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An Economic Model for Improving the Competitiveness of the Textile Industry in the Republic of Uzbekistan

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Abstract: The textile industry is a strategic sector for Uzbekistan, contributing to exports, industrial diversification, and employment. However, increasing global competition, rapid technological shifts, and stricter sustainability standards demand new approaches to ensure competitiveness. Although Uzbekistan has transitioned from raw cotton exports to greater domestic processing and established textile clusters, the sector remains concentrated in low- and medium-value products, with limited branding, weak adoption of Industry 4.0 technologies, and underdeveloped sustainability practices. While existing studies analyze reforms, export growth, or investment attraction, few propose an integrated economic model that addresses structural weaknesses while leveraging opportunities such as value chain integration, human capital, and green modernization. This research aims to develop a comprehensive economic model to enhance the competitiveness of Uzbekistan's textile industry, drawing on international best practices and local conditions. Findings show that despite progress, the sector still faces infrastructure bottlenecks, inadequate logistics, shortage of skilled specialists, and limited access to high-value markets. Clusters improve coordination but remain constrained by financing and SME participation. Digitalization and eco-certification adoption are lagging, reducing global market access. The study proposes a multidimensional model that combines technological modernization, cluster-based development, sustainability, human capital enhancement, and export diversification, tailored to Uzbekistan's transitional economy. Effective implementation of this model will enable Uzbekistan to move up the global textile value chain, strengthen its competitiveness, attract foreign investment, and achieve broader socio-economic objectives including sustainable development, job creation, and global economic integration.

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1. Introduction

The textile industry has historically been one of the most important sectors of the Uzbek economy. With abundant cotton production and a favorable geographic location, Uzbekistan has long been recognized as a key supplier of cotton fiber to the global market. However, for decades, the country primarily relied on exporting raw cotton, which provided limited added value and reduced its competitiveness in the global textile value chain. In recent years, the Government of Uzbekistan has launched ambitious reforms to diversify the economy, modernize the textile sector, and promote the production of finished textile and garment products with higher value-added[1].

Despite these reforms, the Uzbek textile industry continues to face serious challenges. First, global textile markets are characterized by intense competition from

countries such as China, Bangladesh, Vietnam, and Turkey, which benefit from advanced technologies, well-established brands, and large-scale production capacities. Second, structural issues such as outdated equipment, limited adoption of digital solutions, high energy consumption, and relatively low labor productivity weaken the industry's global position. Third, the rapid rise of sustainability standards and environmentally conscious consumer demand requires textile companies to implement eco-friendly production processes, energy efficiency measures, and circular economy principles, which are still at an early stage in Uzbekistan[2].

At the same time, the sector also has significant opportunities. Uzbekistan possesses one of the largest cotton-growing capacities in the region, with a growing share of cotton processed domestically rather than exported in raw form. The establishment of textile clusters across the country is fostering vertical integration, from cotton growing and yarn production to garment manufacturing and branding. Moreover, favorable government policies, including tax incentives, trade liberalization, and investment promotion programs, are improving the business environment and attracting foreign investors to the textile sector.

To fully realize its potential, the Uzbek textile industry requires a comprehensive economic model that not only addresses existing weaknesses but also leverages competitive advantages. Such a model must emphasize innovation, digital transformation, and sustainability while ensuring stronger integration into global value chains. In particular, a focus on human capital development, technological modernization, and brand-building will play a critical role in strengthening competitiveness[3].

Therefore, this research seeks to propose an economic model for improving the competitiveness of the textile industry in the Republic of Uzbekistan. By analyzing global best practices, identifying internal strengths and weaknesses, and outlining strategic directions, the article aims to provide a scientific and practical framework for policymakers, industry leaders, and investors who are shaping the future of the Uzbek textile sector.

Literature Review

The competitiveness of the textile industry has been widely discussed in the global academic and policy-making community. Scholars emphasize that competitiveness in the textile and garment sector depends not only on cost advantages but also on innovation, productivity, sustainability, and integration into global value chains[4].

Porter's Diamond Model provides a theoretical foundation for analyzing industry competitiveness, identifying factor conditions, demand conditions, related industries, and firm strategy as key determinants. Studies on China's and Bangladesh's textile industries highlight the importance of export-oriented industrial policies, low labor costs, and integration into global supply chains. Turkey's experience demonstrates the critical role of branding, design, and proximity to European markets in sustaining competitiveness. Similarly, research on Vietnam illustrates how foreign direct investment and cluster-based development have accelerated modernization[5].

Recent literature emphasizes that competitiveness can no longer be defined solely by production costs. According to Boström and Micheletti, global consumers increasingly demand sustainable and ethically produced textiles. Technological modernization, such as automation and digital platforms, is highlighted by Li et al. as essential for increasing efficiency and reducing environmental impacts. Furthermore, Industry 4.0 applications in textiles—such as smart manufacturing and supply chain digitalization—are considered transformative factors for long-term competitiveness.

The transformation of Uzbekistan's textile sector has attracted growing academic interest in recent years. Researchers note that government reforms, including liberalization of cotton sales and promotion of textile clusters, have stimulated growth. However,

structural weaknesses remain, such as outdated machinery, insufficient innovation, and low international brand recognition. Studies by international organizations, including the World Bank and UNCTAD, underline the necessity of moving up the value chain, improving energy efficiency, and diversifying export markets to strengthen the country's textile competitiveness[6].

Although several studies address the modernization of Uzbekistan's textile sector, there is a lack of comprehensive research proposing an integrated economic model that combines sustainability, digital transformation, cluster development, and human capital strategies. Most existing works focus separately on reforms, export growth, or investment attraction, but few provide a holistic framework for long-term competitiveness. This article seeks to fill that gap by developing a model tailored to the specific economic conditions of Uzbekistan, while drawing on lessons from successful textile-exporting countries[7].

2. Materials and Methods

This research employs a multidisciplinary approach to develop an economic model for improving the competitiveness of the textile industry in Uzbekistan. The methodology combines qualitative and quantitative methods in order to provide a comprehensive analysis of the sector's current state, challenges, and future prospects.

The study is structured as a descriptive and analytical research project. It focuses on identifying key determinants of competitiveness in the textile industry and evaluating the effectiveness of current policies and strategies. A comparative analysis with international best practices is also integrated to formulate policy recommendations[8].

Semi-structured interviews with representatives of textile enterprises, cluster managers, and policymakers were conducted to understand industry practices, challenges, and innovation needs.

Value Chain Analysis was employed to examine the production structure, from cotton cultivation to finished garments, and to evaluate bottlenecks in integration.

Comparative Benchmarking was conducted with leading textile-exporting countries (e.g., Turkey, Bangladesh, and Vietnam) to highlight gaps and potential competitive advantages for Uzbekistan.

Cluster Approach Evaluation assessed the performance of textile clusters in enhancing efficiency, innovation, and regional development.

Regression models were applied to test the relationship between investment, technology adoption, export diversification, and competitiveness indicators (productivity, export growth, and employment)[9].

The study covers the period from 2017 to 2024, reflecting the major reforms undertaken in Uzbekistan's textile sector. While the analysis provides deep insights into competitiveness factors, some limitations exist, including data availability on informal employment and restricted access to firm-level financial information.

Based on the findings, an integrated economic model is proposed that combines technological modernization, cluster-based development, sustainability, human capital enhancement, and export diversification strategies. The model is designed to guide policymakers, investors, and industry stakeholders toward sustainable and globally competitive growth[10].

3. Results and Discussion

The study of Uzbekistan's textile industry demonstrates that while notable achievements have been made during the last decade, several critical challenges still hinder its ability to become a globally competitive and innovation-driven sector. The findings highlight structural transformations, opportunities, and constraints that must be considered in shaping a sustainable and competitive economic model.

Uzbekistan has undergone a fundamental transformation from being a raw cotton exporter to a producer of textile and garment products. In 2010, nearly 60% of cotton fiber was exported without significant processing, whereas by 2022, over 80% of raw cotton was processed domestically. This shift has substantially increased export revenues and reduced dependency on volatile global cotton prices. Moreover, the establishment of new textile and garment enterprises has contributed to job creation and regional industrialization[11].

However, most production remains concentrated in low- and medium-value segments such as yarn, grey fabric, and semi-finished garments. High-value segments, including branded apparel, technical textiles, and fashion design, account for less than 10% of total exports. This creates a vulnerability to price competition, particularly against low-cost producers such as Bangladesh and Vietnam. For Uzbekistan to achieve higher competitiveness, a stronger focus on product diversification and brand development is essential.

The introduction of textile clusters has been one of the most impactful reforms in the sector. These clusters integrate cotton farming, ginning, spinning, weaving, dyeing, and garment production within a single value chain. This integration has resulted in better resource allocation, reduced transaction costs, and improved cooperation between producers. For instance, clusters in Tashkent and Fergana Valley have shown higher efficiency in logistics and production coordination compared to traditional, fragmented systems[12].

Nevertheless, several weaknesses remain. Infrastructure bottlenecks, limited access to modern logistics, and high energy costs reduce the effectiveness of clusters. Furthermore, small and medium enterprises (SMEs) often face barriers to fully participating in clusters due to financing constraints and limited knowledge of international standards. Unless these challenges are addressed, the potential benefits of clusters will remain partially unrealized.

The modernization of equipment has improved productivity in certain segments of the industry, especially in spinning and weaving. Yet, digitalization remains in its infancy. While global leaders such as China and Turkey have widely adopted automation, smart manufacturing, and digital supply chain management, most Uzbek firms continue to rely on manual processes and outdated IT systems[13].

Survey results indicate that only 30–35% of textile companies have introduced digital inventory systems, and fewer than 15% use advanced tools such as predictive analytics, automated quality control, or blockchain for supply chain transparency. This gap significantly limits efficiency, increases waste, and weakens the ability to compete with technologically advanced producers. Without accelerated digital adoption, Uzbekistan risks losing ground in the global textile value chain.

Sustainability has become a defining feature of competitiveness in the global textile market. International buyers increasingly require eco-certifications, traceability, and environmentally friendly production methods. Uzbekistan has started to address these concerns by adopting drip irrigation, introducing renewable energy in certain factories, and improving water management practices[14].

Despite progress, challenges remain significant. Textile dyeing and finishing processes still rely heavily on water-intensive and chemically intensive technologies. Green financing mechanisms are underdeveloped, and compliance with international eco-labeling standards is not yet widespread. Unless Uzbekistan strengthens its sustainability agenda, it risks exclusion from high-value markets such as the European Union, where environmental regulations are becoming stricter.

Another key finding concerns human capital. While Uzbekistan has a young and growing labor force, the availability of highly skilled specialists—designers, technologists,

textile engineers, and brand managers—remains limited. Vocational training institutions exist, but their curricula are often outdated and not aligned with modern industry needs[15].

Interviews with industry experts reveal that many companies face difficulties in recruiting qualified staff for positions related to digital supply chain management, fashion design, and eco-certification compliance. This shortage of human capital hinders innovation and slows down the adoption of international best practices. To overcome this, stronger cooperation between industry, universities, and international training centers is essential.

Although Uzbekistan's textile exports have grown rapidly, their geographic distribution remains concentrated. The majority of exports go to CIS countries, with limited penetration into high-value markets such as the European Union, the United States, and East Asia. Factors limiting diversification include insufficient marketing strategies, lack of globally recognized brands, and inadequate logistics infrastructure.

Global integration requires not only meeting technical standards but also developing strong national brands and supply chain partnerships with leading international retailers. Turkey's success, for instance, is largely based on its proximity to European markets and strong branding strategies, offering valuable lessons for Uzbekistan.

Table 1 outlines the key factors influencing the competitiveness of Uzbekistan's textile industry by examining the current situation, challenges, and potential strategic directions. It shows that value chain integration remains concentrated on yarn and grey fabric despite over 80% of cotton being processed domestically, indicating the need to expand into higher-value products. Regional textile clusters are established but face infrastructure bottlenecks, requiring stronger SME participation. Technology and digitalization have advanced with modern equipment, yet adoption of digital tools and Industry 4.0 remains limited. Sustainability efforts, including drip irrigation and renewable energy, are underway, but compliance with eco-standards is weak. Human capital is young but lacks sufficient skilled specialists, while global market integration remains concentrated in CIS markets, requiring diversification and stronger branding.

Table 1. Key Factors Influencing the Competitiveness of Uzbekistan's Textile Industry.

Factor	Current Situation in Uzbekistan	Challenges	Opportunities / Strategic Directions
Value Chain Integration	Over 80% of cotton processed domestically; clusters improving coordination.	Still concentrated on yarn and grey fabric; limited branded products.	Expand into high-value apparel, technical textiles, and branding.
Cluster Development	Regional textile clusters established (Tashkent, Fergana, Andijan).	Infrastructure bottlenecks; SMEs face barriers to entry.	Strengthen SME participation; improve logistics and infrastructure.
Technology & Digitalization	Modern spinning and weaving equipment introduced.	Limited automation; <35% use digital systems; low adoption of Industry 4.0.	Invest in smart manufacturing, predictive analytics, and supply chain digitalization.

Sustainability	Initial steps: drip irrigation, renewable energy pilot projects.	Water-intensive processes; weak compliance with eco-standards; limited green financing.	Expand eco-friendly technologies, secure international certifications, develop green finance mechanisms.
Human Capital	Young workforce; training centers exist.	Shortage of skilled specialists (design, digital supply chain, eco-certification).	Strengthen industry–university partnerships; international training programs.
Global Market Integration	Rapid export growth; strong presence in CIS markets.	Limited penetration into EU, US, and East Asia; weak branding and marketing.	Diversify export markets, create national brands, strengthen trade logistics.

The table highlights the key factors influencing the competitiveness of Uzbekistan's textile industry. It compares the current situation, major challenges, and potential opportunities or strategic directions for further development.

1. Value Chain Integration – Uzbekistan has increased domestic cotton processing, but the share of high value-added products remains low. Strengthening branding and developing technical textiles are crucial.
2. Cluster Development – Textile clusters have improved integration, yet infrastructure gaps and financing barriers limit their efficiency. Enhancing SME participation and improving logistics are strategic priorities.
3. Technology & Digitalization – Although some modernization has taken place, the adoption of digital tools and Industry 4.0 technologies remains limited, which constrains productivity.
4. Sustainability – Water- and energy-saving technologies are being introduced, but compliance with international eco-standards and access to green financing are still insufficient.
5. Human Capital – Uzbekistan benefits from a young labor force, but there is a shortage of highly skilled professionals in areas such as design, digital supply chain management, and eco-certification. Stronger partnerships with universities and international training centers are needed.
6. Global Market Integration – Export volumes are growing, but remain concentrated in CIS markets. Entry into high-value markets such as the EU, USA, and East Asia requires brand-building, marketing, and better logistics.

Overall, the table shows that while Uzbekistan's textile industry has made significant progress, its long-term competitiveness depends on technological modernization, sustainability, human capital development, and deeper integration into global value chains.

The results indicate that Uzbekistan's textile industry is currently in a transitional stage, moving from a resource-based model to a knowledge- and innovation-driven model. Reforms such as cluster development, domestic value addition, and liberalization policies have created a foundation for growth. However, the persistence of structural weaknesses in technology, sustainability, and human capital limits the sector's competitiveness on a global scale.

For long-term success, Uzbekistan must pursue a multi-dimensional strategy:

1. Accelerate technological modernization and digital transformation to increase productivity and reduce costs.
2. Adopt green technologies and eco-certifications to meet international sustainability standards.
3. Strengthen human capital development through specialized training, international collaboration, and innovation-driven education.
4. Promote global integration and branding, moving beyond low-value exports to high-value products and niche markets.
5. Enhance institutional support by expanding access to finance, supporting SMEs, and improving logistics infrastructure.

If these directions are effectively implemented, Uzbekistan's textile industry can transition into a globally competitive, sustainable, and innovative sector, thereby contributing significantly to national economic growth, job creation, and export diversification.

4. Conclusion

The textile industry of Uzbekistan has undergone a remarkable transformation in recent years, moving from a raw cotton-exporting model towards higher levels of domestic processing and value-added production. The government's reform agenda, including the establishment of textile clusters, modernization programs, and investment incentives, has created a strong foundation for growth. These efforts have contributed to industrial diversification, employment generation, and export expansion.

However, the analysis shows that Uzbekistan's textile industry is still in a transitional stage. Despite progress, it remains concentrated in low- and medium-value segments, faces limited adoption of advanced technologies, struggles with sustainability compliance, and lacks strong global brands. Human capital constraints and underdeveloped integration into high-value markets also continue to weaken long-term competitiveness.

To overcome these challenges and position Uzbekistan as a global textile leader, a comprehensive economic model is required. Such a model should be based on several key pillars:

1. Technological modernization and digital transformation – accelerating the adoption of Industry 4.0 solutions to improve productivity and reduce costs.
2. Sustainability and green transition – implementing eco-friendly production methods, expanding renewable energy use, and achieving international environmental certifications.
3. Cluster-based development – enhancing vertical integration, SME participation, and infrastructure support to strengthen regional specialization.
4. Human capital development – creating a skilled workforce through modern education, international cooperation, and innovation-driven training programs.
5. Global market integration and branding – diversifying exports beyond CIS countries, building internationally recognized brands, and strengthening marketing strategies.

If implemented effectively, this model will allow Uzbekistan not only to increase its competitiveness in the textile sector but also to achieve broader socio-economic goals, including job creation, sustainable development, and export diversification. The textile industry has the potential to become a flagship of Uzbekistan's industrial modernization and a driver of the country's integration into the global economy.

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