Research Article

INCREASE OF THE EFFICIENCY OF WAREHOUSE MANAGEMENT, THAI DESSERT COMMUNITY ENTERPRISE GROUP, NAKHON NAYOK PROVINCE

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ABSTRACT

The objectives of this study were to: 1) Analyze the current issue of warehouse management of Thai Dessert Community Enterprise Group, Nakhon Nayok Province, 2) Arrange the supportive information and to develop the current warehouse system of Thai Dessert Community Enterprise Group, and 3) Evaluate the efficiency of the new warehouse management for Thai Dessert Community Enterprise Group, Nakhon Nayok Province. The key informants were 10 representatives from the Thai Dessert Community Enterprise Group, Nakhon Nayok Province. The research tools were the observation and in-depth interview techniques. The information gathering was divided into 3 stages. The first stage was the analysis of the issue of the warehouse. The second stage was the information gathering and the development of the warehouse system. The third stage is the evaluation of the efficiency of the warehouse. The information gathered was analyzed using Microsoft Excel. Lean thinking approach and ABC Analysis were applied to the analysis in this research.

The result of the research has shown that the overall processes of the warehouse before the improvement required 34.04 minutes on average. Post improvement required 17.04 minutes. The products in the A group scored 17.50% out of the list while the B group

products scored 32.50% out of the list. The products in the C group scored 50% out of the listed products respectively.

Keyword: Community Enterprise, Warehouse, Lean Process

Introduction

At the moment, Thai Dessert has become more popular which is a national identity of Thailand. Beside its beauty and overall sophistication in every of its cooking process since the beginning, its cooking process and its delicious taste and its herbs and candle smoke aroma The dessert can be considered as a side dish which often be eaten alongside with the other Thai food in the religious event and ceremony since the ancient time which is called as "Kaw - Wan dishes". Each of the dessert's name is also represented as its value and the fortune meaning (Ramkhamhaeng University, 2004). The Community Enterprise is consistent with the nation's 20 years strategy (2017 - 2036) in terms of the competitive ability, the development of the enterprises, the community economy, the development of the enterprises' skill and developing the SMEs to the international standard. The Community Enterprise approach also consistent with the new 20-year Rajabhat University's strategy (2017-2036) which aims in the economic goals, strategies and the applied relations mission to improve the local economy in accordance with the context and needs of local development. (New 20-year Rajabhat University's strategy (2017-2036), 2017)

The consumption of the snack and dessert among the population in the year 2017, 3 out of 4 (74.2 percentage) of the population are the people who are older than 6 years old. The young population (6-14 years old) have the highest consumption dessert and snacks rate at 89.2 percent. The second highest group is the working-age group at 82.8 percent (25-29 years old) elderly at 72.6 percent (60 years old or older) which is the lowest group (National statistical office, 2018). Thai Dessert Community Enterprise is not fully developed in the aspect of raw material storage and product storage systems (Basin, 1990). Effective inventory management is very important in business operations.

To increase the competitive ability (Thakkar, Kanda & Deshmukh, 2012) SME has encountered with challenges and what follows is the communication development, the development, and the information. These

let to the competitive and more threats (Bouazza, Ardjouman, & Abada, 2015) The medium and small business will be accepted as an important part of the growth of the economy and the generate more occupations. A limited number of so-called high-growth SMEs make important contributions to job creation and productivity growth. At the earlier stages, management capabilities are crucial to survival. As the firm matures, human resource and innovation strategies increase in importance. By the time the firm has become established, innovation is crucial for growth. (Achanga, Shehab, Roy & Nelder, 2006) Lean process operation among the medium and the small business (SMEs) will lead to more challenges. Implementation of lean manufacturing in any type of organizations can bring many benefits, such as reducing waste and improving operating efficiency. To keep ahead of the completion, organizations look for continuous improvement in Supply Chain Management (SCM).

(Afonso & Cabrita, 2015) Lean paradigm connected to SCM is a strategy based on cost and time reduction to improve the effectiveness. At the operational level, Lean Supply Chain (LSC) is focused on optimizing the processes of all supply chain, searching for simplification, reducing waste and reducing activities that do not add value.

"SMEs require higher operational budget and forecast in the the benefits that follows from the lean process before they can accept" the approach in managing the inventory and no having enough knowledge over the system and the other computer knowledge skill (Muchaendepi, Mbohwa, Hamandishe & Kanyepe, 2019) According to Reference (Meyer, 1991) which lead to incorrect inventory. This led to a certain case of issue such as loss of efficiency, unwanted list of products, stacking of expensive physical stocks and the reduction of the trusts gained from the customers. (Almeida & Cunha, 2017)The analysis of the various activities involved in the coffee production process of a Portuguese company, from the perspective of the ABC methodology, allowed obtaining, analyzing and reflecting about a set of information of high importance for the organization. The ABC costing system provides relevant and useful information for the decision-making process in various domains, such as the definition of cost and sales prices of products, the identification of processes where greater effort is needed to improve or adapt them to the new realities and needs and the restructuring of some areas of the industrial unit.

From the mentioned issue, the researcher of this project gives priority to the

warehouse and inventory management to allow an effective operation. The researcher of this project needs to define a proper inventory placement position by applying lean thinking and categorization of the product based on the ABC Analysis then apply these approaches to the enterprises. The objective is to reduce required time, mistake and operational cost over the warehouse and inventory-related operation so that it can be operated more conveniently and rapidly.

Research Objectives

1. To analyze the current inventory issue of Thai Dessert Community Enterprise Group by use ABC and lean theories analysis, Nakhon Nayok Province.

2. To develop supporting information and develop an inventory and warehouse system for Thai Dessert Community Enterprise Group by use ABC and lean theories analysis, Nakhon Nayok Province.

3. To evaluate the operating efficiency of the new type of inventory for Thai Dessert Community Enterprise Group by use ABC and lean theories analysis, Nakhon Nayok Province.

Expected Benefits

1. To aware of the warehouse and inventory issue of Thai Dessert Community Enterprise Group, Nakhon Nayok Province.

2. To gain supporting information and develop the current inventory system for Thai Dessert Community Enterprise Group, Nakhon Nayok Province.

3. To gain new inventory pattern for Thai Dessert Community Enterprise Group, Nakhon Nayok Province.

Research Scope

Research population scope

The researcher used observation and in-depth interviews. The researcher has specified the qualifications of the in-depth interviewer from the 10 representatives in warehouse, logistics management and work experience and use purposive selection from the Thai Dessert Community Enterprise Group, Nakhon Nayok Province.

Research material scope

This research is about the issue and condition of the inventory management of the Thai Dessert Community Enterprise Group, Nakhon Nayok Province. Moreover, this study has been done since the good receiving

process, inventory counting, inspecting the products, issuing of the good receipt document, product placement by applying lean concept and product categorization based on ABC Analysis.

Time scope

The research had been conducted for one year period (October 1, 2018 - October 31, 2019)

Methodology

Research approach

1. Study the background and the importance of the issue and the working procedures

2. Survey the related research about findings the lean concept and the theory related to the quantitative analysis

3. Gather the in-depth detail and the procedures

3.1 Nakhon Nayok community (Thai dessert shop)

3.1.1 Amount of ingredients

3.1.2 Detail of products/ ingredients

3.2 Detail of the inventories

3.2.1 Name and amount of the ingredients

3.2.2 Type of products

3.2.3 Amount of the storage

3.2.4 Day/ month/ manufacturing date and expiration date

4. Categorization of the issue and the solution for the operation

4.1 Storage and records

4.2 Developing of Excel software system for inventory storage

4.3 Designing of the model which will be used as the center of the community enterprise

5. Develop and design the interview

6. Interview the enterprise community

7. Analyze the information to compare the data before and after the improvement by applying the lean concept

8. Summarize and suggestion

Research Results and Discussion

Research Results

1. The current inventory issue of Thai Dessert Community Enterprise Group, Nakhon Nayok Province From figure 1 placement of the unorganized products and the expiration of the products before being used.



Figure 1 unorganized products arrangement

2. Supporting information and develop an inventory and warehouse system for Thai Dessert Community Enterprise Group, Nakhon Nayok Province. From these issues, the researcher has developed a presentation of the current products categorized by the color as shown.

represents the products with rapid displacement

represents the products with medium displacement

represents the products with slow displacement

Layout of Inventory Storage Location

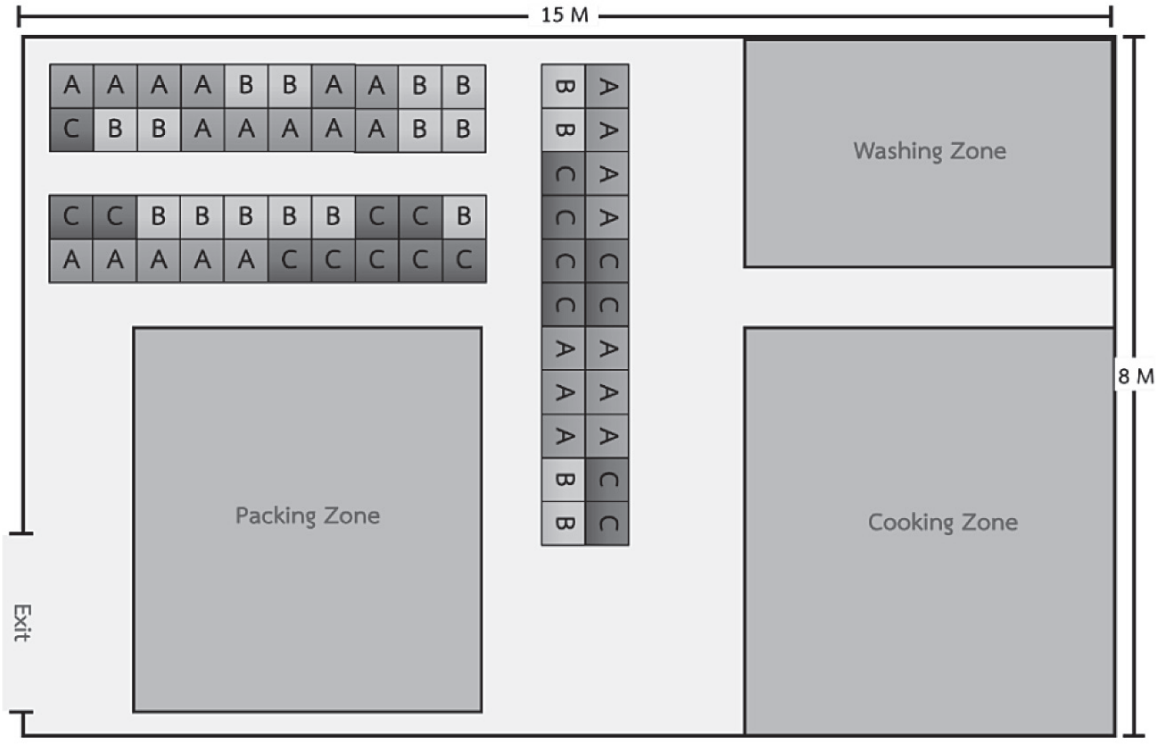


Figure 2 Plan of the 1st floor before improvement

According to figure 2, the building has 2 floors including the cooking session and the ingredient storage. The researcher has drawn the layout before and after renovation. The 1st floor before renovation which the ingredients and some tools are stored together at a washing, packing zone and cooking zone.

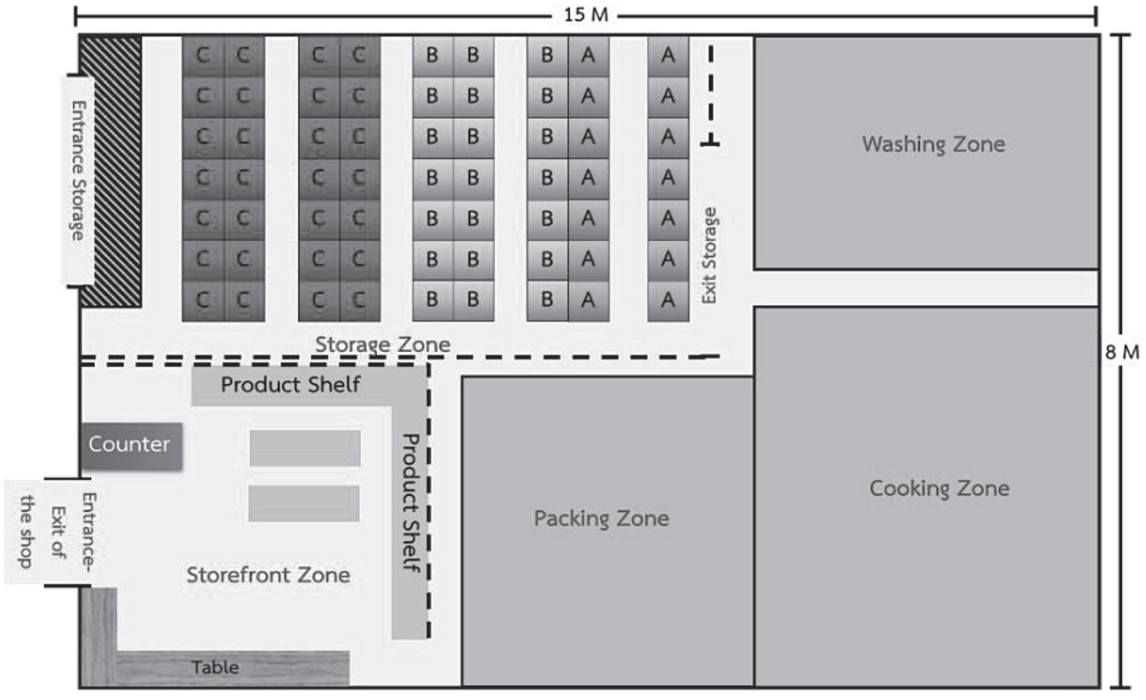


Figure 3 Plan of the 1st floor (after renovation)

From figure 3, the researcher has modeled the shop as the guidelines for product distribution to the customers. By developing a model of the shop 1st in the future. The form of the shop and the cooking zone in which the products or desserts are freshly produced daily which is a way to attract more customers. The storage zone such as ingredients and various packaging materials are arranged by using ABC Analysis approach to ingredient and material loss from expiration or defection.

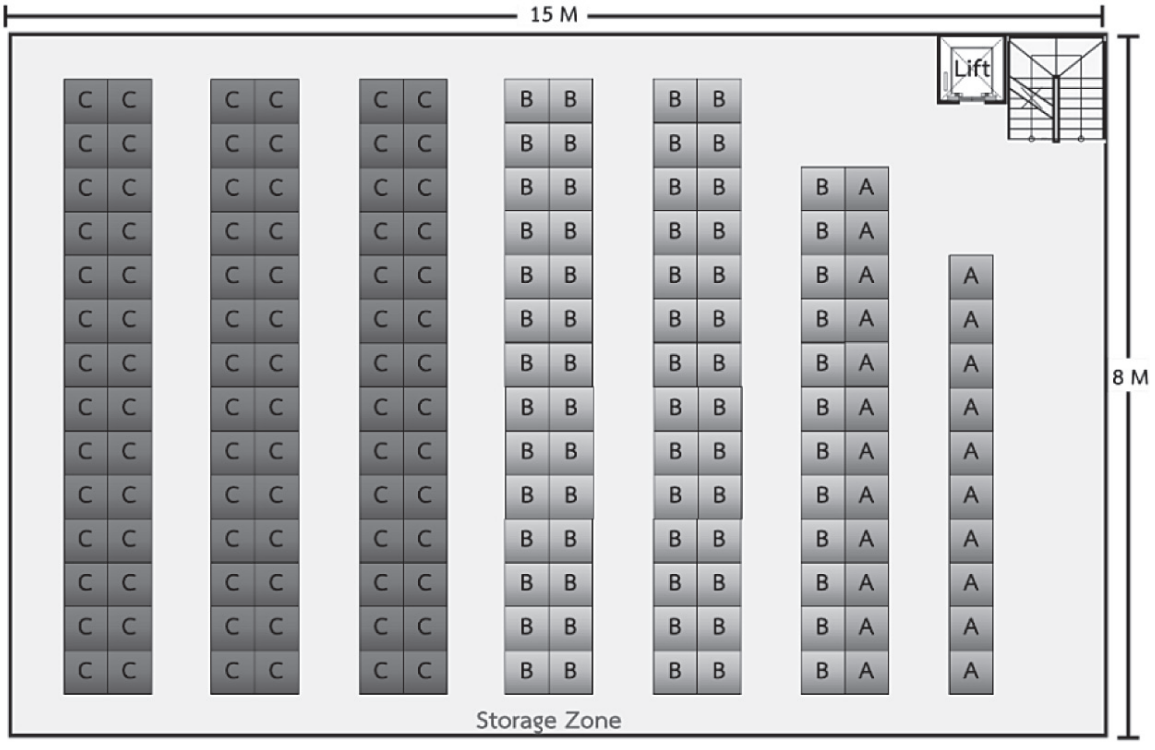


Figure 4 Plan of the 2nd floor

From figure 4, the floor plan of the 2nd floor which was arranged by using ABC Analysis to classify the inventor. (Classification) based on the value of the product (Value) to facilitate and store in an organized fashion.

Table 1 Products segmentation

Group	Number of products	% of inventory	Total Value generated in the past 3 months (THB)	% of the value generated of each group	Movement Type
A	16, 33, 34, 7, 17, 4, 32, 23	17.50	2,219,850	61.27	Fast
B	1, 5, 19, 15, 9, 12, 6, 3	32.50	1,145,985	31.63	Moderate
C	10, 11, 20, 29, 2, 21, 30, 31, 27, 26, 13, 28, 18, 22, 24, 14, 25, 8	50.00	257,509	7.11	Slow
	Total	**100.00**	**3,623,344**	**100**	**Total**

From table 1, The products in the A group scored 17.50 % out of the list while the B group products scored 32.50 % out of the list. The products in the C group scored 50 % out of the listed products respectively. Researchers have now taken the Lean Concept to apply by writing a diagram of the Value Stream Mapping, VSM: Current State as shown in Table 2.

3. Evaluate the operating efficiency of the new type of inventory for Thai Dessert Community Enterprise Group, Nakhon Nayok Province

Table 2 Example of process reduction for product receiving

	Process Flow Chart (Before)											
	Number Chart	Sheet		Product	Conclude							
	Products/Material/Staff				Activity		Up-to-Date	After	Difference			
					Action	●	2					
					Check	■	2					
	Activities: Goods stored in a warehouse				Move	➡	1					
					Wait	D	0					
					Put away	▼	1					
No.	Explanation of Activities	Times (minute)	Operator	Number of Operator	Action ●	Check ■	Move ➡	Wait D	Put away ▼		Remark	
1	Document Delivery Officer Jobs	11.33	Document department	1								
2	Moving products out of the car	17.32	Chauffeur	2								
3	Product count	12.45	Staff	1								
4	Check Product	10.55										
5	Writing A Document	4.65	Staff	1								
6	Store products	17.34										
	Total	74.04										

(A) Before improvement

Table 2 (toward)

	Process Flow Chart (After)											
	Number Chart	Sheet			Product		Conclude					
	Products/Material/Staff						Activity		Up-to-Date	After	Difference	
							Action	●	2	2	0	
							Check	■	2	1	1	
	Activities: Goods stored in a warehouse						Move	➡	1	1	0	
							Wait	◗	0	0	0	
							Put away	▼	1	1	0	
No.	Explanation of Activities	Times (minute)	Operator	Number of Operator	Action ●	Check ■	Move ➡	Wait ◗	Put away ▼		Remark	
1	Document Delivery Officer Jobs	9.45	Chauffeur	1								
2	Moving products out of the car	10.30	Chauffeur	2								
3	Product count and Check Product	4.51	Staff	1								
4	Writing A Document	7.43	Staff	1								
5	Store products	2.33	Receiving	1								
	Total	34.04										

(B) After Update

From Table 2, By analyzing reduced process for receiving the product into the warehouse between before and after the adjustment, it has been found that after reducing the operation from 6 steps to 5 steps decreased the time taken by 40 minutes.

Table 3 The activities before and after the improvement.

Moving product into storage	Steps	Step no.	Total
Before improvement	Value-added activities (VA)	1, 2, 5	3
	Necessary Non-Value-added activities (NNVA)	3, 4	2
	Non-Value-added activities (NVA)	6	1
After improvement	Value-added activities (VA)	1, 2	4
	Necessary Non-Value-added activities (NNVA)	3, 4	2
	Non-Value-added activities (NVA)	5	1
Moving product out storage			
Before improvement	Value-added activities (VA)	1, 3	2
	Necessary Non-Value-added activities (NNVA)	2	1
	Non-Value-added activities (NVA)	-	-
After improvement	Value-added activities (VA)	1,2,3,5	4
	Necessary Non-Value-added activities (NNVA)	4	1
	Non-Value-added activities (NVA)	-	-

Performance Operation before improvement (Moving product into storage)

= (11.33+ 17.32+4.65) / 74.04 * 100

= 44.97 %

Performance Operation after improvement (Moving product into storage)

= (9.45+10.32) / 34.04 * 100

= 58.08 %

Performance Operation before improvement (Moving product out storage)

= (12.34+3.21) / 25.38 * 100

= 61.27 %

Performance Operation after improvement (Moving product out storage)

= (5.44+3.45+2.21+6.54) / 19.07 * 100

= 92.50 %

According to the performance calculation of warehouses efficiency before goods were moved into the warehouse found out that there was a increase of warehouse operation efficiency by 13.11% and also warehouse efficiency after goods were moved out of the warehouse increased with 31.23%.

Discussion

The current inventory issue of Thai Dessert Community Enterprise Group, Nakhon Nayok Province. The discoveries made from the research had indicated that the Thai Dessert Community Enterprise Group gave low priority to the warehouse and inventory as well as the supply chain system in which at the moment is highly competitive. The Community Enterprise is required to provide more attention to the changes. At the moment there is no classification of the products based on the good movement. This led to the unorganized storage. When considering the fact by applying ABC Analysis technique which is consistent with the idea which is mentioned in The Warehouse Management Handbook; the second edition Stock Location Assignment (James & Jerry, 1998)

Supporting information and develop an inventory and warehouse system for Thai Dessert Community Enterprise Group, Nakhon Nayok Province. Although ABC is a statistical tool developed originally to perform population genetics analysis (Pritchard et al., 1999), the technique actually provides a framework within which to perform Bayesian analysis in a wide range of fields (e.g. Ratmann et al., 2007; Bortot et al., 2007; Grelaud et al., 2009. Also see a short review in Lopes and Boessenkool, 2009).The book mentioned the criteria of ABC Analysis which is a popular criterion in terms of products placement and storage. The products will be arranged and stored based on the type of good movement. By organizing the products based on the given criteria,

it was found that only 20% of the products will be counted as 80% of the good movement out of the whole stocks of products (Braglia, Grassi & Montanari, 2004) The ABC Analysis classify the products into 3 types based on the annual cost. When the manufacturing plant applied the ABC Analysis in which the component was categorized into 3 essential parts which are “very important (A-class), important (B class) and less important (C class)” The mentioned discovery from the research has indicated that the supporting information for developing the inventory and warehouse system in which the ABC Classification theory has been applied as well as the lean concept which led to the more effective management of the inventory.

Evaluate the operating efficiency of the new type of inventory for Thai Dessert Community Enterprise Group, Nakhon Nayok Province. The given application is consistent with the Applied ABC Analysis research studies (Mehdizadeh, n.d.) to control the products remaining in the supply chain of the automobiles spare parts in which has been classified based on the demand of the retailer in the future (Kolla, Minufekr & Plapper, 2019). SMEs enterprises are required to change themselves in accordance with the upcoming trend such as the industry 4.0 while practicing the existing manufacturing concepts such as Lean Production System (LPS) in order to compete with the world market. The analysis of the information has indicated the importance of the new kind of inventory which led to a more effective system. This is consistent with the research related to lean production, analysis, concept of the instruments and the concept of lean production which has been practically applied in the actual even, quantitative analysis to reduce the waste and to allow and easier goods flow. Based on the research of (Redeker, Kessler & Kipper, 2019), it was mentioned that lean is the set of philosophy and the business process which allow the operation which is known and able to be widely applied since the year of 1960 (Rose, Deros, Rahman, & Nordin, 2011).

Suggestions and Recommendations

1. The public and private sectors should support to increase the ability to compete in the Thai dessert business. Other community organizations can use an analytical model and encourage them to systematically develop data for the entire supply chain to reduce costs and help operations become more efficient.

2. There should be an agency to support, organize training, provide knowledge and develop community enterprise logistics management. It is recommended that young people be encouraged to consume Thai dessert since most young people are starting to know Thai desserts less.

3. Educational institutions provide academic services to provide knowledge to community enterprises.

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