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WAREHOUSE AND DISTRIBUTION OPERATIONS FOR COMPETITIVE ADVANTAGE: EASTERN THAILAND PERSPECTIVE

The objective of this study is to examine how to improve warehouse management and achieve a competitive advantage by focusing on 7 operations factors: material holding period reduction; warehouse consolidation; warehouse operation cost reduction; appropriate picking system; new IT system; cross-docking system; and warehouse working process improvement. The questionnaires from 37 entrepreneurs of public warehouses and 37 entrepreneurs of private warehouses in the warehousing were analyzed. The results confirm that these 7 factors indeed influence the effectiveness of warehouse management and play the role in sustaining competitive advantages.

Keywords: warehouse; distribution; picking system; competitive advantage.

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ФОРМУВАННЯ КОНКУРЕНТНИХ ПЕРЕВАГ СКЛАДІВ ТА ЦЕНТРІВ ДИСТРИБУЦІЇ: НА ПРИКЛАДІ СХІДНОГО ТАЙЛАНДУ

У статті проаналізовано, яким чином можна покращити складський менеджмент та досягнути конкурентних переваг на цьому ринку. Дослідження зосереджено на 7 чинниках: зменшення термінів складування, консолідація складських приміщень, скорочення видатків на складські операції, вибір відповідної системи сортування, встановлення нової інформаційної системи, установка кросс-докінгу та покращення загальних складських процесів. Проаналізовано дані опитування 37 співробітників приватних складів та 37 співробітників на державних складах. Результати підтверджують вплив усіх 7 факторів на ефективність управління складами та отримання нових конкурентних переваг.

Ключові слова: склад; дистрибуція; система сортування товарів; конкурентна перевага.

Рис. 1. Табл. 3. Літ. 12.

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ФОРМИРОВАНИЕ КОНКУРЕНТНЫХ ПРЕИМУЩЕСТВ СКЛАДОВ И ЦЕНТРОВ ДИСТРИБУЦИИ: НА ПРИМЕРЕ ВОСТОЧНОГО ТАИЛАНДА

В статье проанализировано, каким образом можно улучшить складской менеджмент и достичь конкурентных преимуществ на данном рынке. Исследование сосредоточено на 7 факторах: сокращение сроков складирования, консолидация складских помещений, сокращение расходов на складские операции, выбор подходящей системы сортировки, установка новой информационной системы, установка кросс-докинга и улучшение общих складских процессов. Проанализированы данные опроса 37 сотрудников частных складов и 37 работников на государственных складах. Результаты подтверждают влияние всех 7 факторов на эффективность управления складами и получение новых конкурентных преимуществ.

Ключевые слова: склад; дистрибуция; система сортировки товаров; конкурентное преимущество.

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Introduction. Effective management of warehouses and distribution centers is important for business operations so that to outperform their competitors on production and operation costs management and customer satisfaction. Low operation costs and high productivity are the goals for warehouse and distribution center operations.

Efficient and effective warehouse operations can significantly reduce costs and also play a critical role in integration of transformation processes. Optimal warehouse operations are determined by selecting the appropriate factors that affect not only costs but also customer satisfaction, which creates a competitive advantage.

Automated warehouses are used in manufacturing, warehousing and distribution centers. The important operational dimension of storage and retrieval systems is to minimize the total cost and distance travelled by a machine to complete the retrieval process of customer orders.

Since a warehouse is an important link in any supply chain, it is crucial to allocate optimal warehouse resources to enhance productivity and reduce operation costs. Warehouse management systems (WMS) have been introduced to handle and monitor warehouse resources and warehouse operations.

Logistics and supply chain management costs have been significantly lowered by reducing inventory and improving warehouse management. Efficient and effective warehouse and distribution center operations reduce the total management costs and improve customer satisfaction.

This study focuses on Thai entrepreneurs' effective warehouse management and distribution center operations parameters, and includes separate studies of a public warehouse and a private warehouse. The findings of this study would benefit Thai entrepreneurs by showing them how to manage warehouse and distribution operations effectively in order to improve customer satisfaction and achieve competitive advantages.

Literature review. Picking time is an important factor in warehouse operations, since it covers about 55% of total operation costs. There is a number of activities that can reduce costs, such as efficient picking routing, distance reduction, and picking items that are close to input and output points (Berglund and Batta, 2012).

The concept of a rolling inventory was introduced as a warehouse management strategy to reduce operational costs. The rolling inventory objective is to enable the incoming product to be unloaded and stored in trailers to reduce costs and allow for more warehouse storage space (Muriel and Ruiz-Benitez, 2006).

Cross-docking points are currently very popular because they lower transportation costs through product or material consolidation, reduce inventory through a distribution network, increase delivery speed between suppliers and customers, and require less product handling and storage within a warehouse (Aichlmayr, 2001).

Different product or material peak cycles create different demands on distribution centers. Seasonal demand creates multi-line orders; however, product promotion creates single-orders for the product being promoted. To handle promotional products, these must be consolidated and stored close to the packing station since it is more efficient to pick and pack. Picking strategies are very important to ensure efficient and cost-saving distribution centers (Trebilcock, 2014).

Warehouse space utilization is affected by various independent and dependent variables. More efficient use of warehouse space can be achieved by changing the

placement angle of pallets and width of an aisle. Warehouses designed with single dock considerations can also reduce travelling time which, in turn, reduces costs (Ozturkoglu et al., 2012).

The number of e-retailers is significantly increasing to meet the growing market demand. E-retailers can offer more product lines, more distribution innovation and more flexibility in loading and unloading operations. With the growing need for better product delivery speeds and efficiency, distribution centers need to optimize their multiple operations while minimizing setup times and warehouse space needs for conveying equipment (Will, 2015).

Potential areas for improvement in warehouse and distribution center operations include the need to revise and, reorganize forklift operations to influence higher picking results. Optimal picking operation times have to be calculated before picking activities begin. The optimum forklift operations need to take returns to storage and new supplier delivery plans into consideration (Burinskiene, 2015).

Data warehouses are used for effective business planning and decision-making. Data warehouses store more subject-oriented data and integrate data from many different sources. Data warehouses are specifically designed to give workers information they need for strategic decisions. A spatial data warehouse provides a unique view of integrated spatial data from many spatial databases (Kumar and Thareja, 2014).

Information systems such as warehouse management systems (WMSs) have been developed for data collection and sharing, efficient and effective data collection and to analyze and solve warehouse problems such as material handling problems. Radio frequency identification (RFID) technology has also been adopted to facilitate warehouse data collection and sharing (Poon et al., 2009).

Problem statement and research objectives. Efficient and effective warehouse operations significantly help organization reduce costs and also support integration of transformation process. Optimal warehouse operations are achieved by selecting the appropriate factors that affect not only cost but also customer satisfaction, which then creates a competitive advantage.

The objectives of this study are:

1. To study effective warehouse and distribution center factors.
2. To explore effective warehouse and distribution center management practices to achieve a competitive advantage.
3. To focus on logistics cost reduction and customer satisfaction to maintain a competitive advantage.

Materials and methods. This is an exploratory research study, which focuses on new factors that impact the effectiveness of inventory management in Thailand's logistics industry. The research also explores the degree to which each effective warehouse management factor influences firm's warehousing competitiveness advantage.

The methodology applied quantitative methods by means of using questionnaires. Qualitative contextual tools were used as the first parameter identification. Secondary data were taken from literature review and from confirmation of the research findings.

The research process began with literature review so that to set parameter measurements of worker-related issues, which were then used while consulting supervisors and experts, before conducting the pilot survey with 37 entrepreneurs in public

warehouses and 37 entrepreneurs in private ones. The measures were applied to the results of the survey’s final version. The survey results were analyzed by using a mean and SD model.

The study focuses on the results of questionnaires that were filled by 74 entrepreneurs in engaged warehousing business. After the data were analyzed, the observations of workers were used to confirm the results.

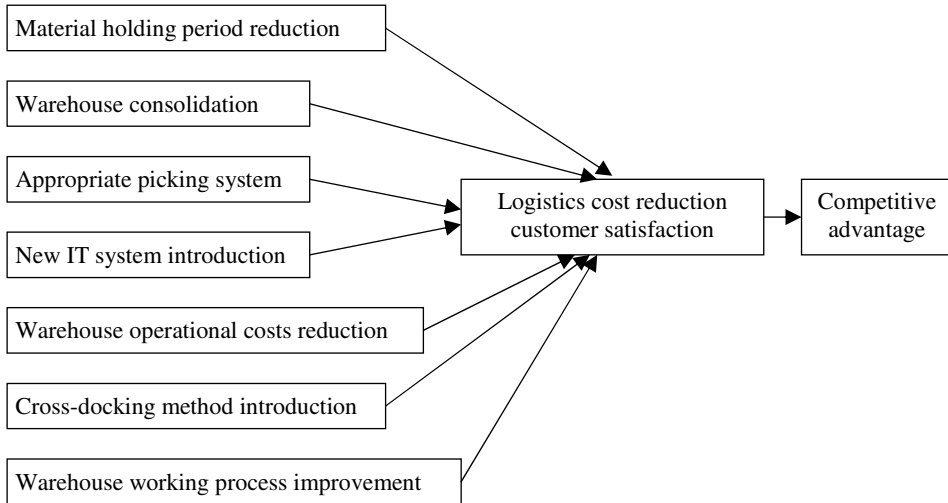


Figure 1. Conceptual framework of this study, author’s

Key results. Table 1 shows the mean and SD results for the variables under study. The results show that the responses were at the agreed level in which the mean = 3.86 and SD = 0.36. The mean for warehouse consolidation is 4.50. The mean for material holding period reduction is 4.43. The mean for appropriate picking system is 3.66. The mean for new IT system introduction is 3.66. The mean for warehouse working process improvement is 3.64. The mean for cross-docking method introduction is 3.63, and the mean for warehouse operational cost reduction is 3.54.

Table 1. Important factors for private warehouse operations, author’s

Variables	mean	SD
Warehouse consolidation	4.50	0.33
Material holding period reduction	4.43	0.35
Appropriate picking system	3.66	0.39
New IT system introduction	3.66	0.45
Warehouse working process improvement	3.64	0.38
Cross-docking method introduction	3.63	0.29
Warehouse operational cost reduction	3.54	0.38
Average	3.86	0.36

The number of the respondents = 37.

Table 2 shows the mean and SD results for the same out in the case of variables public warehouse. The results show that the responses were at the agreed level in which the mean = 3.97 and SD = 0.42. The mean for new IT system introduction is

4.04. The mean for material holding period reduction is 4.03. The mean for warehouse consolidation is 3.99. The mean for appropriate picking system is 3.99. The mean for warehouse working process improvement is 3.92. The mean for warehouse operational cost reduction is 3.91, and finally the mean for cross-docking method introduction is 3.91.

Table 2. Important factors of public warehouse operations, author's

Variables	Mean	S.D
New IT system introduction	4.04	0.40
Material holding period reduction	4.03	0.44
Warehouse consolidation	3.99	0.38
Appropriate picking system	3.99	0.43
Warehouse working process improvement	3.92	0.43
Warehouse operational cost reduction	3.91	0.47
Cross-docking method introduction	3.91	0.42
Average	3.97	0.42

The number of the respondents = 37.

Table 3 shows the mean and SD results for the variables and the thirds group of operations. The results demonstrate that the responses were at the agreed level in the mean = 3.91 and SD = 0.39. The mean for warehouse consolidation is 4.24. The mean for material holding period reduction is 4.23. The mean for new IT system introduction is 3.85. The mean for appropriate picking system is 3.82. The mean for warehouse working process improvement is 3.78. The mean for cross-docking method introduction is 3.77, and the mean for warehouse operational cost reduction is 3.72.

Table 3. Important factors of warehouse and distribution center operations, author's

Variables	mean	SD
Warehouse consolidation	4.24	0.35
Material holding period reduction	4.23	0.39
New IT system introduction	3.85	0.42
Appropriate picking system	3.82	0.41
Warehouse working process improvement	3.78	0.40
Cross-docking method introduction	3.77	0.35
Warehouse operational cost reduction	3.72	0.42
Average	3.91	0.39

Conclusion and directions for further investigation. Efficient and effective warehouse operations consist of many factors such as minimizing inventory levels and warehouse management practices. Material handling period, new IT, warehouse consolidation and cross-docking – all play important roles in warehouse & distribution operations. Customer demand requires having a wide range of product varieties but low quantities, and customers also expect timely delivery. The order picking process is time consuming and labor intensive since products must be divided into small quantities. An efficient picking system can be developed by grouping small orders into batches, thus reducing travelling time and then reducing operation costs (Lam et al., 2014).

Warehouses are generally designed to satisfy customer needs and provide a buffer for uncertain customer demand. Since customer demand is uncertain, more products should be stored than would be needed. To improve the efficiency of storage operations, shipping and receiving docks must be located on the same side as the warehouse, and fast-moving products should be stored near warehouse doors (Bassan et al., 1980).

Many organizations apply a lean production system to improve their competitive advantage and productivity. Lean production systems were introduced for production and warehouse integration to eliminate waste and create value, which leads to quality improvement, lead time improvement, lower inventory levels and cost reductions. RFID has become an effective way to track products through a supply chain and is considered as one of the most interesting technologies for production, warehousing and distribution center operations (Chen et al., 2013).

Since this study was limited to Eastern Thailand only, the outcomes might not be applicable to service quality results for all over Thailand. Funding for this study are also limited by the amount of time available, so a longer-term study could be considered.

Future research should also cover other issues related to effective warehouse management. This might contribute to further development of a conceptual framework model to enhance warehouse management practices and innovations.

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