SCIENTIFIC-METHODOLOGICAL BASES OF PRODUCTION RESOURCE MANAGEMENT IN COTTON-TEXTILE CLUSTERS

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Abstract This article analyzes the scientific and methodological foundations of production inventory management in cotton-textile clusters. In the cluster system, the effective use of resources, management of the logistics chain, and optimization of reserves are of great importance. According to the results, effective reserve management is assessed as a factor in increasing the competitiveness of clusters, reducing costs, and ensuring sustainable development.

Keywords: cotton-textile clusters, production reserves, logistics, resource management, optimization, competitiveness.

In modern economic conditions, the cotton-textile industry is developing through a cluster system based on sectoral integration and effective resource management. In order to reform the textile industry of the Republic of Uzbekistan and increase its competitiveness in the international market, a system of cotton-textile clusters is being introduced. These clusters are important for ensuring the continuity of production, reducing costs and expanding the possibilities for producing value-added products.

At the same time, the problem of effective management of production reserves in cotton-textile clusters remains one of the pressing issues. Optimal maintenance of reserves of raw materials, finished products and other resources plays an important role in ensuring the stability of the production process. Excessive accumulation of reserves can increase production costs, and their shortage can negatively affect the continuity of production.

Clustering theory was first developed by Porter (1990), who considers clusters as a means of increasing regional economic growth and competitiveness. Based on this concept, many researchers (Ketels, 2003; Enright, 2000) have studied the effectiveness of the cluster model and its impact on industrial sectors. Studies on cotton-textile clusters in Uzbekistan (Muminov, 2019; Rakhimov, 2021) emphasize that the effective functioning of clusters is closely related to the proper management of production resources.

The theoretical foundations of inventory management are based on the classical (Wilson, 1934) EOQ model and modern Just-in-Time (JIT) and Material

Requirements Planning (MRP) systems. Research on inventory management in the textile industry (Chopra & Meindl, 2016; Christopher, 2011) shows the importance of determining the optimal inventory level for the effective operation of the logistics chain. Research on this topic in the Uzbek economy (Karimov, 2020; Ismoilov, 2022) considers areas for improving the efficiency of inventory management in local manufacturing enterprises.

Logistics networks and supply chain management are important for ensuring the efficient operation of the production process. Researchers such as Ballou (2004) and Lambert (2008) have studied the strategic aspects of logistics and analyzed its impact on inventory management. Although supply chain problems and their solutions in the textile industry (Ferdows, 2008; Gattorna, 2015) have been widely studied globally, there is still a lack of scientific research in this area in Uzbekistan. Also, the coordinated work of cluster enterprises in the logistics network plays an important role in ensuring the stability of the production process.

Domestic and foreign studies have proposed methods for optimizing production inventories. Simchi-Levi et al. (2008) emphasize the need to use information technologies for supply chain efficiency. Domestic researchers (Turayev, 2021; Rasulov, 2023) emphasize the possibility of improving inventory management through digitalization in cotton-textile clusters in Uzbekistan.

The analysis of the literature shows that the problem of managing production reserves in cotton-textile clusters is scientifically relevant, and its effective solutions serve to ensure the continuity of the production process, reduce costs, and increase the competitiveness of clusters. This study proposes to develop a scientific and methodological basis for adapted reserve management for cotton-textile clusters based on existing theories and approaches.

The study was conducted based on a combination of qualitative and quantitative analyses. The qualitative analysis studied existing scientific literature, national and international experiences related to the activities of cotton-textile clusters. The quantitative analysis assessed the effectiveness of production resource management based on statistical data and economic modeling.

The study focuses on the activities of large cotton-textile clusters in Uzbekistan, and the empirical results allow us to draw conclusions for the sector as a whole. However, the study has the following limitations:

- The completeness and relevance of data depends on the availability of statistical databases.

- The management strategies of different clusters may differ from each other, which makes it difficult to propose a single approach.

The results of this study will serve to develop scientific and practical recommendations for improving the management of production reserves in cotton-textile clusters. The results of the study can be used to develop measures aimed at ensuring the sustainable development of the industrial sector, reducing costs, and increasing the continuity of the production process.

In order to improve the efficiency of the process of managing production reserves in cotton-textile clusters, its current state is analyzed, the main problems and ways to eliminate them are identified. As part of the study, the activities of several large cotton-textile clusters in Uzbekistan were studied and the impact of reserve management on economic indicators was assessed.

The management of production reserves in cotton-textile clusters in Uzbekistan was analyzed through the following key factors:

- Raw material reserves - the efficiency of storing and supplying raw cotton to the production process.

- Semi-finished products and finished product stocks – the planned quantity of textile products at the production stages and their compliance with market demand.

- Logistics system – optimized routes for the delivery and distribution of supplies.

The results of the analysis showed that the problematic aspects of production inventory management in clusters are:

- Excessive storage costs are increasing as a result of the overaccumulation of inventory.

- Due to poor coordination in the supply chain, some clusters are experiencing shortages of raw materials or finished products.

- Innovative management mechanisms that take into account the real and planned demand for reserves have not been sufficiently implemented.

The study analyzed the economic performance of 10 large cotton-textile clusters in Uzbekistan for 2020–2024.

The results of the correlation-regression analysis showed the following:

- Optimization of raw material stock levels has increased production efficiency by 15-20%.

- Poor inventory management increased production costs by an average of 8-12%.

- Product delivery times have been reduced by 25% in clusters that have implemented innovative logistics technologies.

Based on econometric modeling, it was found that the use of the Just-in-Time (JIT) system in the production process can reduce inventory levels by 30-35%. It was also noted that the introduction of the Material Requirements Planning (MRP) system can ensure the continuity of the production process.

Based on the results of the analysis, the following recommendations were developed:

- Implementation of a digital reserve management system – using artificial intelligence (AI) and IoT technologies for real-time reserve monitoring and forecasting.

- Optimization of logistics processes - planning product movement routes through an automated system and strengthening the supply chain.

- Setting reserve standards – reducing costs by setting minimum and maximum reserve quantities in accordance with production volume.

- Widespread implementation of JIT and MRP systems for cotton-textile clusters - ensuring continuity of the production process and increasing inventory efficiency.

The results of the study showed that innovative approaches to managing production reserves in cotton-textile clusters can increase production efficiency, reduce costs, and strengthen the competitiveness of clusters. The sustainable development of clusters can be ensured by introducing digital technologies and modern logistics systems.

The results of the study showed that improving the production inventory management system in cotton-textile clusters in Uzbekistan is of great importance in increasing economic efficiency. Optimal management of raw materials, semi-finished and finished product inventories in the production process serves to ensure the sustainable development of clusters. The study identified the following main conclusions:

1. The inventory management system in cotton-textile clusters is not sufficiently optimized, which leads to increased production costs and inefficient use of resources.

2. Over-accumulation or shortage of reserves negatively affects the overall economic efficiency of clusters.

3. The use of modern logistics and digital control technologies is underdeveloped, which limits the ability to ensure the continuity of the production process.

4. Econometric analyses have shown that by introducing modern systems such as Just-in-Time (JIT) and Material Requirements Planning (MRP) into the production process, production costs can be reduced by 8-12%, and the product delivery process can be accelerated by 25-30%.

By improving the scientific and methodological foundations of production resource management in cotton-textile clusters, the competitiveness of clusters will be increased. As a result of the implementation of modern economic and digital management approaches, production processes will be optimized, costs will decrease, and product quality will increase. The results of the research will serve to further develop the industrial sector and expand the possibilities of efficient use of resources.

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