		→			

After the researcher has improved the reserved space of the convenience store. It was found that the time spent searching for products and picking goods was 8 minutes, which reduced the total time by 9 minutes as shown in Table 2.

Table 2 Flow Process Chart (After)

Description (Process)	No.	Time (Mins)	○	→	■	D	▽
Staff checks products at reserving area	1	5			■		
Staff walks to space storage	1	1					
Staff search products	1	3	○	→			
Staff picks up products	1	5	○				
Staff brings products to store in storage area	1	3		→			

The Ishikawa Scheme Analysis used for find out the main problem and factors that cause problems (Hiranphaet, A., 2016). The results show that the fish head or the main issue is problems with late picking. By separating into the first factor is equipment, and sub-factors is poor storage and tools set up. The second factor is personnel, and the sub-factor is lack of attention to stock records Step-by-step recording. The third factor is the product, and the sub-factor is some groups of products are similar, causing the wrong product to be picked. Some types of goods cannot be moved at once because they have to be moved by human labor. The fourth factor is area and sub-factor is not specifying a clear storage location, not categorizing products.

Increasing the efficiency of product management in the convenience store's reserved areas by applying the ABC Analysis concept to divide product groups into different zones. Zone A is water products that has high demand. Zone B is snack products, which are the best-selling products after Zone A. Zone C are dry food products, which are products that are sold less, while Zone D and Zone E are kitchenware products and general products. It is the least sold item in convenience stores. After the process of dividing the product group into different zones. Therefore, the researcher designed the arrangement of the storage space of the convenience store. According to

the type of product to be suitable for systematic work by applying the concept of visual control theory to enable employees to understand the operation, symbol, or labels such as lines limiting the boundaries of placing goods product zone sign. It will increase efficiency in accessing products more easily, conveniently, and quickly in picking products as shown in figure 2.
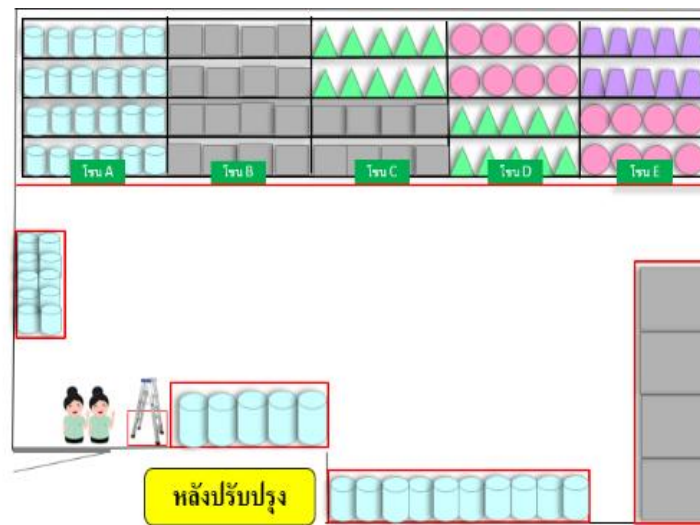

Figure 2 Scheme of storage of goods in the reserve area

In general, the efficiency of the reserved space in the storage of goods can be summarized according to the 3 aspects of logistics indicators as shown in Table 3.

Table 3 Logistics Indicators

Indicators	Before	After
Time (minute)	10	5
Cost (Bath)	7.50	3.75
Reliability (%)	75	95

SUGGESTIONS

A case study of convenience stores should be added. and expand the space for storing both present And in the future there may be more products added than ever. There must be management management about customer service, should not allow customers to wait in long queues. And employees should have regular training on work processes to increase efficiency and effectiveness in convenience stores. or to the company

Those who do research who are interested in studying and researching in the future should add an inventory management system (Inventory Management) is to manage various items in the inventory from collection. Take note of incoming and outgoing goods Should control the amount of inventories in the right amount. Including maintaining current or future storage of resources to keep the operation going.

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