



Article

Evaluate and Optimize Warehouse and Storage Efficiency in Retail Business

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Abstract: This article analyzes the issues of assessing warehouse and storage efficiency in retail enterprises. The study examined the warehouse capacity, average annual inventory volume, product range, warehouse occupancy rate, and storage costs of a number of trading enterprises operating between 2021 and 2025. The analysis results showed that warehouse efficiency indicators vary significantly across enterprises, and this is due to the level of inventory management and the development of the logistics system. It was also found that warehouse capacity and inventory growth are closely related to sales growth. As a result of the study, scientifically based proposals and recommendations were developed aimed at optimizing warehouse operations in retail enterprises, effectively managing inventory, and reducing storage costs.

Keywords: Warehouse management, warehouse capacity, inventory management, warehouse efficiency, logistics system, product range, warehouse utilization rate, storage costs, cost-effectiveness.

1. Introduction

In today's environment of globalization and increasing competition, the effective operation of retail businesses largely depends on how well their logistics system, in particular their warehouse management, is organized. Warehousing and storage processes are essential for ensuring the uninterrupted supply of commercial enterprises, accelerating turnover, and meeting consumer demand in a timely manner. Therefore, indicators such as warehouse capacity, inventory management, product assortment, and storage costs are emerging as key factors determining enterprise efficiency.

In recent years, the expansion of product types in the retail sector, the variability of consumer demand, and the complexity of logistics processes have required new approaches to warehouse management. In particular, excessive or insufficient inventory formation leads to additional costs for enterprises, inefficient use of working capital, and a decrease in profit levels. At the same time, underutilization of warehouse capacity or, conversely, overloading negatively affects logistics efficiency [1].

Practice shows that the assessment and management of warehouse and storage efficiency in many retail enterprises is not sufficiently scientifically based. In particular, the correlations between warehouse capacity, reserve size, product range and storage costs are not analyzed in depth, and an integrated approach to their optimization is lacking. As a result, the efficiency of the use of resources in enterprises is reduced, and there are excessive costs [2].

The need to solve these problems determines the relevance of this study. Therefore, the article aims to assess the effectiveness of storage and storage in retail enterprises, analyze

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key indicators and develop scientifically based proposals and recommendations aimed at improving them.

The issues of effective organization of warehouse management and inventory management in retail enterprises occupy an important place in logistics and supply chain theory. In studies conducted by foreign scientists, the warehouse system is considered as an integral part of the logistics process. Including D. Bowersox and D. In his scientific works, Closs evaluates warehouse management as a key link in ensuring the continuity of commodity movement, emphasizing that by effectively organizing it, it is possible to reduce overall logistics costs [3].

Also, R. Ballou studied in depth the problems of managing reserves in the logistics system, substantiating the fact that determining the optimal reserve level directly affects the financial results of the enterprise [4]. In his opinion, excess inventory increases storage costs, while insufficient inventory leads to disruptions in the sales process.

M. Christopher, on the other hand, advocates an integrated approach to supply chain management, noting that improving warehouse efficiency ensures the competitiveness of the entire logistics system [5]. At the same time, A. Rushton et al. show that by integrating warehouse and distribution system management, product movement can be optimized and service levels can be improved [6]. In inventory management theory, E. The approaches developed by Silver and his co-authors are important, as they proposed mechanisms for economically justifying and managing inventory levels [7]. Also, S. Chopra and P. Meindl argues that in supply chain management, the interdependence between inventory, transportation, and warehouse systems is fundamental, and their coordination is a key condition for improving efficiency. In the field of operational management, J. Heizer and B. Render views warehouse operations as an important element of an enterprise's operating system, showing that costs can be minimized through efficient use of resources [8].

Management issues in logistics and trade enterprises have also been extensively studied by local scientists. In Particular, B.Yu. Khodiev, Sh.Sh. Shadmanov and J.B. Ergashev emphasizes the importance of rational use of resources in ensuring economic efficiency [9]. B.A. Abdukarimov, on the other hand, highlights the role of warehouse management in the logistics system and justifies the need to improve inventory management mechanisms. O.R. Yuldashev and J.B. Ergashev showed that warehouse and supply processes can be effectively organized by developing a management system in trading enterprises [10].

At the same time, data from the State Statistics Committee of the Republic of Uzbekistan and regulatory and legal documents confirm that improving logistics and warehouse systems is an important direction in the development of the trade sector [11].

However, the analysis shows that existing scientific work does not adequately cover the complex study of the interrelationships between warehouse capacity, inventory size, product assortment, warehouse occupancy rate, and storage costs. In this regard, this study is relevant in that it aims to analyze these indicators in an integrated manner and develop practical recommendations [12].

2. Methodology

This study used a comprehensive methodological approach aimed at assessing the effectiveness of storage and storage in retail enterprises and analyzing its main indicators. The theoretical basis of the study is scientific views on logistics, warehouse management and stock management. The study used a combination of empirical and analytical methods. In particular, economic and statistical methods were used to collect and summarize data, and practical indicators of a number of retail enterprises operating during the period 2021–2025 were studied. As research objects, commercial enterprises with different levels of activity were selected, and their indicators such as warehouse capacity, average annual stock volume, product assortment, warehouse occupancy rate, and storage costs were analyzed.

In the process of analysis, the comparative (comparative) method was widely used, determining the dynamics of indicators and growth rates in the cross section of enterprises. Also, through dynamic Series Analysis, Trends in change in the cross-sectional of the indicators over the years were evaluated. This approach made it possible to determine how the warehouse capacity and the volume of reserves were formed by time. The study used logical analysis, a systematic approach, and economic analysis methods to assess the effectiveness of inventory management. The relationships between warehouse occupancy and storage costs were analyzed, and the efficiency of resource utilization was determined. At the same time, the interaction between product assortment expansion and inventory volume was also studied.

The methods of induction and deduction were used to formulate scientific conclusions, and the results obtained from individual enterprises were generalized. To ensure the reliability of the research results, official statistical data, internal reports of enterprises, and practical indicators were relied upon. This methodological approach allowed for a comprehensive assessment of warehouse and storage efficiency in retail enterprises, identification of existing problems, and the development of scientifically based proposals and recommendations aimed at their elimination.

3. Results and Discussion

Warehouse and storage efficiency of trading enterprises are important indicators in organizing the supply of trading enterprises. Therefore, these indicators were analyzed based on the enterprise data presented in Table 1. An analysis of the warehouse capacity of retail enterprises in 2021–2025 shows that the warehouse capacity of enterprises of LLC “Arsh 313 trade baraka” and LLC “Djalolov Temur Ulugbekovich” is unchanged and indicates that the enterprise does not need excess stock [13]. However, we cannot say that the storage capacity of the enterprise “Abilov Akram ota Trade” LLC has not changed, but the enterprise does not have a need for excess reserves, because the enterprise may have excess reserves due to the large size of the storage capacity. However, the storage capacity of the trading enterprises “Sam Sifat Plus” LLC and “Sherzod zoovet malham” LLC has been changing and increasing every year, as the demand for these enterprises to increase their storage capacity has also increased as the trading process has developed [14].

Warehouse inventory plays an important role in supply chain management for retail businesses. Analysis on the basis of data from Table 1 shows that in the period 2021–2025, the annual average reserve value of the LLC “Sam Quality Plus” was 83.64% for the highest growth among the analyzed enterprises. In second place after this enterprise was the enterprise “Sherzod zoovet malham” LLC with 38.48% [15]. The main reasons for the high growth of these two enterprises in this are 2 different, one operates by making the warehouse Reserve higher, and the other is due to the sharp increase in the warehouse Reserve in 2022 with the warehouse Reserve in 2021, the annual average has turned out to be higher. The warehouse stock of the enterprises “Abilov Akram Ota Trade” LLC and “Djalolov Temur Ulugbekovich” LLC amounted to an average of 12.85% and 14.79% per

year, respectively. The average annual reserve value of the company "Arsh 313 Trade Blessing" LLC was the lowest among the analyzed companies, with an increase of 7.7% [16].

Product variety is an important consideration for every retail business. The higher the product variety of a retail business, the greater the ability to meet consumer demand. The table below provides information on product types for each enterprise, where product types refer to product groups rather than specific types of products. Examples include product groups such as dairy and dairy products, meat products, non-alcoholic beverage products, confectionery, water and cool beverage products, cosmetics, non-food products, ready-made foods made from cereals and cereals, vegetable products, bakery products, office supplies [17]. In 2021-2025, the annual average product range of enterprises of Sam Quality Plus LLC and Abilov Akram ota Trade LLC was 7.55% and 8.34% - the highest compared to enterprises analyzed by these two enterprises. The growth rate of the enterprise "Djalolov Temur Ulug'bekovich" LLC was 5.9%. The enterprises "Sherzod Zoovet Malham" LLC and "Arsh 313 Savdo Baraka" LLC achieved an increase of 3.25% and 2.73%, respectively [18].

In addition to indicators such as warehouse capacity and warehouse inventory, another important indicator is the warehouse occupancy rate, which also contributes significantly to the storage efficiency of the enterprise's warehouse. The warehouse banality rate of the enterprise "Sherzod zoovet ointment" LLC was 85.01% per annum on average in the last 5 years-that is, 14.99% is the highest among enterprises analyzed for the level of idle employment. Next in line is the LLC "Djalolov Temur Ulug'bekovich", with a share of 71.72%. The annual average employment rates of enterprises of Sam Quality Plus LLC, Arsh 313 trade baraka LLC and Abilov Akram ota Trade LLC were 49.35%, 44.35% and 57.80%, respectively.

By minimizing costs in trading companies, the company can achieve maximum profit. Therefore, the maintenance costs of the companies analyzed over 5 years were also studied. As a result, the average growth was 77.5%, belonging to the enterprise Sherzod zoovet ointment LLC. "Sam Quality Plus" LLC enterprise this was 26.24%. The average annual growth rate of the enterprises "Arsh 313 Trade Blessing" LLC and "Djalolov Temur Ulug'bekovich" LLC was 16.32% and 13.03%, respectively. The company "Abilov Akram Ota Trade" achieved the lowest growth of 5.04%.

Table 1. Warehouse and storage efficiency of retail businesses.

Enterprises	Warehouse capacity (m ²)	Warehouse Reserve (mln. so'm)	Product types (groups)	Warehouse occupancy (m ²)	Storage costs (mln. so'm)
2021 yil					
"Sam Sifat Plus" LLC	200	24,43	9	68,3	34,80
"Arsh 313 savdo baraka" LLC	45,5	34,74	10	23,7	7,91
"Djalolov Temur Ulug'bekovich" LLC	76,3	36,41	8	50,6	11,76
"Abilov Akram ota savdosi" LLC	240	115,83	16	187,8	43,79
"Sherzod zoovet malham" LLC	22,6	125,80	12	18,8	3,93
2022 yil					
"Sam Sifat Plus" LLC	200	121,61	10	96,5	42,00
"Arsh 313 savdo baraka" LLC	45,5	38,93	11	20,4	9,55
"Djalolov Temur Ulug'bekovich" LLC	76,3	49,87	9	53,4	13,38
"Abilov Akram ota savdosi" LLC	240	137,89	18	196,8	47,19
"Sherzod zoovet malham" LLC	48,3	145,97	11	40,6	10,14
2023 yil					
"Sam Sifat Plus" LLC	220	55,12	11	118,6	54,12
"Arsh 313 savdo baraka" LLC	45,5	36,18	10	18,8	11,19
"Djalolov Temur Ulug'bekovich" LLC	76,3	56,69	9	55,2	15,41
"Abilov Akram ota savdosi" LLC	483	149,17	19	203,6	49,83
"Sherzod zoovet malham" LLC	48,3	215,53	14	41,4	11,88
2024 yil					
"Sam Sifat Plus" LLC	273,76	102,52	11	143,1	77,20
"Arsh 313 savdo baraka" LLC	45,5	39,62	10	19,8	12,83
"Djalolov Temur Ulug'bekovich" LLC	76,3	61,55	10	56,8	17,84
"Abilov Akram ota savdosi" LLC	483	167,91	21	208,1	51,64
"Sherzod zoovet malham" LLC	76,4	264,13	12	65,8	21,54
2025 yil					

"Sam Sifat Plus" LLC	273,76	91,33	12	159,3	87,05
"Arsh 313 savdo baraka" LLC	45,5	43,74	11	18,2	14,46
"Djalolov Temur Ulug'bekovich" LLC	76,3	63,45	10	57,6	19,16
"Abilov Akram ota savdosi" LLC	483	185,67	22	210,1	53,28
"Sherzod zoovet malham" LLC	104	492,48	13	89,4	33,07

4. Conclusion

Warehouse and storage efficiency in retail enterprises varies significantly depending on how well inventory is managed: some companies maintain stable, well-planned warehouse capacity, while others see inventory growth driven by overstocking, sales expansion, or abrupt shifts in demand, which in turn affects working capital efficiency, warehouse workload, and storage costs. Expanding product assortment improves the ability to meet consumer demand but also increases warehouse complexity, and uneven employment of warehouse resources with some enterprises underutilizing capacity and others overloaded further highlights the need for better planning. Since storage cost dynamics are closely tied to the effectiveness of warehouse management systems, enterprises facing rising costs should prioritize optimizing their inventory mechanisms. Overall, improving warehouse and storage efficiency in retail requires a combination of scientifically grounded inventory management, including ABC and XYZ analysis to reduce excess stock while ensuring continuity of high-demand goods; capacity planning based on sales volume, demand forecasts, and logistics indicators; balancing occupancy levels by renting out underused space or expanding overloaded facilities; adopting digital tools such as Warehouse Management Systems (WMS) for real-time control and reduced human error; optimizing storage costs through energy-saving technologies and streamlined logistics; managing product assortment by prioritizing high-turnover goods; and strengthening demand forecasting through statistical and AI-based methods to prevent excess inventory and enhance overall warehouse performance.

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