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GLOBALLASHUV SHAROITIDA SUN'IY INTELLEKTNING MAXSUS IQTISODIY ZONALAR RIVOJLANISHIGA TA'SIRI (XITOIY XALQ RESPUBLIKASI TAJRIBASI)

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Annotatsiya. Ushbu maqolada globallashuv sharoitida sun'iy intellekt maxsus iqtisodiy zonalar rivojlanishini qanday o'zgartirayotgani tahlil qilinadi. Asosiy e'tibor Xitoydagi Shenzhen maxsus iqtisodiy zonasi va Qianhai hamkorlik zonasiga qaratiladi. Ma'lumotlar, hisoblash infratuzilmasi, malakali kadrlar va sun'iy intellektning joriy etish investitsiyalarni jalb qilish hamda eksportni kengaytirishga yo'naltirilgan an'anaviy zona modelini qanday o'zgartirayotgani o'rganiladi. Maqolada sun'iy intellektning zona iqtisodiyotiga ta'sir ko'rsatish kanallari, jumladan, biznes samaradorligini oshirish, yangi tarmoqlarni rivojlantirish, transchegaraviy xizmatlarni kengaytirish va boshqaruvni takomillashtirish yoritiladi. Shuningdek, bandlik, ma'lumotlarni himoya qilish, texnologiyalardan foydalanish imkoniyatlaridagi tengsizlik va energiya iste'moli bilan bog'liq xatarlar ko'rib chiqiladi. Bundan tashqari, ushbu xulosalarning O'zbekiston uchun ahamiyati muhokama qilinib, mamlakatning maxsus iqtisodiy zonalariga sun'iy intellektning joriy etish bo'yicha siyosiy tavsiyalar bayon etiladi. Maqolada sun'iy intellektidan foydalanadigan zonalarining muvaffaqiyati texnologiyalarga investitsiyalarni mas'uliyatli boshqaruv, kadrlar salohiyatini rivojlantirish va innovatsiyalarni mahalliy korxonalar orasida keng yoyish bilan uyg'unlashtirishga bog'liq, degan xulosaga kelindi.

Kalit so'zlar: maxsus iqtisodiy zonalar, sun'iy intellekt, globallashuv, Xitoy, Shenzhen, Qianhai, raqamli iqtisodiyot, innovatsion siyosat.

ВЛИЯНИЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА НА РАЗВИТИЕ СПЕЦИАЛЬНЫХ ЭКОНОМИЧЕСКИХ ЗОН В УСЛОВИЯХ ГЛОБАЛИЗАЦИИ (ОПЫТ КИТАЙСКОЙ НАРОДНОЙ РЕСПУБЛИКИ)

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Аннотация. В статье рассматривается, как искусственный интеллект меняет развитие специальных экономических зон в условиях глобализации. Основное внимание уделяется Шэньчжэньской специальной экономической зоне и зоне сотрудничества Цяньхай в Китае. Анализируется, как данные, вычислительная инфраструктура, квалифицированные кадры и внедрение ИИ меняют традиционную модель зон, ориентированную на привлечение инвестиций и расширение экспорта. В статье выделены основные каналы влияния ИИ на экономику зон: повышение эффективности бизнеса, развитие новых отраслей, трансграничные услуги и совершенствование государственного управления. Также

рассматриваются риски, связанные с занятостью, защитой данных, неравным доступом к технологиям и энергопотреблением. Кроме того, обсуждается значение этих выводов для Узбекистана и обозначаются меры политики по интеграции ИИ в специальные экономические зоны страны. В заключении отмечается, что успех зон, использующих ИИ, зависит от сочетания инвестиций в технологии с ответственным управлением, развитием кадрового потенциала и распространением инноваций среди местных предприятий.

Ключевые слова: специальные экономические зоны, искусственный интеллект, глобализация, Китай, Шэньчжэнь, Цяньхай, цифровая экономика, инновационная политика.

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE DEVELOPMENT OF SPECIAL ECONOMIC ZONES UNDER GLOBALIZATION (EVIDENCE FROM THE PEOPLE'S REPUBLIC OF CHINA)

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Abstract. This article examines how artificial intelligence is reshaping the development of special economic zones under globalization. Drawing primarily on the Shenzhen Special Economic Zone and the Qianhai Cooperation Zone in China, it analyzes how data, computing infrastructure, skilled workers, and AI adoption are changing the traditional zone model focused on attracting investment and expanding exports. The article identifies key channels through which AI can affect zone economies, including higher business efficiency, new industries, cross-border services, and improved governance. It also considers risks related to employment, data protection, unequal access to technology, and energy consumption. In addition, the article discusses the relevance of these findings for Uzbekistan and outlines policy implications for integrating AI into its special economic zones. It concludes that the success of AI-enabled zones depends on combining technology investment with responsible governance, workforce development, and the diffusion of innovation among local firms.

Keywords: special economic zones, artificial intelligence, globalization, China, Shenzhen, Qianhai, digital economy, innovation policy.

Introduction

Special economic zones (SEZs) have traditionally been used to attract foreign investment, promote exports, create jobs, and introduce new technologies. In China, the development of these zones became one of the instruments of reform and opening up. Initially, they were established to attract capital, technology, and production capabilities; later, they became a foundation for industry clusters and for testing new approaches to economic regulation.⁴⁹

The role of such zones is changing under globalization. Competition is no longer limited to investment and industrial sites; it increasingly concerns access to data, computing resources, skilled workers, and international

⁴⁹ Zeng D. Z. How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development? World Bank Policy Research Working Paper No. 5583. Washington, DC: World Bank, 2011. <https://documents1.worldbank.org/curated/en/310891468018256346/pdf/WPS5583.pdf>

innovation networks. Artificial intelligence can affect productivity, supply chain organization, product development, customer service, and managerial decision-making. SEZs are therefore increasingly viewed as platforms that connect research, manufacturing, finance, trade, and digital services.

The experience of China's pilot zones shows that their functions can extend beyond trade facilitation: they are also used to test institutional arrangements, upgrade industry, and develop services.⁵⁰ This article aims to determine how the adoption of artificial intelligence is changing the economic functions of SEZs and what conditions are needed for technological modernization to contribute to sustainable development.

The main case examined is the Shenzhen Special Economic Zone. The article also considers the Qianhai Cooperation Zone, located in Shenzhen and oriented toward cooperation with Hong Kong in modern services. The two areas are geographically and economically connected, but they have different administrative and legal statuses.

Research methodology

The study is based on a qualitative analysis of documents from the World Bank and UNCTAD, Shenzhen regulations, support measures for the Qianhai Cooperation Zone, and AI development plans for China and Shenzhen. The materials include the Shenzhen Special Economic Zone Regulations on Promoting the Artificial Intelligence Industry, adopted in 2022; Qianhai support measures issued in 2024; and Shenzhen's AI development plan for 2026–2028.⁵¹

The study uses content analysis and comparative institutional analysis. The documents were grouped into four areas: infrastructure and data development; support for research and business; the adoption of AI across industries; and risk regulation. This analysis identifies policy priorities and potential economic mechanisms, but it does not measure actual changes in productivity or employment. Accordingly, targets stated in policy documents are treated as planned benchmarks, not as results already achieved.

Results and discussion

From Investment Destination to Innovation Ecosystem

Early SEZ models relied mainly on location, infrastructure, tax regimes, and access to external markets. The World Bank, however, noted the need for

⁵⁰ UNCTAD. The Role of China's Pilot Free Trade Zones in Promoting Institutional Innovation, Industrial Transformation and South-South Cooperation. UNCTAD/GDS/2023/5. Geneva: United Nations, 2023. <https://unctad.org/publication/role-chinas-pilot-free-trade-zones-promoting-institutional-innovation-industrial>

⁵¹ Shenzhen Municipal Justice Bureau. Regulations of Shenzhen Special Economic Zone on Promoting the Artificial Intelligence Industry. Adopted 30 August 2022; effective 1 November 2022. https://sf.sz.gov.cn/fggzywyb/content/post_11216296.html

Qianhai Authority. Several Measures on Supporting High-Quality Development and High-Level Application of Artificial Intelligence in Qianhai Shenzhen-Hong Kong Modern Service Industry Cooperation Zone. Document No. 1/2024, 2 January 2024. https://www.sz.gov.cn/cn/xxgk/zfxgj/zcfg/content/post_11084373.html

China's zones to move toward a more technology-intensive and innovative model as costs rise and global competition changes.⁵²

AI reinforces this trend. To use it in practice, firms need more than incentives and industrial premises. They also need computing capacity, data, channels for knowledge exchange, skilled workers, testing facilities, and clear rules for using the technology. A zone's competitiveness therefore increasingly depends on its ability to bring these resources together in a functioning ecosystem.

In this respect, an SEZ can perform three related functions: attract technology companies and capital; help introduce AI into existing industries; and provide conditions for testing new products and management solutions. The economic effect comes not only from companies that develop AI directly, but also from the use of algorithms in manufacturing, logistics, trade, finance, and professional services.

Recent data illustrate the scale and diffusion of these processes. In 2025, China's core AI industry was valued at more than RMB 1.2 trillion, and the number of AI companies exceeded 6,200. By the end of that year, more than 30% of manufacturing enterprises with annual main business turnover of at least RMB 20 million had adopted AI technologies.⁵³ Shenzhen's 2026–2028 action plan, meanwhile, sets targets of more than RMB 300 billion for the city's core AI industry and over 3,000 AI companies by 2028.⁵⁴ These are municipal targets, not achieved results or figures specific to Shenzhen's SEZs.

Firm-level research using data on Chinese listed companies from 2009 to 2021 also reports that AI investment contributes to output and productivity growth and can generate positive spillovers to nearby firms. The study notes, however, that these gains vary across firms. This supports the economic rationale for zones to connect AI developers with established manufacturers and service providers, while also highlighting the importance of ensuring that smaller firms can access the technology.

Infrastructure and Regulation as Conditions for AI Adoption

The Shenzhen SEZ regulations provide for support for computing infrastructure, shared development platforms, data exchange, testing, and certification of AI products. They also allow limited testing of low-risk

⁵² Zeng D. Z. How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development? World Bank Policy Research Working Paper No. 5583. Washington, DC: World Bank, 2011. <https://documents1.worldbank.org/curated/en/310891468018256346/pdf/WPS5583.pdf>

⁵³ Xinhua. “China's core AI industry scale tops 1.2 trln yuan in 2025: official.” 5 March 2026. https://english.www.gov.cn/archive/statistics/202603/05/content_WS69a96a11c6d00ca5f9a09932.html.

⁵⁴ Shenzhen Municipal Bureau of Industry and Information Technology, Shenzhen Municipal Development and Reform Commission, Shenzhen Science and Technology Innovation Bureau. Action Plan for Promoting the Development and Application of Artificial Intelligence in Shenzhen (2026–2028). Adopted 28 August 2026. https://www.sz.gov.cn/cn/xxgk/zfxgj/tzgg/content/mpost_12966979.html

solutions for which local or national standards have not yet been established, provided that the solutions meet recognized advanced requirements.⁵⁵

These measures matter to the zone economy for two reasons. First, shared infrastructure can lower entry costs for companies, especially startups and small businesses. Second, testing facilities make it possible to assess technologies more quickly in specific industrial and service settings. This can create a link between research, testing, and commercial deployment.

However, the mere presence of computing centers or digital platforms is not enough. If only large companies use them, the spread of innovation to local businesses will remain limited. An important measure of a zone's development is therefore whether small and medium-sized enterprises can access computing resources, advisory services, industry-specific AI models, and employee training.

In the support measures for Qianhai published in 2024, AI is linked to several areas of the zone's development. The document provides for attracting AI companies, supporting computing infrastructure, and integrating AI with manufacturing, finance, logistics, and commercial services. It also envisages industry-specific models and demonstration projects, including projects at transport and business infrastructure sites.⁵⁶

This approach reflects a broader trend: modern zones are developing not only export manufacturing but also services that connect markets, companies, and professionals across countries and regions. This is particularly relevant to Qianhai in the context of cooperation between Shenzhen and Hong Kong.

At the same time, cross-border cooperation requires coordinated procedures for data exchange, protection of commercial information, and compliance with the regulatory requirements of different jurisdictions. Global integration thus creates additional opportunities for zones while raising the bar for legal compatibility and data governance.

Productivity, Industrial Upgrading, and Global Value Chains

In manufacturing, AI can be used to predict equipment failures, inspect product quality, optimize production processes, manage inventories, and coordinate supplies. In services, it can support risk analysis, customer service, translation, demand forecasting, and personalization. These mechanisms can reduce costs, speed up operations, and improve the accuracy of decisions.

Shenzhen's 2026–2028 plan identifies advanced manufacturing, financial services, software, trade, and logistics as areas for AI adoption. It also sets targets for 2028 of more than 3,000 AI companies and an AI core industry worth over RMB 300 billion. These are program targets, not current

⁵⁵ Shenzhen Municipal Justice Bureau. Regulations of Shenzhen Special Economic Zone on Promoting the Artificial Intelligence Industry. Adopted 30 August 2022; effective 1 November 2022. https://sf.sz.gov.cn/fggzywyb/content/post_11216296.html

⁵⁶ Qianhai Authority. Several Measures on Supporting High-Quality Development and High-Level Application of Artificial Intelligence in Qianhai Shenzhen-Hong Kong Modern Service Industry Cooperation Zone. Document No. 1/2024, 2 January 2024. https://www.sz.gov.cn/cn/xxgk/zfxxgj/zcfg/content/post_11084373.html

indicators of the zone’s development.⁵⁷ The plan’s priority sectors and 2028 targets are summarized in Figure 2.

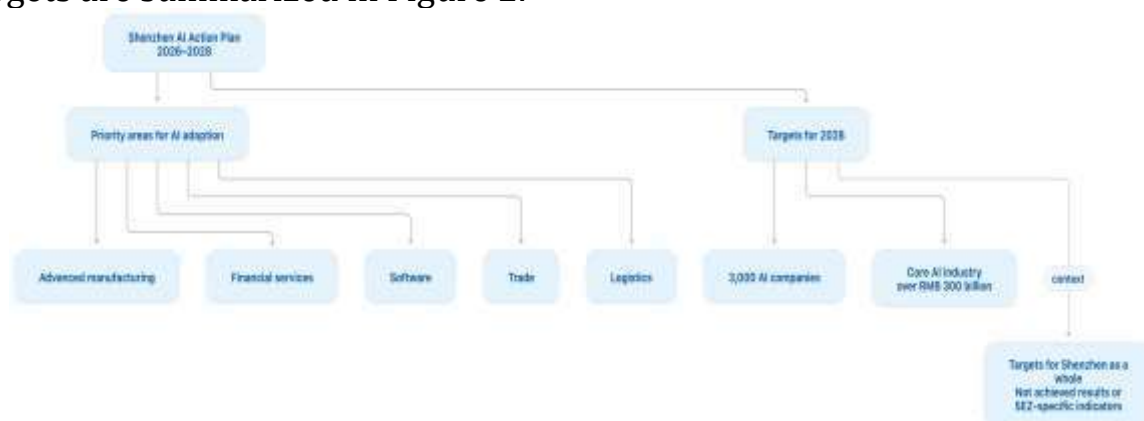


Figure 1. Priority sectors and 2028 targets in Shenzhen’s AI Action Plan⁵⁸

For global value chains, it is not only the output of goods that matters, but also companies’ ability to participate in design, software development, data analysis, after-sales services, and supply chain management. AI adoption can support a move toward these higher-value functions. The outcome, however, depends on whether local firms can master the technologies and establish themselves in new segments of these chains, rather than simply purchasing ready-made solutions.

Limitations and Risks

AI adoption does not guarantee an automatic increase in productivity. Its effects may be constrained by skills shortages, incompatible data and equipment, high computing costs, or unsuitable business processes. Another risk is a widening gap between large corporations with access to capital and data and small firms that face greater difficulties in adopting new technologies.

Automation can change the demand for labor: some tasks may decline, while others require new skills. The Shenzhen SEZ regulations provide for differentiated oversight of AI applications and assessment of their effects on employment and social equity.⁵⁹ China’s national “AI Plus” policy also includes workforce training and assessment of the technology’s impact on employment.⁶⁰

⁵⁷ Shenzhen Municipal Bureau of Industry and Information Technology, Shenzhen Municipal Development and Reform Commission, Shenzhen Science and Technology Innovation Bureau. Action Plan for Promoting the Development and Application of Artificial Intelligence in Shenzhen (2026–2028). Adopted 28 August 2026. https://www.sz.gov.cn/cn/xxgk/zfxxgj/tzgg/content/mpost_12966979.html

⁵⁸ Compiled by the author based on the [Shenzhen AI Action Plan 2026–2028](https://www.sz.gov.cn/cn/xxgk/zfxxgj/tzgg/content/mpost_12966979.html) (https://www.sz.gov.cn/cn/xxgk/zfxxgj/tzgg/content/mpost_12966979.html).

⁵⁹ Shenzhen Municipal Justice Bureau. Regulations of Shenzhen Special Economic Zone on Promoting the Artificial Intelligence Industry. Adopted 30 August 2022; effective 1 November 2022. https://sf.sz.gov.cn/fggzywyb/content/post_11216296.html

⁶⁰ State Council of the People’s Republic of China. Opinions on Further Implementing the “Artificial Intelligence Plus” Initiative. No. 11/2025, 21 August 2025. https://www.nda.gov.cn/sjj/swdt/xwfb/0826/20250826173046592282838_mobile.html

Other important issues include the protection of personal and commercial data, transparency of algorithmic decisions, information security, and the energy use of computing infrastructure. For zones oriented toward international cooperation, these issues also have economic consequences: companies’ willingness to place projects, staff, and business functions in a zone depends in part on their confidence in its data governance rules.

In light of this analysis, SEZ performance should be assessed not only by investment volumes and the number of registered companies. Additional indicators could include productivity growth, the share of local firms adopting AI, commercialization of research, workforce upskilling, the quality of jobs created, small firms’ access to infrastructure, and the environmental efficiency of computing centers. Such an approach can show whether technology initiatives are translating into broad economic change.

One indicator of this pressure is the IEA’s estimate that global data-centre electricity consumption will rise from 485 TWh in 2025 to 950 TWh by 2030 (Figure 2). This projection covers AI and non-AI workloads and provides global context rather than a forecast specific to China or Shenzhen.

Projected growth in global data-centre electricity consumption, 2025–2030 (TWh). Note: The 2025 figure is reported data; 2030 is an IEA projection. The dashed line connects the two reported endpoints and does not represent annual observations.⁶¹

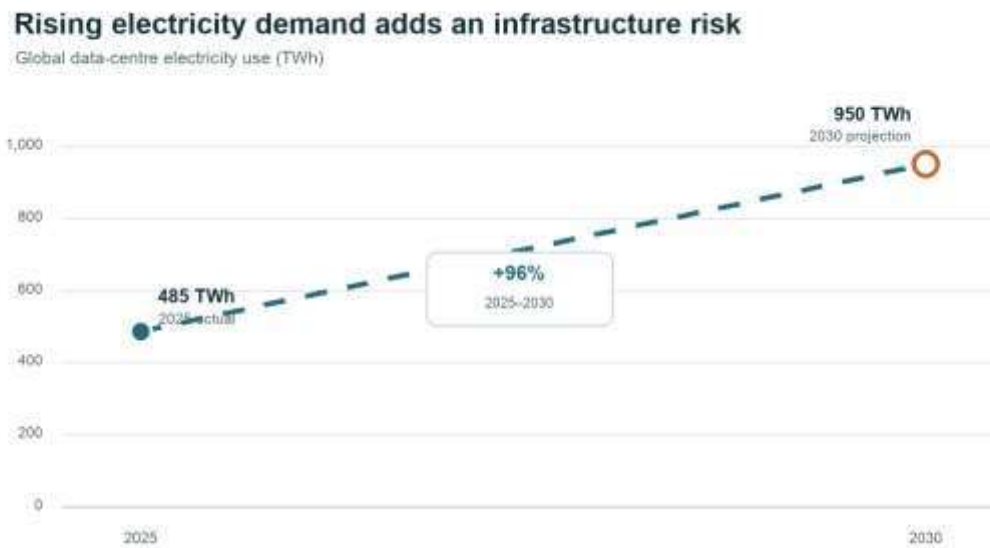


Figure 2. Uzbekistan: Prospects for Integrating AI into Special Economic Zones

Uzbekistan’s experience provides a relevant context for considering how artificial intelligence could contribute to the development of special economic zones. At a meeting on AI implementation in October 2025, President Shavkat

⁶¹ IEA. *Key Questions on Energy and AI*. Paris: International Energy Agency, 2026.
<https://www.iea.org/reports/key-questions-on-energy-and-ai/executive-summary>.

Mirziyoyev linked the adoption of new technologies to the country’s ability to compete globally. He stated that “whoever is the first to show persistence and determination and achieve concrete results will be ahead of the rest”.⁶² The official report also identifies computing infrastructure, access to open data, and workforce training as priorities for developing Uzbekistan’s AI capacity.

Table 1

Uzbekistan’s AI priorities and their potential relevance to special economic zones⁶³

National AI priority	Measure reported in 2025	Potential relevance to SEZs	Possible indicator for assessment
Computing infrastructure	The report stated that \$50 million had been allocated for 16 supercomputers in 2025, with a larger allocation planned for 2026.	Shared computing resources could help zone-based firms test and deploy AI without each company building its own infrastructure.	Number of tenant firms using shared computing resources; access cost for AI testing.
Open data	The report called for consolidating 55 databases into a single data center and integrating government information systems.	Governed access to compatible data could support AI applications in manufacturing, logistics, customs, and business services.	Number of datasets available for authorized use; number of data-based pilot projects.
Workforce training	The report identified specialist training as a priority and discussed expanding the “One Million AI Leaders” program.	Training could help existing firms adopt AI and prepare workers for changing job requirements.	Number of workers trained; share of SEZ firms adopting AI; employee upskilling rate.

For special economic zones, these priorities point to the importance of connecting investment incentives with practical conditions for technology adoption. Zones could provide shared computing resources, testing facilities, workforce training, and clear data-governance procedures. They could also help local firms—particularly small and medium-sized enterprises—apply AI in manufacturing, logistics, and business services.

This is a potential policy direction rather than evidence that these measures have already been implemented across Uzbekistan’s special economic zones. Their contribution could be assessed by tracking AI adoption among resident firms, productivity, participation of small businesses, exports of technology-intensive goods and services, workforce skills, and the energy efficiency of digital infrastructure. Such indicators would help determine

⁶² President of the Republic of Uzbekistan. “The implementation of artificial intelligence technologies to be elevated to a new level.” 21 October 2025. <https://www.president.uz/en/lists/view/8582>.

⁶³ Compiled by the author based on the [official report on the President of Uzbekistan’s website https://www.president.uz/en/lists/view/8582](https://www.president.uz/en/lists/view/8582)

whether AI initiatives are supporting broader economic change and stronger integration into global value chains.

Conclusion

Artificial intelligence is reshaping the role of special economic zones under globalization. Alongside infrastructure, business incentives, and access to export markets, zones increasingly depend on computing capacity, data, innovation networks, and the ability to deploy new technologies.

The Shenzhen and Qianhai documents show that policy support for AI includes research, computing infrastructure, industrial applications, skills development, and pilot projects. These measures create conditions for upgrading manufacturing and services, but they do not by themselves demonstrate that productivity has already increased.

Uzbekistan's national AI priorities computing infrastructure, access to open data, and workforce training - offer a useful basis for considering how AI could be incorporated into the development of its special economic zones. Their impact will depend on whether these capabilities become accessible to zone-based firms, including small and medium-sized enterprises. The available policy statements establish priorities; they are not evidence of achieved results in Uzbekistan's zones.

Sustainable outcomes will depend on spreading AI beyond the largest companies, developing workers' skills, enabling responsible data exchange, and assessing the economic and social effects of automation. A promising SEZ model is therefore an open innovation environment that connects business, science, public institutions, and international markets.

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