

MODERN APPROACHES TO INDUSTRIAL COOPERATION AND THEIR APPLICATION IN UZBEKISTAN'S ECONOMY

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Abstract

This article examines global best practices in industrial cooperation and their applicability to Uzbekistan's economy. It highlights SME clusters, innovation parks, and public-private partnerships as key drivers of competitiveness, technological adoption, and export growth. Recommendations focus on cluster development, digital integration, cooperative supply chains, and international collaboration to enhance Uzbekistan's SME sector.

Keywords: SME, industrial cooperation, clusters, innovation, technology transfer, export, public-private partnership, digitalization, incubators, supply chains, Uzbekistan, international integration.

Annotatsiya

Ushbu maqolada sanoat kooperatsiyasining jahon tajribalari va ularning O'zbekiston iqtisodiyotiga tatbiq etish imkoniyatlari tahlil qilinadi. Kichik va o'rta biznes klasterlari, innovatsion texnoparklar hamda davlat-xususiy sheriklik mexanizmlari raqobatbardoshlik, texnologik yangilanish va eksport salohiyatini oshiruvchi muhim omillar sifatida yoritiladi. Tavsiyalar klasterlarni rivojlantirish, raqamli integratsiya, kooperatsion ta'minot zanjirlari va xalqaro hamkorlik orqali O'zbekistonning KOB sektorini kuchaytirishga qaratilgan.

Kalit so'zlar: KOB, sanoat kooperatsiyasi, klasterlar, innovatsiya, texnologiya transferi, eksport, davlat-xususiy sheriklik, raqamlashtirish, inkubatorlar, ta'minot zanjirlari, O'zbekiston, xalqaro integratsiya.

Аннотация

В статье рассматриваются мировые практики промышленной кооперации и возможности их применения в экономике Узбекистана. Особое внимание уделяется кластеризации МСП, инновационным технопаркам и механизмам государственно-частного партнерства как ключевым факторам повышения конкурентоспособности, технологического обновления и экспорта. Рекомендации направлены на развитие кластеров, цифровую интеграцию, кооперационные цепочки поставок и международное сотрудничество для укрепления сектора МСП Узбекистана.

Ключевые слова: МСП, промышленная кооперация, кластеры, инновации, трансфер технологий, экспорт, государственно-частное партнерство, цифровизация, инкубаторы, цепочки поставок, Узбекистан, международная интеграция.

INTRODUCTION

Cooperation in the small and medium-sized enterprise (SME) sector is considered one of the key drivers of growth and sustainability in today's global economy. Through various forms of inter-firm collaboration, SMEs are able to enhance their competitiveness, accelerate the adoption of new technologies, and improve production efficiency. Manufacturing clusters represent geographically concentrated groups of interconnected small and medium enterprises. As of 2023, more than 2,000 industrial clusters operate worldwide, accounting for approximately 25–30% of global GDP.

Trends in innovative cooperation are particularly pronounced in developed countries, where start-ups and small firms jointly develop innovation projects in partnership with universities and large corporations. Both governmental and non-governmental organizations actively participate in supporting small businesses by providing grants, subsidies, and access to informational resources. Sector-based cooperation also creates opportunities for SMEs to pool resources and reduce operational costs.

LITERATURE REVIEW

The member states of the European Union possess some of the most advanced experience in small business cooperation. In Germany, the *Mittelstand* model serves as the foundation for the joint development of small and medium-sized enterprises. *Mittelstand* companies account for 52% of Germany's total exports and play a leading role in the introduction of technological innovations. Through the cluster model, these enterprises engage in mutual knowledge and resource exchange, thereby enhancing product quality and fostering innovation.

In Italy's industrial district model, small enterprises unite on a regional basis to form specialized production sectors. Today, Italy has more than 200 industrial districts, which contribute over 40% of the country's industrial product exports.

In France and the Netherlands, technoparks and business incubators have created an advanced innovation infrastructure for small enterprises. As of 2023, the Netherlands alone hosts more than 70 technoparks, which has increased the number of small and innovative firms by 20%.

The European Union also provides specialized financial support and training programs for small businesses through various initiatives. For example, under the COSME program, more than 2 million European SMEs received financial and advisory assistance between 2014 and 2024. European cooperative associations actively support small businesses in digital transformation and international trade.

Technological cooperation among small enterprises has become a key driver of innovation in Japan as well. Innovation hubs and technoparks offer platforms for knowledge exchange and technological development. As of 2023, Japan has more than 120 technoparks, enabling small enterprises to increase their production of innovative goods by 25%.

Various forms of government support have also been established, including special grants, tax incentives, and programs designed to subsidize innovative activities aimed at stimulating small business development. As a result of the cluster-based

approach, more than 45% of Japan’s total exports are generated by small and medium-sized enterprises.

In the United States, industrial parks and innovation zones play a major role in the development of small businesses. As of 2024, there are more than 400 industrial parks and over 200 technoparks operating across the country. These zones serve as core platforms that provide SMEs with technical infrastructure and access to financial resources.

Through the programs of the Small Business Administration (SBA), small enterprises receive credit, grants, and consulting services. In 2023 alone, the SBA issued approximately USD 68 billion in small business loans. In addition, the SBA implemented numerous training programs and initiatives aimed at preparing SMEs for export activities and helping them enter international markets.

There is also a strong interconnection between technological development and the SME sector. Small technology firms in the United States account for nearly 30% of the nation’s total innovation output.

In the area of supply chain cooperation, small enterprises increasingly serve as strategic suppliers for large corporations. For instance, companies such as Boeing and General Motors source around 40% of their supply chains from small and medium-sized businesses.

Regarding financial and informational support, more than 200,000 small business entities receive grants, preferential loans, and advisory services each year through the SBA and other federal programs (Table 1).

Table 1. Development Indicators of Small Industrial Enterprises Cooperation and Innovation Infrastructure at the International Level (2020–2024)¹

Year	Industrial Clusters Operating Worldwide	Share of SMEs in Exports in Europe (%)	Share of SMEs in Japan (%)	Small Business Loans via SBA in the USA (billion \$)	Number of Technoparks Worldwide
2020	1800	48	58	55	380
2021	1850	49	59	58	390
2022	1900	50	59	60	400
2023	1950	51	60	65	410
2024	2000	52	60	68	420

This table reflects the development indicators of small industrial enterprises’ cooperation and innovation infrastructure worldwide during 2020–2024. It presents the growth in the number of industrial clusters, the share of small enterprises in European exports, the role of small and medium-sized enterprises (SMEs) in Japan’s overall economy, the volume of loans provided to small businesses in the USA through the Small Business Administration (SBA), and the number of technoparks operating

¹ Author's work

globally. According to the data, the number of industrial clusters increased from 1,800 in 2020 to 2,000 in 2024, the share of European SMEs in exports rose from 48% to 52%, and SBA loans for small businesses increased from \$55 billion to \$68 billion. These indicators confirm the steady global development of SME cooperation and innovation infrastructure.

China has one of the largest and most successful experiences in small and medium-sized enterprise cooperation worldwide. By developing international industrial parks, China has actively integrated small enterprises into global production chains. As of 2024, more than 250 international industrial parks operate in China, contributing over 30% of the country's total export volume.

The formation of SME clusters is a key pillar of China's economic strategy. For example, industrial clusters in Guangdong and Jiangsu provinces host over 100,000 small industrial enterprises. These clusters have enhanced the competitiveness of small enterprises by 25% through technological integration, resource sharing, and the development of innovative projects.

State-business cooperation has also developed actively. The Chinese government has established special funds to finance small and medium-sized enterprises (SMEs), which, by the end of 2023, exceeded 300 billion yuan (approximately \$42 billion). In innovative sectors, particularly biotechnology, artificial intelligence (AI), and semiconductors, more than 1,200 joint projects have been implemented between SMEs and large enterprises.

Export-oriented small industrial sectors also occupy a significant place in China's economy. According to 2024 data, nearly 35% of China's exports are contributed by SMEs, representing a 5% increase compared to 2020.

Countries in the ASEAN region, particularly Singapore, Malaysia, Indonesia, and Vietnam, have achieved considerable success in promoting cooperation among SMEs. Regional cooperative programs, notably the ASEAN SME Plan of Action 2020–2025, focus on developing innovative infrastructure for small businesses and enhancing cross-border collaboration.

With the strengthening of trade and production links, common export networks for SMEs are being established. As of 2023, SMEs in the ASEAN region accounted for 25% of total exports. To facilitate trade, special "One Window" electronic platforms have been introduced, enabling small businesses to carry out export and import processes more quickly and cost-effectively.

Investment funds for SMEs are also expanding. For example, in Malaysia, the Small and Medium Enterprise (SME) Bank allocated 5 billion ringgit (approximately \$1.2 billion) for small businesses. Through the ASEAN Investment Facilitation program, over 600 SME projects were financed between 2020 and 2024.

Innovation and technology transfer have also developed significantly. Within the ASEAN Technology Transfer Initiative, SMEs have implemented more than 250 technology transfer projects in collaboration with universities and large corporations. These projects have contributed to an average 20% increase in the innovative capacity of small businesses (Figure 1).

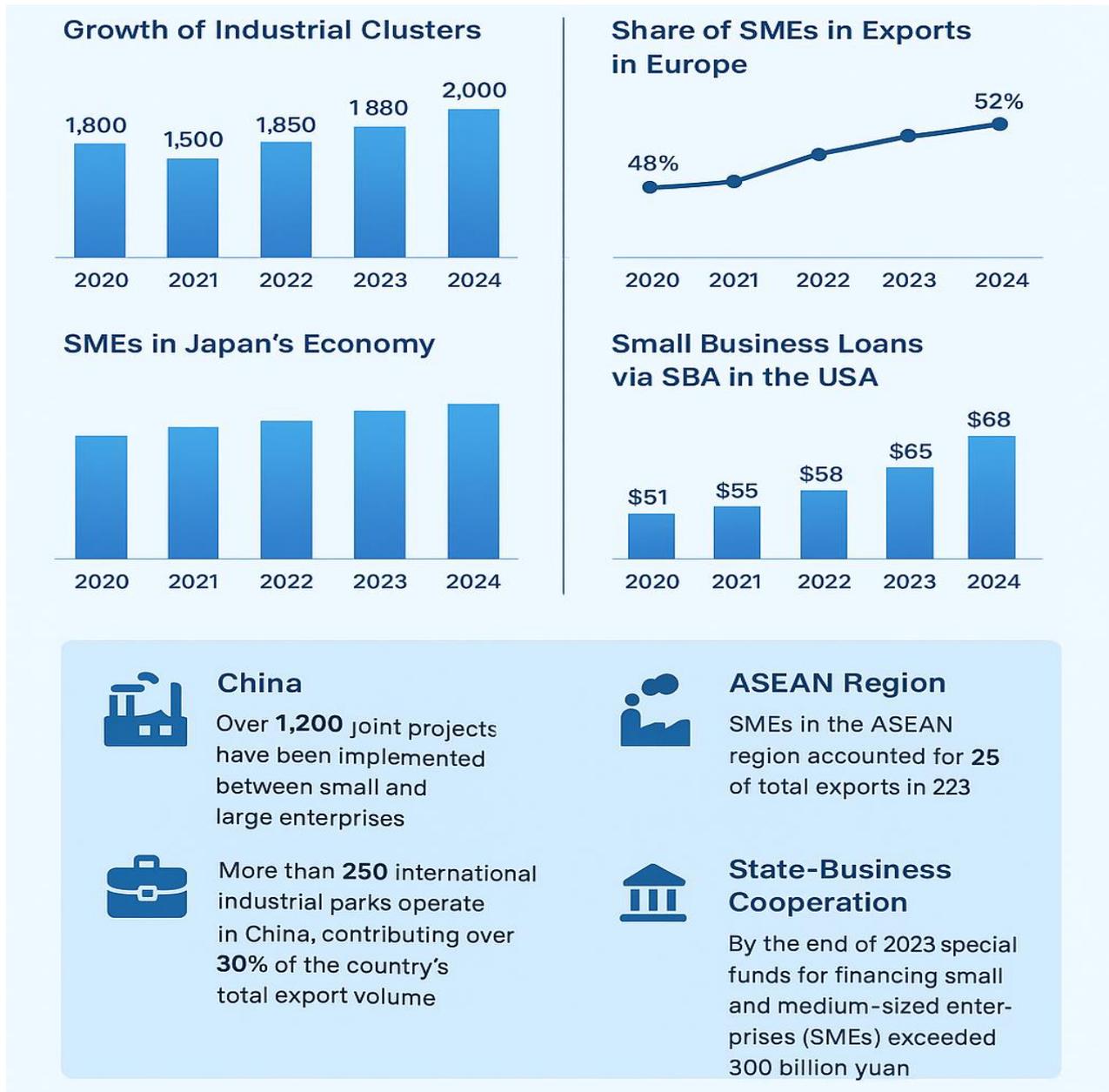


Figure 1. Global Trends in Small Industrial Enterprises Cooperation and Innovation Infrastructure (2020-2024)¹

The ASEAN Business Incubators program has been supporting small businesses in startups and innovative projects. As of 2023, over 300 incubators are operating in the ASEAN region, through which more than 12,000 small and startup companies have achieved development.

The Scandinavian countries, particularly Norway and Sweden, have advanced experience in developing small business clusters and innovation cooperation. In Norway and Sweden, innovation clusters have created technological and scientific platforms for small and medium-sized enterprises (SMEs). According to 2024 data,

¹ Author's work

Norway has over 60 technological clusters, which have increased the innovation activity of small businesses by 30%.

Sustainable production and ecological business models are a distinctive feature of the Scandinavian experience. For example, in Sweden, as of 2023, 45% of small businesses had ecological certifications and implemented “green” production practices.

Within the framework of technology and service cooperation, small businesses actively participate in IT, digital services, artificial intelligence, and smart city projects. In Sweden, the number of digital innovation projects implemented with the participation of small businesses reached 700 in 2024.

Integration of small businesses into the digital economy also holds significant importance. In Norway, in 2023, 65% of small businesses used digital platforms and online services in their operations (Figure 2).

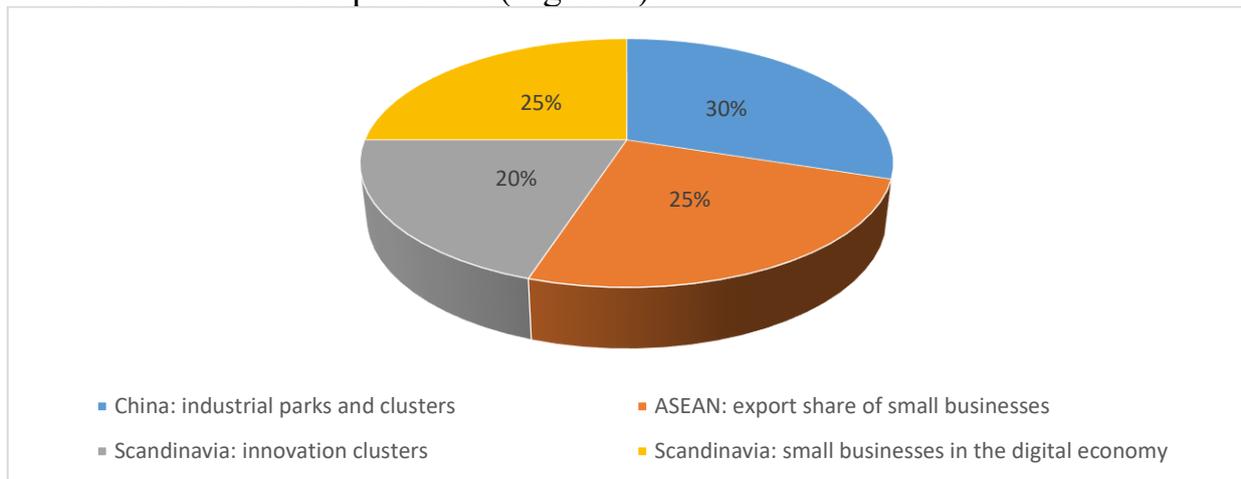


Figure 2. Share of small industrial enterprises' cooperation and development in international experience in 2024¹

This diagram reflects the share of cooperation and development activities among small industrial enterprises in leading regions worldwide as of 2024. The diagram shows that China’s industrial parks and cluster development account for 30% of global cooperation, while the export potential of small businesses in the ASEAN region stands out with a 25% share. Innovation clusters in Scandinavian countries occupy a 20% share, and the integration of small businesses into the digital economy in Scandinavia amounts to 25%. These indicators clearly demonstrate the role of small enterprises in the global economy and their growth in innovation and export sectors.

METHODOLOGY

This study employs a qualitative-comparative methodology grounded in cross-national policy analysis and evidence-based benchmarking. The research framework integrates descriptive synthesis and empirical generalization to evaluate industrial cooperation models across various economic systems. International case studies—particularly from Germany, Japan, ASEAN countries, and the United States—were selected based on their relevance to SME development, cluster dynamics, and

¹ Author's work

innovation ecosystems. Key indicators such as SME export shares, the number of technoparks, and inter-firm cooperation rates were analyzed using secondary data from official government publications, institutional reports (e.g., WTO, OECD, SBA), and academic literature.

To contextualize these findings, Uzbekistan's SME ecosystem was examined through national development strategies, presidential decrees, and statistical reports from the State Committee of Statistics. A diagnostic approach was used to assess gaps in industrial clustering, digital integration, and value chain cooperation within the local context. The comparative model enabled the formulation of region-specific recommendations by aligning Uzbekistan's economic structure with globally recognized cooperation mechanisms, ensuring methodological validity and policy relevance.

ANALYSIS AND RESULTS

Innovation technoparks provide technological and scientific bases for small businesses. In 2024, over 110 technoparks operate in Russia, more than half of which are aimed at supporting small and medium enterprises (SMEs). In Eastern European countries, particularly Poland and Hungary, the technopark network is expanding, positively influencing the innovative development of small businesses.

Government programs are an integral part of these processes. In Russia, under the "Industrial Cooperation and Import Substitution" national project, 300 billion rubles (approximately \$4 billion) were allocated from 2020 to 2024 to support small businesses. In Poland, the Agency for Innovation and Digitization provided grants and subsidies for small businesses totaling €1.5 billion in 2024.

Local and international cooperation is developing steadily. For example, in Russia, over 500 joint projects were implemented with German and Chinese companies within industrial cooperation frameworks. Eastern European countries are expanding cross-border cooperation among small businesses through European Union programs.

Links between large corporations and small producers have strategic importance. According to 2023 data, 45% of large industrial enterprises in Russia involved small and medium business entities in their supplier networks.

In international experience, government support systems for small businesses play a crucial role. Tax incentives and grants are among the most common forms of assistance. For instance, in Germany, small businesses enjoy 10–15% reductions in tax rates, and in 2023, over 200,000 small firms benefited from these incentives.

Credit and guarantee systems are vital for expanding financing opportunities for small businesses. In France, the Bpifrance agency provided €45 billion in concessional loans for SMEs between 2020 and 2024. The European Small Business Guarantee Fund has provided nearly €30 billion in financial guarantees for small enterprises.

Technical and informational assistance for small businesses is also widely developed. In the United States, the Small Business Administration (SBA) annually provides technical support and business plan development services for over 200,000 small business entities.

Public-private partnership projects are increasingly used as a mechanism to support small industrial development. In Japan, under the “Public-Private Innovation Partnership” program, by 2024, over 600 innovative projects of small businesses were financed.

Entrepreneurship incubators and accelerators serve as effective platforms for developing small business startups. In 2023, over 7,500 business incubators and accelerators operated worldwide. With their support, over 15,000 startup companies achieved successful development between 2020 and 2024.

International trade and cooperation platforms open new opportunities for small businesses. The World Trade Organization (WTO) has developed programs to support the integration of small enterprises into the global trading system. In 2023, under the Trade Facilitation Agreement, WTO introduced simplified export-import procedures for small and medium businesses in over 100 countries.

Through mechanisms strengthening foreign economic relations, small businesses bring their products to international markets. For example, in Germany, more than 3,000 small companies entered international markets in 2024 through the “Mittelstand Global Export Initiative”.

International fairs and exhibitions also serve as important platforms for small enterprises. In 2023, the “Global SME Expo” hosted over 5,000 small business representatives from 120 countries, who signed new cooperation agreements (Figure 3).

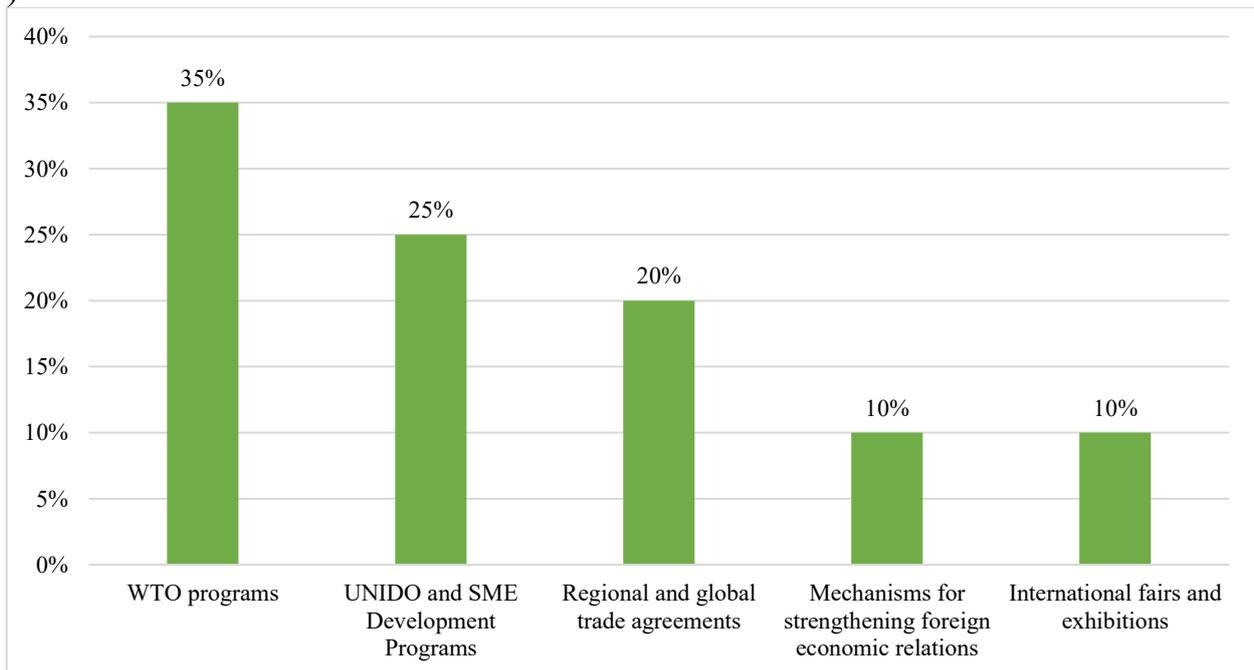


Figure 3. Share of international trade and cooperation platforms in 2024 activities¹

The diagram shows that WTO programs play the largest role in regulating and facilitating international trade, accounting for 35% of the total share. UNIDO and SME

¹ Author's work

Development Programs have a 25% share in supporting small businesses' access to global markets. Regional and global trade agreements open new opportunities for small businesses with a 20% share, while mechanisms for strengthening foreign economic relations and international fairs and exhibitions each account for 10%, contributing to enhanced export and cooperation potential. These data highlight the relevance of international relations and cooperation platforms for small businesses.

In Uzbekistan, a favorable environment is being formed to apply international experience in the development of small and medium enterprises (SMEs). In recent years, significant steps have been taken to develop small businesses and industrial clusters. As of the end of 2023, the number of SMEs in Uzbekistan exceeded 500,000, with their contribution to economic growth reaching 56%.

Expanding digital infrastructure is an important factor in applying international experience. As of 2024, internet coverage in Uzbekistan reached 93%, enabling the implementation of digital services and online platforms for small business activities. The expansion of electronic document circulation systems plays a key role in accelerating small business cooperation.

Development of new clusters and industrial zones is also yielding tangible results. By 2024, there are over 130 industrial zones in the country, hosting thousands of SMEs. Based on international experience, specialization and cooperation opportunities in these zones can be further expanded.

Creating cooperative supply chains is of great importance for small industrial enterprises. In 2023, the number of projects developing cooperative supply chains among small businesses in Uzbekistan reached 150.

Effective use of export and import opportunities is another crucial direction for applying international experience. By the end of 2024, SMEs' share in Uzbekistan's total exports reached 18%, which can be further increased through integration with international trade platforms.

Utilization of resources and infrastructure is also significant. By developing transport and logistics infrastructure, product delivery and export capabilities for SMEs improved by 20%.

Strengthening financing for cooperative projects is necessary. Special credit lines and grant programs for small businesses are planned. For example, in 2024, the Uzbek Digital Economy Development Fund aims to allocate \$50 million to support small business cooperation.

Harmonizing local and international experience has strategic importance. By adapting industrial cooperation experience from Germany, Japan, and ASEAN countries to Uzbekistan, the potential of small enterprises can be increased.

Developing technological cooperation and innovative projects is a key direction. In Andijan region, between 2023–2024, the number of innovation technoparks and business incubators tripled, expanding small businesses' technological capabilities.

Strengthening legal mechanisms for cooperation increases trust among small enterprises and consolidates long-term cooperative relations. In 2024, a new law supporting SME cooperation and cluster activities is being developed in Uzbekistan.

CONCLUSIONS AND SUGGESTIONS

Strategic recommendations for developing local small industrial enterprises include:

- Creating specialized clusters. Although over 130 industrial zones exist, only 30% operate as fully specialized clusters. Establishing clusters based on product characteristics and market demand will boost SME development.
- Developing regional business incubators enhances SMEs' innovation potential. By the end of 2023, there were 150 incubators, with plans to increase this number to at least 300 by 2025.
- Effective use of local raw materials reduces costs and increases product competitiveness. Proper utilization of agricultural and mining resources can ensure sustainable industrial growth.
- Promoting marketing and export activities allows SMEs to successfully enter domestic and international markets. The 18% export share in 2024 reflects a positive trend.
- Harmonizing competition and cooperation among SMEs is essential. Healthy competition and collaborative development strategies create new opportunities. By the end of 2023, the number of cooperation agreements among SMEs increased by 15%.
- Branding and common product marks help SMEs produce goods according to uniform quality standards and strengthen their international presence. The number of products exported under the “Made in Uzbekistan” brand increased by 35% from 2020 to 2024.
- Shared use of resources — logistics centers, laboratories, and marketing services — reduces costs for SMEs by 10–15%.
- Balancing large and small enterprises expands delivery and service opportunities for SMEs. Currently, 42% of large industrial enterprises in Uzbekistan involve SMEs as suppliers.
- Adapting to international standards and certifications enhances product quality and competitiveness. In 2023, the number of international quality certificates obtained by SMEs increased by 25%.

Challenges and risks for local SMEs include:

- Economic and political risks — currency fluctuations, inflation, and changes in international trade conditions affected 12% of SMEs between 2022–2023.
- Digital and technological gaps hinder integration into the global digital economy. In 2024, only 40% of SMEs actively applied digital technologies.
- Financing difficulties limit the adoption of new technologies and production lines due to insufficient bank credits and investments.
- Shortage of skilled personnel and technical knowledge slows industrial development. In 2023, 38% of SME managers reported difficulties in finding qualified technical and engineering staff.
- Weak legal and regulatory framework also impedes effective SME development. Despite over 15 new laws for small businesses being enacted in recent years, challenges remain in their practical implementation.

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