
LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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FEATURES OF INVENTORY MANAGEMENT IN LOGISTICS SYSTEM OF A
TRADING ENTERPRISE

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Abstract. The article **aims** to define the role of inventory management in the logistics system of a trading enterprise. In the article general theoretical aspects of inventory management have been identified and existing systems of trading enterprises' inventory management have been analyzed. General scientific theoretical and empirical **methods** have been used in the course of the research: observation and comparison, analytical, grouping and generalization of data, structural methods, elements of economic and financial analysis. Having analyzed the existing inventory management systems of trading enterprises and having examined the main directions of improving the inventory management system at domestic trading companies, it was determined that to solve all the tasks on fostering the efficiency of trading companies, it is necessary to create and develop their integrated trading management system, based on synchronized use of existing models. As a **result** the relevance and feasibility of modifying the inventory management system at a trade enterprise are substantiated. It is stated that effective inventory management of a trading enterprise should be based on: the use of powerful information technologies; improving inventory control and supply coordination; ensuring the continuous interaction of the functional subsystems of the whole set of enterprises-producers, consumers and suppliers and establishing effective communication with them; modification of the planning system in the field of sales, procurement, promotion and motivation of staff; optimization of the enterprise marketing system and improvement of order management; reorganization of the warehouse system in accordance with the selected order management system.

Keywords: trading enterprise, inventory management system, trading inventories, continuity of logistics operations, fluctuations in demand, warehouse costs.

JEL Classification: D24, L 23.

INTRODUCTION

The main tasks of the inventory management system of modern trading enterprises are to increase profits while reducing inventory costs. Thus, at the present stage of market competition, the improvement of the inventory management system is a particularly relevant trend for the development of trading enterprises. The relevance of the research is due to the necessity of a

detailed introduction of the basic problems of the inventory management system and the development of the key directions of the optimization process of stock management in trading companies.

LITERATURE REVIEW

There are different perspectives on logistic activities of modern enterprises. The logistical activity of enterprises is regarded as the formation of economic relations; determining the needs for transportation of products, their volumes; the choice of modes of transport, vehicles, routes and technology of transportation; coordination of operational management of supply and transportation of products; optimization of inventory and warehouse; placement and organization of business activities; warehouse network; providing logistics services etc. With respect to inventory management, the theoretical issues of using the modern concept of inventory management and warehousing logistics have been the object of the research of domestic and foreign scientists: Yu.K. Bazhenov et al. (1997), A.M. Hajinsky (2007), I.A. Lenshin and Yu.I. Smolyakov (1996), M.A. Oklander (2004), Y.V. Ponomariova (2003), I.G. Smirnov (2004), V.O. Shyshkin (2019) and others.

Paying attention to these researches, it should be noted that there are still many issues that need further research, one of which are particular features of inventory management in logistics system of a trading enterprise and their role in the effectiveness of domestic enterprises.

METHODOLOGY

General scientific theoretical and empirical methods have been used in the course of the research, such as: analysis and generalization of literature on the topic of the research, methods of observation and comparison, analytical, grouping and generalization of data, structural methods, elements of economic and financial analysis, methods of coordination and formalization, methods of mathematical statistics and logistics, graphical and tabular representation of data are used in the work. The theoretical and practical database on logistics and supply chain management, logistic infrastructure and organization of warehouse economy at the enterprise has been considered as an information base of the research.

RESULTS AND DISCUSSION

During the economic crisis, the economy of the region is more likely to be flooded with the internal economic issues and the shortest period of time for the turnover of the capital. Moreover, it is the responsibility of any organization to take care of the unique market situation at a regional level. All trading companies should take over the turnover of stocks, to take into account the maximal sales axis and, as a result, to bring in the inflow of goods from the state's activities. A perfect system of direct sales is without taking the goods to the warehouse, so that they are immediately delivered. However, in such a way it is not possible to trade a large number of types of products in the product portfolio of the organization, the turnover of stocks is one of the most important directories, which is detailed by the enterprises.

Material reserves are products of tester-technical recognition, which are on the basis of different stages of production and the process of production and public utilities, which should be mentioned in the process of a test or special care. The main function of the material reserves is to ensure the continuity of the process of supplying the goods. Material reserves are a part of the warehouse of the resources of production processes and the need for services (stocks of finished products). In general, it is one of the main reasons why the process of supplying has become

uninterrupted. The function is to preserve a part of the total material stock, including the number of inventories. At the same trading, enterprise goods are stored by a different warehousing state system, which stores a significant part of the company's assets and is the main aspect of its potential resource (N. Vlasova, 2006).

For the efficient performance of the trading company, the number of reserves should be optimal. Level of inventory, nature and quality of stocks and the level of inventory management can be directly exploited due to the scale of production, efficiency, and competitiveness of the enterprise.

The accounting systems of the region are divided into two large groups:

- 1) own stockpile (the company's reserves);
- 2) reserves that are not owned by the company.

The company's own reserves are recorded in its balance sheets and are assets that:

- are stored for their further sale in the course of business activity of the enterprise;
- are in the process of production for the subsequent sale of manufactured products;
- stored for consumption in the production process, service delivery and enterprise management.

According to this, fig. 1 shows the classification of the main types of inventories:

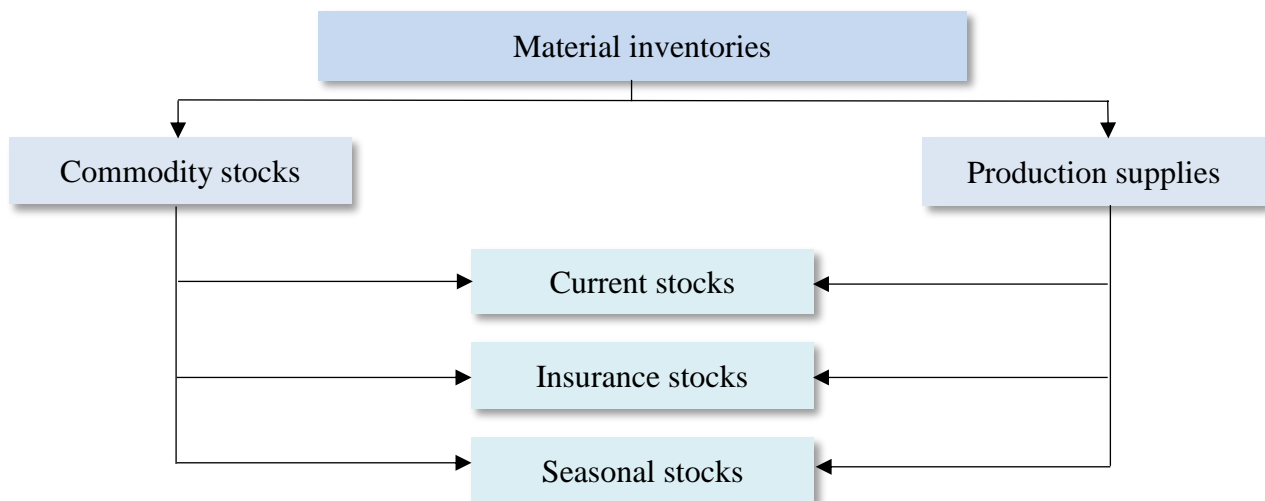


Fig. 1. Basic types of material reserves

Source: modified after (Grebnev et al., 1997)

Thus, in the company's logistic systems inventories are divided into the production supplies, which ensure the continuity of consumption of resources with the discretion of their supply, and commodities, which link the intervals between the supply of products from the supplier and delivery to the buyer.

Production supplies are classified into production inventories and transport inventories that are created in the process of cargo transportation. Therefore, there are three levels of inventories at enterprises (table 1):

Table 1

Levels of inventories

Type of inventory	Function
Stocks of finished products	Minimization of supply lines, which is the shortest possible cycle of turnover (without discount on production). Insurance of risks from stoppage of production through repair, strikes and downtime. Regulation of production in case of seasonal changes in demand, which can provide stability of productivity.
Stocks of unfinished production	Transgression of all operational control of the production process through the process control on the front end.
Stocks of purchased material resources and inventories	Reducing the occurrence of infestations, allow the creation of trading tips for the selection of great party material resources and speculation. Moreover, the model provides the safety from the monopolies.

Source: modified after (Waarst and Reventlow, 1991)

The demand for spare parts is based on the nature of the manufacturing and production processes. The main reason for the creation of reserves for the company is the separation of the manufactured and serviced products at the same time (Waarst and Reventlow, 1991). Additional reasons for the creation of material stocks on the enterprises are given in table 2:

Table 2

Reasons for inventories and their roles

Reason	Role of inventories
1	2
Probability of delay of the established schedule of supplies	In the case of an unpredictable decrease in the intensity of the input material flow, a stock of raw materials is necessary to avoid the loss of the production process, which is especially important for enterprises with an uninterrupted cycle of production.
Possible changes in demand	It is possible to oversupply products with large quantities of goods in bulk. The prognosis will fall on a specific product more than a folding process. In order to understand the situations, if the product is not to shipped, it will be possible to oversupply it with large quantities of goods.
Seasonal changes in the production of goods	In most cases, stocks are created in the logistics system of agricultural enterprises.
Speculations	The price of some goods can increase dramatically. Entrepreneurship, which has been able to foresee this factor, creates inventories to make a profit by increasing the market price.
Discounts for the purchase of a large batch of goods	Inventories are created for a large amount of accumulated material resources.

Table 2 continuation on the next page

Table 2 continuation

1	2
Expenses related to ordering	The process of placing each new order is accompanied by a number of administrative costs. These costs can be reduced by reducing the number of orders, which is equivalent to an increase in the volume of ordering and an increase in the size of the stock.
Possibility of uniform managing operations with production and distribution	In the case of stock absence, the intensity of material flows in the distribution system fluctuates in accordance with changes in the intensity of production. The presence of stocks in the distribution system allows to carry out the process of realization more evenly, regardless of the situation in production. In turn, the availability of production stocks is smoothing fluctuations in the supply of raw materials and semi-finished products, ensures the uniformity of the production process.
Ability to provide immediate customer service	Orderings for customers in one of the following ways: - develop the ordered product; - to purchase the ordered product; - Issue the ordered goods immediately from the stock available. (The last method is usually the most expensive, as it requires a stock level).
Minimization of production downtime due to the lack of spare parts	Equipment breakdowns and a variety of accidents can lead to production stoppages if additional parts, items are not available. This is especially important for enterprises with a continuous production process, as it can be too costly to shut down a production.
Simplification of production management processes	The availability of these reserves reduces the requirements for the degree of consistency of production processes at different sites, and therefore the associated costs of organizing the management of these processes.

Source: modified after (Hadzhinsky, 2007)

Thus, the main aim of inventory creation is to reduce the direct dependence between supplier, producer and consumer, as well as to ensure the continuity of the production process. The availability of stocks provides production with inventories supplied in optimal batches, processing raw materials into finished products in optimal sizes and, most importantly, timely delivery of finished products to customers.

Despite the fact that the process of stock maintenance in the warehouse requires significant costs, enterprises are forced to create them. So more than a third of cumulative public products is spent annually on inventories (Hadzhinsky, 2007).

Inventory functions are not limited to the accumulation and insurance of risks in the event of unanticipated stoppages of the commodity movement process. Other inventory functions are presented in table 3:

Table 3

Inventory functions

Function	Value
Regulation of the process	Inventories are necessary to allow time for the completion of one production operation and for the transition it to another.
Economic function	Ensuring the independence of individual workplaces, sites, workshops, simplification of production and/or distribution processes. Reducing these inventories to a minimum requires changes in organization and financing, namely: quality management, maintenance, material updates, staff training.
Warning function	Buffer stocks are necessary if stocks are consumed in a predictable but variable manner and if necessary to smooth fluctuations in stock levels rather than changes in production systems
Insurance of unforeseen risks	Emergency stocks are established to protect against fluctuations in delivery times and demand fluctuations, to ensure the continuity of the production process
Production function	Inventories are needed when there is a need for a period of latent development that is necessary for a chemical reaction or for the conversion of products (e.g. wine maturation).

Source: modified after (Hadzhinsky, 2007)

Since the turnover of inventories is directly related to the volume of product sales, the usage of effective ways to stimulate sales to accelerate their turnover. One way to accelerate the turnover of inventories is to invest minimal resources. As turnover increases, so does sales and profits. However, the high volume of inventories leads to large losses due to moral and physical aging and spoilage during storage. Delays due to the placement of orders, transportation and warehouse processing of goods require from the trading company to maintain trade stocks at the necessary level in accordance with the sales forecast for the stability and rhythm of their implementation. As a result, it is impossible to carry out the purchase of goods at the time of receipt of the order from the consumer.

Effective management of trade enterprise inventories should be based on the usage of powerful information technologies, which provide regular control of the state and dynamics of goods movement, automatic implementation of placing orders through the computer network and replenishment of stocks to the optimal level (Yu. Nerush, 2008).

Modern enterprises in order to improve the information system of the enterprise use additional software. The most common automated programs to provide information support for the system of control and inventory management are shown in Fig. 2:

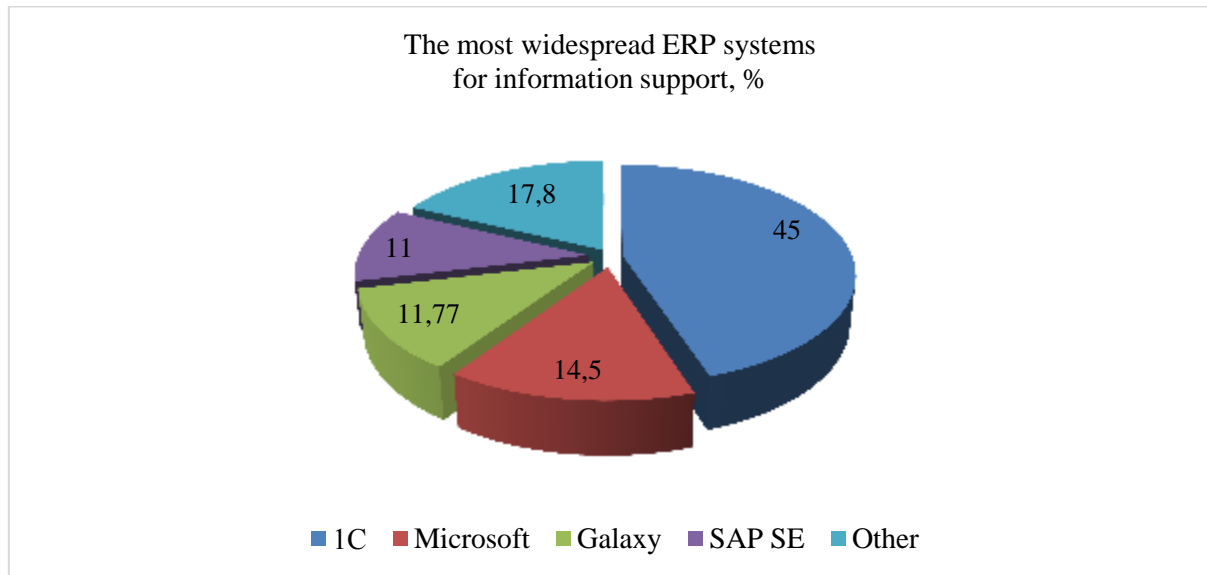


Fig. 2. The most widespread ERP systems for information support, %.

Source: modified after (1C: Enterprise 8. System of programs, 2019)

Thus, the majority of modern domestic trade enterprises use programs based on “1C”, “Galaxy” and others (Fig. 2). Such platforms are the technological environment with the help of which developers create programs (applied solutions). The systems are addressed to medium and large enterprises and have wide functionality for information support of the whole range of strategic planning and operational management tasks, including the enterprise inventory management system. Using the above-mentioned types of information support for inventory management, the trade enterprise solves the following tasks:

- 1) ensuring that the necessary quantity of stock is available in the warehouse;
- 2) achieving an optimal level of customer service;
- 3) minimization of working capital requirements;
- 4) elimination of material resources deficit;
- 5) increasing the turnover rate of goods;
- 6) minimization of expenses of the enterprise for the purchase and storage of stocks;
- 7) liquidation of excess stocks.

In order to fully achieve the objectives above, the application solution allows maintaining an optimal level of stock in the warehouse, to provide the number of goods on current shipping orders and to meet the needs of procurement plans.

The control of inventories is based on the calculation of their level and associated costs, such as current inventory costs.

The main management decisions regarding inventories are to determine the terms and volumes of the order, which affect the cost of purchased goods, the number of costs associated with the order, the storage of stocks and the amount of damage, as well as the possible shortage or absence of stocks.

One of the main problems of modern trade enterprises is the accumulation by the enterprise at the end of the year of a large number of illiquid products in the warehouse, as well as the deficit on the main items. The reason for this is the preliminary order of goods, which is carried out on the basis of preliminary sales plans, which are established by the commercial department of the company based on the archive of information orders. Thus, the enterprise receives losses on the maintenance of warehouse premises and a decrease in the turnover of funds.

The most competitive are those companies that have organized a rational order system based on the following tasks:

1. Costs reduction of stock creation and storage.
2. Minimization of delivery time.
3. Compliance with delivery deadlines.
4. Optimization of sales activities.

In order to achieve the above objectives, the trading company must achieve continuous interaction of functional subsystems of the entire set of manufacturers, consumers, and suppliers and establish effective communication with them.

Foreign experts in the practice of logistics developed and implemented two fundamentally different approaches to the supply of material resources: pull and push systems (Kristianto, 2009; Li and Scheller-Wolf, 2010; Thonemann, U. et al. 2005).

Push and pull systems of material flow management are the basis of the system of inventory management in the logistics system of the enterprise, gives reference points in the management of material reserves, on which, in turn, the efficiency of the logistics chain as a whole depends (Yu. Ponomareva, 2003). Types of push and pull control systems of material flows are given in Table 4:

Table 4

Material flow control systems

Push systems	Pull systems
MRP	KANBAN
MRP I	OPT
MRP II	ZIPS
DRP	MAN
ERP	DOPS
ERP II	NOT
LRP	LP

Source: compiled by authors

The push system is a sales strategy aimed at forming inventories in warehouses of retail wholesalers by outpacing demand. The pushing out models of material flow management are mainly oriented to a constant demand for a long period of time (Wood et al., 1995).

The usage of the information support system has improved its application in the logistics system of the enterprise (Table 5):

Table 5

Characteristics of the push inventory management systems

Benefits	Drawbacks
<ol style="list-style-type: none"> 1. Minimization of expenses for the ordering organization. 2. Elimination of errors in forecasting demand and errors in the supply of materials, resources, etc. 3. Increasing the level of customer satisfaction. 4. Minimization of dependence on suppliers. 5. Creation of insurance and seasonal stocks that protect against changes in weather and climate conditions. 	<ol style="list-style-type: none"> 1. Need for storage space. 2. Increased risk of physical loss. 3. Additional storage costs. 4. Allowed defects in the stock. 5. The need for high-level information support, which requires significant financial resources. 6. Complicated inventory control system through centralized management.

Source: modified after (I. Smirnov, 2004)

Pull strategy is a sales strategy aimed at stimulating demand for products in the retail sector by outpacing inventory formation. The advantage of pulling systems is their independence from computerization. However, such systems provide for a high level of labor organization and compliance with all parameters in the supply chain, as well as the responsibility of executors at all levels due to limited centralization in the regulation of logistics processes (Table 6):

Table 6

Characteristics of pulling inventory management systems]

Benefits	Drawbacks
<ul style="list-style-type: none"> - ensuring a high quality of stocks. Release of capital from inventories. - minimization of the cost of stock maintenance and reduction of stocks. - eliminating the risk of physical losses. - simplified inventory management system as a result of decentralization. 	<ul style="list-style-type: none"> - risk of errors in demand forecasting and delayed delivery of resources. - order placement costs. - increased dependence on the supplier. - complex synchronization of logistics process timescales with "just in time" principles. - apply the "just in time" principle only in the raw material supply system, not for commercial products.

Source: modified after (Oklander, 2004)

It is possible to provide the decision of all tasks set before the trading enterprise only by means of creation of the integrated control system of stocks of the trading enterprise. Such enterprises are based on the synchronized use of separate models (as in case of their application separately there is an imperfection of decisions on stocks), which provide the reaching to logistics high result (Oklander, 2004).

A special role in the organization of the company's activities is played by inventory planning because inventories require significant financial costs for storage, warehousing, and management in the supply chain. So for the reception of competitive advantages and a powerful market position the trading enterprise should plan effectively expenses of activity, to predict stocks for a finding of their optimum level. Such a model will provide the chance to the enterprise in due time to realize delivered lots of the goods and not to accumulate illiquid goods. Improvement of the system of

planning in the sphere of sales, procurement, promotion, and motivation of personnel will provide a trading enterprise with a stable increase in profits and strengthening of market positions (I. Lenshin, 1996).

To ensure the effective usage of circulating assets at the trading enterprise and increase the level of profitability of products it is necessary to minimize the volume of stocks, and therefore to ensure the stability of sales. In such a way the goods will not be delayed in the warehouse.

To accelerate working capital and achieve an optimal level of operation of the enterprise by minimizing overhead costs associated with warehousing and inventory creation, the company must perform the following tasks:

- to optimize the marketing system of the enterprise;
- to optimize and improve the order of management;
- reorganization of the storage system in accordance with the chosen order management system.

By improving the order of management system it is necessary to integrate retraining and professional development of the company's management staff, improving the personnel motivation system and optimization of the company's management as a whole. In order to enhance the quality of customer service and accelerate the order of the execution process, it is necessary to minimize the time and number of components of the cycle through effective coordination and acceleration of deliveries.

CONCLUSION

The main objective of inventory creation is to reduce the direct dependence between the supplier, producer, and consumer, as well as to ensure the continuity of the production process. In addition, the reasons for the creation of inventories by trade enterprises are the following: the probability of violation of the established schedule of deliveries, the possibility of fluctuations in demand (unpredictable increase in the intensity of the output flow), seasonal fluctuations in demand for some types of goods, discounts for the purchase of large batches of goods, costs associated with the order placement, the possibility of uniform implementation of operations for the distribution of goods, the possibility of immediate customer service.

Moreover, it is crucial to analyze the existing stock management systems of the trading enterprise and study the main directions of improvement of the stock management system at the domestic trading enterprise. It was determined that to solve all the tasks set before the trading enterprise it is necessary to create an integrated stock management system of the trading enterprise, based on the synchronized use of existing individual models.

Furthermore, the effective management of inventories of a trading enterprise should be based on: the use of powerful information technologies; improvement of the system of stock control and coordination of supplies; provision of continuous interaction of functional subsystems of the entire set of enterprises-manufacturers, consumers and suppliers and establishment of effective communication; planning in the sphere of sales, purchases, promotion and motivation of personnel; optimization of the marketing system of the enterprise and improvement of management order; reorganization of the warehousing system in accordance with the selected order management system.

In the current situation, many domestic enterprises work under the order. Such a system is a win-win for the seller, but not always acceptable to the buyer because if the demand is unsatisfied, the buyer can move to another seller. Therefore, in order not to lose customers and not to store a large number of stocks, the company correctly calculates the balance between the accumulation of stocks for rapid response to demand and the system of work under the order.

A trading company must find the optimal solution between the costs and benefits of the chosen level of inventories in order to determine a balanced level of inventories for each commodity group or even positions to meet market demand. Thus, the improvement of the system of determining the optimal level of inventories will allow enterprises not only to minimize the costs of storage and warehousing of inventories, yet it will enable the enterprise to direct financial resources to invest them in other types of entrepreneurial activity, which in turn will bring additional profit.

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ОСОБЛИВОСТІ УПРАВЛІННЯ ЗАПАСАМИ В ЛОГІСТИЧНІЙ СИСТЕМІ ТОРГОВЕЛЬНОГО ПІДПРИЄМСТВА

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Метою представленої наукової статті є аналіз сучасної моделі управління запасами логістичної системи торговельного підприємства та дослідження основних напрямків удосконалення системи управління запасами на вітчизняному торговельному підприємстві. У статті визначено роль управління запасами в логістичній системі торговельного підприємства. Розкрито теоретичні аспекти управління запасами і проаналізовано існуючі системи управління запасами торговельних підприємств. Обґрунтовано актуальність і доцільність модифікації системи управління запасами на торговельному підприємстві. Визначено завдання та мотиви створення запасів торговельними підприємствами. В результаті проведення дослідження визначило необхідність створення інтегрованої системи управління запасами торговельного підприємства, що ґрунтується на синхронізованому використанні існуючих окремих моделей, для досягнення стандартних сучасних задач торговельного підприємства. Доведено, що ефективне управління матеріальними запасами торговельного підприємства повинно базуватись на: використанні потужних інформаційних технологій; удосконаленні системи контролю запасів та координації поставок; забезпеченні безперервної взаємодії функціональних підсистем усієї сукупності підприємств-виробників, споживачів і постачальників та налагодженні ефективної комунікації з ними; модифікації системи планування у сфері збуту, закупівель, просування та мотивації персоналу; оптимізації маркетингової системи підприємства і вдосконаленні управління замовленнями; реорганізації системи складування відповідно до обраної системи управління замовленнями.

Ключові слова: торговельне підприємство, система управління запасами, торгові запаси, безперервність логістичних операцій, коливання попиту, складські витрати.

ОСОБЕННОСТИ УПРАВЛЕНИЯ ЗАПАСАМИ В ЛОГИСТИЧЕСКОЙ СИСТЕМЕ ТОРГОВОГО ПРЕДПРИЯТИЯ

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Целью представленной научной статьи является анализ современной модели управления запасами логистической системы торгового предприятия и исследование основных направлений совершенствования системы управления запасами на отечественном торговом предприятии. В статье определены роль управления запасами в логистической системе предприятия. Раскрыты теоретические аспекты управления запасами и проанализированы существующие системы управления запасами торговых предприятий. Обоснована актуальность и целесообразность модификации системы управления запасами на торговом предприятии. Определены задачи и мотивы создания запасов торговыми предприятиями. В результате проведенное исследование определило необходимость

создания интегрированной системы управления запасами торгового предприятия, основанной на синхронизированном использовании существующих отдельных моделей, для достижения стандартных современных задач предприятия. Доказано, что эффективное управление материальными запасами торгового предприятия должно базироваться на: использовании мощных информационных технологий; совершенствовании системы контроля запасов и координации поставок; обеспечении непрерывного взаимодействия функциональных подсистем всей совокупности предприятий-производителей, потребителей и поставщиков и налаживании эффективной коммуникации с ними, модификации системы планирования в сфере сбыта, закупок, продвижение и мотивации персонала; оптимизации маркетинговой системы предприятия и совершенствовании управления заказами; реорганизации системы складирования в соответствии с выбранной системы управления заказами.

Ключевые слова: торговое предприятие, система управления запасами, торговые запасы, непрерывность логистических операций, колебания спроса, складские расходы.