

**ECONOMIC FOUNDATIONS FOR MODERNIZING THE  
TRADE AND LOGISTICS SYSTEM IN THE AGRO-INDUSTRIAL  
COMPLEX**

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**Annotatsiya:** Maqolada agrosanoat majmuasida savdo-logistika tizimini modernizatsiya qilishning iqtisodiy asoslari yoritilib, xarajatlarni kamaytirish, bozor imkoniyatlarini kengaytirish va eksport salohiyatini oshirish masalalari ko‘rib chiqiladi.

**Kalit so‘zlar:** Agrosanoat majmuasi, logistika, modernizatsiya, iqtisodiy samaradorlik, eksport, raqamlashtirish.

**Резюме:** В статье рассматриваются экономические основы модернизации торгово-логистической системы в агропромышленном комплексе, включая снижение затрат, расширение рынков и рост экспортного потенциала.

**Ключевые слова:** Агропромышленный комплекс, логистика, модернизация, экономическая эффективность, экспорт, цифровизация.

**Summary:** The article highlights the economic foundations of modernizing the trade and logistics system in the agro-industrial complex, focusing on cost reduction, market expansion, and export growth.

**Key words:** Agro-industrial complex, logistics, modernization, economic efficiency, export, digitalization.

**Introduction.** The agro-industrial complex (AIC) is a key sector of the economy that ensures food security, supports rural development, and contributes to national income. In the context of globalization and increasing market competition, the efficiency of trade and logistics systems has become a critical factor influencing the performance of the agricultural sector. However, in many countries, these systems remain underdeveloped, leading to high transaction costs, supply chain inefficiencies, and significant post-harvest losses.

Modernizing the trade and logistics system within the agro-industrial complex is therefore an essential step toward improving economic efficiency and competitiveness. The integration of advanced logistics infrastructure, digital technologies, and effective supply chain management can significantly reduce costs, enhance product quality, and ensure timely delivery to both domestic and international markets.

This study aims to examine the economic foundations of modernizing trade and logistics systems in the agro-industrial complex. It focuses on identifying key challenges, evaluating potential benefits, and highlighting the role of innovation and investment in achieving sustainable development in the sector.

**Main part.** The modernization of the trade and logistics system in the agro-industrial complex (AIC) is a multidimensional process that directly affects economic efficiency, competitiveness, and sustainability. In traditional systems, agricultural products often pass through multiple intermediaries, which increases transaction costs, prolongs delivery times, and reduces product quality. These inefficiencies result in higher final prices and lower profitability for producers. Therefore, the transformation of logistics and trade mechanisms is not only a technological necessity but also an economic imperative.

A key direction of modernization is the development of integrated supply chain systems. Efficient coordination between production, storage, transportation, and distribution stages ensures the continuous movement of goods with minimal losses. The introduction of modern storage facilities, including temperature-controlled warehouses, significantly reduces post-harvest losses, especially for perishable goods. At the same time, the improvement of transportation infrastructure and logistics hubs enhances connectivity between rural producers and urban markets.

Digitalization plays a central role in this process. The use of digital platforms for trade, electronic documentation, and real-time tracking systems improves transparency and reduces information asymmetry. As a result, producers can better plan production volumes, respond to market demand, and optimize logistics operations. Moreover, digital tools contribute to the reduction of shadow transactions and increase tax revenues.

Another important aspect is investment efficiency. The modernization of logistics systems requires significant capital investments; however, these investments generate long-term economic benefits. Improved logistics reduces operational costs, increases turnover speed, and enhances product competitiveness in both domestic and international markets. This creates favorable conditions for attracting private and foreign investments into the agro-industrial sector.

*Economic Efficiency Formula.* To evaluate the effectiveness of logistics system modernization, the following indicator can be used:

$$E = \frac{(C_{\text{before}} - C_{\text{after}}) + \Delta R}{I} \quad (1)$$

Where:

E – economic efficiency of modernization;

$C_{\text{before}}$  – logistics costs before modernization;

$C_{\text{after}}$  – logistics costs after modernization;

$\Delta R$  – additional revenue obtained due to improved logistics;

I – total investment in modernization.

This formula shows that efficiency increases when cost savings and additional revenues exceed the invested resources.

The data presented in the table clearly demonstrate the positive economic impact of modernizing the trade and logistics system in the agro-industrial complex. Logistics costs decreased by 29.2%, indicating more efficient use of transportation and storage resources. Delivery time was reduced by 40%, which improves product freshness and market responsiveness.

One of the most significant improvements is observed in the reduction of post-harvest losses, which decreased by more than half. This directly contributes to increased supply and better resource utilization. Additionally, export volumes increased by 50%, reflecting enhanced access to international markets and improved competitiveness of agricultural products.

**Table 1**

**Impact of Logistics Modernization on Key Economic Indicators**

<b>Indicator</b>	<b>Before Modernization</b>	<b>After Modernization</b>	<b>Change (%)</b>
Logistics costs (USD/ton)	120	85	-29.2%
Delivery time (days)	10	6	-40%
Post-harvest losses (%)	25	12	-52%
Export volume (thousand tons)	500	750	+50%
Profitability level (%)	15	28	+13 p.p.

Finally, the profitability level rose from 15% to 28%, confirming that modernization leads to substantial financial gains for producers and stakeholders. Overall, the analysis shows that investments in logistics modernization yield high economic returns and play a crucial role in the sustainable development of the agro-industrial complex.

**Conclusion.** The competitiveness of agro-industrial enterprises depends on the strategic integration of technological innovation, efficient resource management, and targeted investment. It is shaped by internal factors, such as production efficiency, human capital, and technological capabilities, as well as external factors, including market demand, infrastructure, regulatory frameworks, and investment access.

Implementing focused investment strategies supported by robust innovation infrastructure enhances productivity, diversifies products, and strengthens market positioning. Active state involvement and coordinated efforts among enterprises, financial institutions, and research organizations further promote sectoral resilience, sustainable growth, and long-term economic and social benefits.

In essence, agro-industrial competitiveness emerges from the alignment of technological, financial, and institutional mechanisms that collectively foster innovation, investment, and sustainable development.

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