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Study on the Impact of Artificial Intelligence on Yunnan's Economy and Its Radiation Effectiveness in South Asia and Southeast Asia

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Abstract: In the global digital wave, artificial intelligence has emerged as a key driver of economic development. As an open frontier facing South and Southeast Asia, enhancing Yunnan's economic radiation capacity is crucial. Studying AI's impact on Yunnan's economic radiation efficacy can provide new pathways and strategies for regional development. This paper focuses on the enabling value of AI technology. Against the backdrop of Yunnan's development as a hub radiating influence toward South and Southeast Asia, it explores the mechanisms and practical effectiveness of AI in promoting economic and trade cooperation, industrial upgrading, and infrastructure connectivity between Yunnan and South/Southeast Asia. It analyzes existing shortcomings and constraints in current AI applications, proposes countermeasures to optimize radiating effectiveness, and provides theoretical and practical support for Yunnan to enhance its regional influence and deepen cooperation with South and Southeast Asia through AI technology.

Keywords: artificial intelligence, Yunnan, south and southeast Asia, radiation effectiveness, regional economy, cooperative development

Introduction

The new technological revolution and industrial transformation driven by artificial intelligence as a core technology are profoundly reshaping regional economic development and the landscape of international cooperation. As China's hub for economic outreach to South and Southeast Asia, Yunnan plays a pivotal role in regional economic cooperation due to its geographical advantages. Therefore, it is imperative to systematically examine the efficacy of artificial intelligence in Yunnan's economic outreach to South and Southeast Asia, explore enabling pathways and optimization strategies, and contribute to enhancing the quality and efficiency of Yunnan's hub development.

1. The Correlation Between Yunnan's Economic Radiation Effectiveness and South and Southeast Asia

Located in China's southwestern frontier, Yunnan borders or is adjacent to numerous countries in South and Southeast Asia. This unique geographical position grants Yunnan a strategic role in opening up to South and Southeast Asia. Yunnan's economic development maintains a close and mutually reinforcing relationship with its outreach effectiveness to South and Southeast Asia. In trade, Yunnan serves as China's frontline region for commercial exchanges with South and Southeast Asia. The level of Yunnan's economic development directly impacts trade volume and its outreach effectiveness (Zheng & Liu, 2024). A prosperous Yunnan economy can drive the export of a wider variety and greater quantity of goods and services to meet market demands in South and Southeast Asia. It can also attract more products from the region into

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Yunnan, fostering positive trade interactions. For instance, Yunnan's specialty agricultural and mineral products possess competitive advantages in South and Southeast Asian markets. Economic development further drives continuous optimization and upgrading within these industries, enhancing product quality and value-added potential. This, in turn, expands market share and strengthens regional influence. From an investment perspective, Yunnan's economic development level determines its capacity for outward investment and its attractiveness to foreign capital. Its robust economic strength equips Yunnan enterprises with greater resources and capabilities to expand into South and Southeast Asia for investment activities, participation in local infrastructure development, and industrial advancement. This not only stimulates local economic growth but also amplifies Yunnan's regional influence and radiating effect. Simultaneously, a favorable economic environment attracts enterprises from South and Southeast Asian countries to invest in Yunnan, fostering a two-way investment pattern that strengthens regional economic ties and amplifies radiating effects. Within industrial cooperation, Yunnan's industrial structure and development level influence the degree of synergy with South and Southeast Asian industries. Yunnan's competitive industries—such as tourism, specialty agriculture, and biomedicine—complement those of South and Southeast Asian nations. Strengthening industrial cooperation enables Yunnan to leverage its advantages in technology, capital, and management expertise, while integrating local resources and labor strengths. This synergy achieves coordinated industrial development and elevates regional influence.

2. Analysis of AI's Effectiveness in Expanding Yunnan's Economic Influence Across South and Southeast Asia

2.1 Empowering economic and trade cooperation for enhanced quality and efficiency

Artificial intelligence significantly impacts Yunnan's economic and trade cooperation with South and Southeast Asia, substantially enhancing the quality and efficiency of collaboration. In the trade sector, AI technologies can be applied to market analysis and forecasting. By thoroughly researching and analyzing vast amounts of market data—such as consumption patterns, shifts in market demand, and adjustments to trade policies across South and Southeast Asian countries—enterprises can more accurately grasp the latest market trends. This enables proactive planning for product R&D and production, optimizing product structures to meet diverse market demands (Xu & Sun, 2024). For instance, by employing AI algorithms to analyze Indian consumers' preferences for electronic products, Yunnan electronics companies can purposefully develop goods with specific functionalities and designs. This enhances product competitiveness in the Indian market, thereby expanding trade scale. In cross-border e-commerce, AI helps optimize customer service. Intelligent customer service agents can interact with customers around the clock, answering inquiries about product information, logistics, and after-sales service, significantly boosting customer satisfaction (Li et al., 2025). Simultaneously, AI-based recommendation systems can accurately suggest products that meet consumer needs based on browsing and purchase histories, thereby driving cross-border e-commerce transactions. Taking a cross-border e-commerce platform targeting Southeast Asian markets as an example, such intelligent recommendation systems can suggest Yunnan specialty teas and handicrafts tailored to the cultural backgrounds and consumption habits of consumers in different countries, thereby increasing sales conversion rates. From a trade process perspective, AI technology has achieved automation and intelligence. Intelligent customs declaration systems can process customs documents quickly and accurately, identify risk points, improve declaration efficiency, shorten clearance times, and reduce costs. Additionally, AI can be applied in supply chain management to monitor cargo transportation status in real time, predict logistics risks, and optimize delivery routes to ensure timely

and secure arrivals. Taking Yunnan's trade with Myanmar as an example, AI-optimized logistics systems effectively address complex border traffic conditions, ensuring uninterrupted trade flows and comprehensively enhancing Yunnan's economic cooperation with South and Southeast Asia.

2.2 Promoting collaborative industrial upgrading

AI holds significant potential to drive industrial synergy and upgrading in Yunnan and the South Asian-Southeast Asian region. In agriculture, Yunnan and Southeast Asian nations possess complementary agricultural resources and technologies. AI can facilitate collaborative smart agriculture initiatives (Feng, 2022). For instance, integrating satellite remote sensing with drone technology and AI algorithms enables real-time crop growth monitoring, precise assessment of pest and disease outbreak areas, and timely delivery of accurate control solutions. Yunnan's agricultural technology enterprises can promote these technologies and initiatives to Southeast Asian nations, enhancing local agricultural productivity and product quality. Simultaneously, big data analysis of market demand can guide both sides in optimizing crop structures and achieving coordinated industrial upgrades. In manufacturing, AI facilitates smart manufacturing collaboration. Yunnan manufacturing enterprises can partner with South and Southeast Asian companies to introduce AI technologies, automating and intelligentizing production processes. Taking the automotive sector as an example, AI can optimize production line scheduling to enhance efficiency and product quality. AI-powered quality inspection can swiftly and accurately detect defects, reducing defective products. This smart manufacturing collaboration not only strengthens Yunnan's regional competitiveness but also elevates manufacturing standards and fosters industrial synergy across South and Southeast Asia. In tourism, AI enables intelligent travel experiences. Yunnan's abundant tourism resources attract large numbers of visitors from South and Southeast Asia. AI technology can be leveraged to develop multilingual intelligent tour guide systems, offering personalized itinerary recommendations and attraction commentary services (Miao & Cheng, 2020). Simultaneously, analyzing tourist preferences and behavioral patterns through big data enables tourism enterprises to optimize products and services, thereby enhancing visitor satisfaction. For instance, Buddhist-themed itineraries can be designed based on South Asian tourists' affinity for Buddhist culture. Utilizing intelligent platforms for targeted promotion will drive synergistic development and elevate tourism across Yunnan and the broader South and Southeast Asian regions.

2.3 Facilitating smart infrastructure connectivity

Artificial intelligence plays a crucial role in promoting smart infrastructure connectivity between Yunnan and South Asia/Southeast Asia. Within transportation infrastructure, AI can be applied to intelligent traffic management systems. By deploying sensors across roads, bridges, ports, and other transportation facilities to collect data on traffic flow and road conditions, and utilizing AI algorithms for real-time analysis and prediction, it enables intelligent traffic signal control, traffic flow optimization, and congestion reduction (Wang & He, 2024). Taking the border crossing between Yunnan and Laos as an example, the intelligent traffic management system can rationally allocate customs clearance lanes based on the flow of vehicles entering and exiting the country, thereby enhancing clearance efficiency. Simultaneously, AI technology can monitor and maintain transportation infrastructure, enabling the timely detection of potential hazards and prompt repairs to ensure the safety and smooth operation of the transportation network. Regarding energy infrastructure, AI facilitates intelligent energy allocation and management. Yunnan and several Southeast Asian countries possess cooperation potential in clean energy sectors like hydropower and wind power. AI technology enables real-time monitoring and analysis of energy production, transmission, and consumption to optimize resource allocation. For instance, big data analysis of regional energy demand fluctuations allows intelligent adjustments to transmission directions and volumes, thereby enhancing energy

utilization efficiency and reducing losses. AI also enhances the intelligent operation and maintenance of energy facilities by predicting equipment failures, minimizing downtime, and ensuring stable energy supply. In communication infrastructure, AI drives advancements in 5G networks and the Internet of Things (IoT). As Yunnan strengthens communication cooperation with South and Southeast Asia, AI-powered optimization of 5G network coverage and performance improves communication quality and speed. Furthermore, the application of IoT technology in industrial, agricultural, and logistics sectors relies heavily on AI support. Taking cross-border logistics as an example, IoT devices enable real-time tracking of goods' location and status, while AI analyzes and processes this data to achieve intelligent logistics information management and sharing. This enhances regional infrastructure connectivity and intelligence.

2.4 Optimizing regional public service provision

AI plays a proactive role in optimizing Yunnan's public service provision to South and Southeast Asian regions. In education, AI facilitates cross-border online learning by establishing platforms that deliver multilingual teaching resources and intelligent tutoring services through AI technologies (Cai, 2025). Yunnan's high-quality educational resources—such as vocational courses and language training—can be transmitted via online platforms to meet the learning needs of students in South and Southeast Asian countries. Simultaneously, intelligent education systems can deliver personalized learning plans tailored to students' progress and characteristics, thereby enhancing educational quality and effectiveness. For instance, Chinese language courses offered to students from Southeast Asian countries, combined with intelligent tutoring systems that provide real-time corrections for pronunciation and grammatical errors, can significantly improve students' mastery of the Chinese language.

3. Policy Recommendations for Enhancing Yunnan's Influence in South and Southeast Asia Through Artificial Intelligence

3.1 Accelerating technological innovation and application of artificial intelligence

To strengthen Yunnan's influence in South and Southeast Asia, accelerating innovation and application of artificial intelligence technologies is crucial. This includes increasing investment in AI research and development, with the government formulating policies to guide and encourage enterprises, universities, and research institutions to allocate more funds to AI R&D (Zhang, 2024). To bolster Yunnan's independent innovation capabilities in AI, dedicated research funds should be established to support critical AI technology research, such as machine learning, deep learning, and natural language processing. For instance, Yunnan's universities and research institutions should be encouraged to jointly develop natural language processing technologies tailored to the linguistic and cultural characteristics of South and Southeast Asia, providing technical support for cross-border communication and services. Subsequently, an AI innovation platform should be established. Establish a collaborative innovation platform integrating industry, academia, research, and application to promote cooperation and exchange among enterprises, universities, and research institutions. This platform will consolidate resources for joint AI technology R&D, pilot applications, and commercialization of research outcomes. For instance, in smart agriculture, enterprises can collaborate with universities and research institutions to leverage the platform for AI technology R&D and application, rapidly transforming research outcomes into tangible productivity. This will drive agricultural industry upgrades in Yunnan and South/Southeast Asia. Furthermore, efforts should be intensified to popularize AI technology applications. Governments can adopt a combination of policy guidance and financial support to incentivize enterprises to actively utilize AI technologies in trade, industry, infrastructure, and public services. Implement AI application demonstration projects to scale successful models from pilot initiatives to broader adoption. For

instance, establish AI application demonstration accounts in cross-border e-commerce to showcase intelligent customer service and recommendation systems, encouraging other businesses to follow suit and driving industry-wide intelligent development.

3.2 Enhancing industry and talent support systems

Strengthening industrial and talent support systems is crucial for enhancing Yunnan's influence in South and Southeast Asia through AI applications. From an industrial perspective, cultivate and expand AI-related industries. The government should introduce preferential policies to attract domestic and international AI enterprises to establish R&D centers or production bases in Yunnan, fostering industrial clustering effects. Simultaneously, local enterprises should be encouraged to enter the AI field, increasing investment in AI technology R&D and application. For instance, support should be provided to local manufacturing enterprises in Yunnan to introduce AI technologies, upgrade smart manufacturing, and enhance regional industrial competitiveness. Improve the industrial ecosystem and strengthen cooperation among upstream and downstream enterprises in the industrial chain. Advance the deep integration of AI with traditional industries, fostering technological innovation and coordinated industrial development. Taking the logistics sector as an example, AI enterprises should collaborate with logistics companies to develop intelligent logistics systems that enhance efficiency and service quality. Regarding talent support, strengthen AI talent cultivation by encouraging universities and vocational colleges to establish AI-related majors and courses aligned with market demands, thereby producing high-caliber professionals meeting industry needs. Simultaneously, enhance exchanges and cooperation with domestic and international universities and research institutions to introduce advanced teaching concepts and methodologies, improving the quality of talent development. For instance, Yunnan's universities have partnered with top national institutions to implement AI talent development programs, sending faculty and students for exchanges and training to elevate local AI education standards. Efforts to attract talent should be intensified by formulating preferential policies to draw outstanding AI professionals from home and abroad to work and start businesses in Yunnan. Providing an excellent work environment and living conditions will alleviate their concerns, enabling them to fully dedicate themselves to AI technology development and application. This will enhance Yunnan's capacity to influence South and Southeast Asia.

3.3 Deepening the regional artificial intelligence cooperation mechanism

Strengthening the regional artificial intelligence cooperation mechanism is a key step in enhancing Yunnan's influence in South and Southeast Asia. This involves establishing intergovernmental cooperation and exchange mechanisms. Local governments in Yunnan should intensify exchanges and consultations with governments in South and Southeast Asian countries, signing agreements in the field of artificial intelligence to define cooperation partners, content, and approaches. Regularly organize regional AI cooperation forums or seminars to discuss challenges encountered during collaboration and develop solutions, ensuring the smooth implementation of cooperative projects. For instance, jointly formulate cross-border AI transportation and energy cooperation plans with Southeast Asian governments to advance smart regional infrastructure connectivity. Subsequently, foster corporate collaboration by encouraging Yunnan AI enterprises to partner with South and Southeast Asian companies and establish strategic alliances. Enterprises can adopt forms such as technology transfer, joint R&D, and co-construction of projects to achieve resource sharing and complementary advantages. For instance, Yunnan AI enterprises and Indian software companies could jointly develop AI application products targeting the South Asian market, expand market share, and enhance the overall competitiveness of the regional AI industry. Strengthen collaboration between research institutions and universities by organizing academic

exchanges, joint research projects, and other activities between Yunnan research institutions and universities and their counterparts in South and Southeast Asia. Achieve shared access to research resources and outcomes while cultivating international AI talent. For instance, collaborating with Southeast Asian universities on AI applications in agriculture could yield locally tailored smart farming solutions, driving coordinated regional agricultural development.

Conclusion

AI technology presents a significant opportunity for Yunnan to enhance its economic influence in South and Southeast Asia, serving as a key driver for advancing the construction of a high-quality regional hub. This article analyzes the enabling mechanisms and practical effectiveness of AI, identifies existing constraints, and proposes corresponding countermeasures and recommendations. It aims to provide insights for Yunnan to deepen regional cooperation through technological innovation. Moving forward, Yunnan must leverage its geographical and resource advantages, harness AI technology, strengthen multi-sectoral cooperation with South and Southeast Asian nations, continuously optimize its economic influence, achieve mutually beneficial regional economic cooperation, and contribute to the refinement of China's overall opening-up strategy.

Conflict of Interest

The authors declare that they have no conflicts of interest to this work.

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