ISSN: 2688-9323

Research on the Construction of Typical Application Scenarios of Artificial Intelligence in Wuzhou from the Perspective of New Quality Productive Forces

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Abstract

With the breakthrough development of generative artificial intelligence technology, AI is transforming from a technological novelty into a core productivity engine. As an important industrial city in Guangxi, Wuzhou boasts distinctive industries, including renewable energy, Liubao tea, and artificial gemstones. However, its overall level of digitalization and intelligentization remains low, and the traditional factor-driven development model is no longer sustainable. There is an urgent need to develop new quality productive forces and drive industrial transformation and upgrading via AI technology. Based on a review of the connotation and classification of typical AI application scenarios, and drawing on the experience of advanced cities both at home and abroad, like Singapore, Shenzhen, and Hangzhou, this study deeply analyzes five major problems facing Wuzhou in promoting the construction of AI application scenarios: the lack of exploration of scenario demands, the weak technical supply capacity, the underutilized value of data elements, the shortage of professional talents, and the inadequate social awareness. In response to these problems, this paper suggests a systematic approach to countermeasures, including deepening industrial integration, strengthening technical supply, activating data value, enhancing talent cultivation and introduction, and improving social awareness. The goal is to offer a theoretical foundation and a practical route for building AI applications that are replicable, scalable, and typical in Wuzhou, so that the city can exploit new technological opportunities and achieve high-quality development.

Keywords

Artificial Intelligence; Typical Application Scenarios; Wuzhou; New Quality Productive Forces; Policy Recommendations.

1. Introduction

In recent years, large language models, which are a form of generative artificial intelligence, have made significant advancements. The products like ChatGPT, ERNIE Bot, and Tongyi Qianwen have emerged, which continuously expands the application boundaries of AI, making it go beyond initial image recognition and speech interaction into multiple fields, such as content creation, code generation, scientific computing, and decision assistance [1-6]. According to the Artificial Intelligence Development Report (2025) by the China Academy of Information and Communications Technology (CAICT), the core scale of China's AI industry reached 80 billion yuan in 2025, which is more than 80 billion yuan, driving related industries

ISSN: 2688-9323

to surpass 2.5 trillion yuan. AI is transforming from a "frosting on the cake" technological embellishment into a "fuel in the snow" productivity engine [7-12]. On this background, how to deeply integrate AI technology with regional characteristic industries, urban governance, and public services, and create a batch of replicable and scalable typical application scenarios, is a crucial proposition for regions aiming to promote high-quality development [13-19].

From the perspective of industrial structure, Wuzhou has five pillars of industries, namely renewable resources, high-end new metal materials, building materials, and environmental protection, food and medicine, and electronic information, along with distinctive competive industries like Liubao tea and artificial gemstones. But these industries are usually in the middle-to-low end of the value chain, with a lot of traditional manufacturing, and there's a need to improve their digitalization and intelligentization levels. Taking the renewable resources industry as a case, Wuzhou Circular Economy Industrial Park is one of the first national "Urban Mineral" demonstration bases. But still, processes like sorting, dismantling, and processing waste materials are mostly done manually, which results in low efficiency and possible safety hazards. Another instance is the Liubao tea industry. Although its brand influence has been steadily increasing over the years, the level of intelligentization in areas like planting management, production, processing, quality inspection, and marketing is low, which makes it hard to meet the new consumption requirements and market competion.

From the development momentum viewpoint, Wuzhou is currently in a crucial phase of transition from old to new growth drivers. The traditional factor-driven model is now unsustainable, so there's a big need to cultivate and expand new quality productive forces through scientific and technological innovation, especially in the development of artificial intelligence technology. The so-called new quality productive forces are an advanced form of productivity, driven by scientific and technological innovation, and aimed at high-quality development. Its main point is to make a big improvement in total factor productivity by making a big breakthrough in technological breakthroughs and allocating production factors innovatively. As a key representative of new quality productive forces, artificial intelligence can re-express the production function via intelligent methods, driving the transformation of traditional industries towards higher-end, more advanced, and environmentally friendly directions. So, systematically studying how Wuzhou can develop typical application scenarios for artificial intelligence is not just a political consciousness in response to national strategic deployments, but also a practical necessity to overcome Wuzhou's development bottlenecks and promote industrial transformation and upgrading.

2. Literature Review

2.1. Research on the Connotation and Classification of Typical AI Application Scenarios

Regarding the conceptual definition of typical artificial intelligence application scenarios, the academic community hasn't reached a unified understanding. Synthesizing existing research, typical AI application scenarios can be seen as solutions that are supported by core AI technologies, aimed at solving practical problems in specific industries or domains, and developed through the integration of technology and the innovation of models. Such scenarios usually have three main characteristics: first, they rely on core AI technologies like machine learning, computer vision, and natural language processing as their technical foundation; second, they are designed to address real business pain points and demand gaps; and third, they can generate demonstration effects and promotional value in similar contexts.

In classification research, scholars have categorized these scenarios from various angles. From an application domain viewpoint, they can be categorized into several broad areas, such as industrial manufacturing, urban governance, public services, and commercial finance. From a

ISSN: 2688-9323

technological perspective, they can be classified into computer vision, natural language processing, knowledge graphs, and intelligent robots. From the perspective of scenario maturity, they can be divided into exploratory/trial, pilot-demonstration, and large-scale application types. Furthermore, in the Guiding Opinions on Accelerating Scenario Innovation and Promoting High-Quality Economic Development through High-Level Application of Artificial Intelligence, issued by the National Development and Reform Commission and other departments, AI application scenarios are classified into four major categories: industrial application scenarios, social governance scenarios, public service scenarios, and scientific and technological innovation scenarios, which provide an important reference for the classification framework of this study.

2.2. Practices and Experiences of Advanced Cities at Home and Abroad in Building AI Application Scenarios

Advanced cities at home and abroad have practices and experiences that are widely recognized. At the international level, Singapore is a global model of smart city construction. Singaporean government launched the "Smart Nation 2025" initiative, which uses AI a lot in transportation, healthcare, government services, and housing. For example, its "Intelligent Transport System" dynamically adjusts traffic signals and issues congestion warnings in real time by collecting and analyzing real-time data, thereby increasing the average vehicle speed by 15% during peak hours. In the healthcare sector, Singapore developed an AI-Assisted Diagnosis System, which has been used in a few public hospitals, helping doctors do image analysis and screen diseases, which greatly improves diagnostic efficiency and accuracy.

At the domestic level, cities like Shenzhen, Hangzhou, and Chengdu are leading the way in building AI application scenarios. Shenzhen has established benchmarks in smart manufacturing, intelligent transportation, and smart government services, which are led by Huawei, Tencent, and BYD. Among them, Shenzhen's "Smart Airport" project uses facial recognition, baggage tracking, and intelligent scheduling technologies to make passenger flow seamless and contactless throughout the entire journey, which greatly improves the travel experience. Hangzhou is centered on its "City Brain" which integrates data from various departments, including transportation, urban management, environmental protection, culture and tourism, to build a comprehensive urban intelligent governance system that covers the entire city, which is considered the "Hangzhou Model of Urban Digital Governance" Chengdu focuses on unique scenarios, like "AI + Healthcare" and "AI + Cultural Tourism" to develop typical cases, such as the "West China Hospital AI-Assisted Diagnosis and Treatment Platform" and the "Kuanzhai Alley Smart Cultural Tourism Demonstration Zone" thereby generating positive demonstration effects.

The successful experiences of advanced cities indicate that building AI application scenarios demands attention to several key aspects: first, a strong top-level design and coordination mechanisms are necessary to avoid fragmented efforts and redundant construction; second, a large amount of data resources and unobstructed data sharing channels are required to provide foundational support for algorithm training and model optimization; third, active market enties and innovation ecosystems are need to form a development pattern of "government guidance, enterprise leadership, and market operation"; and fourth, an open and inclusive innovation environment with fault-tolerance mechanisms that encourage bold exploration and pioneering trials.

2.3. Research on AI Empowering the Development of Regional Characteristic Industries

In recent years, research on AI empowering regional characteristic industries has been increasing, mainly focusing on three directions: first, integrate AI with traditional

ISSN: 2688-9323

manufacturing, explore how smart manufacturing and Industrial Internet can drive traditional factories to smart factories; second, integrate AI with agriculture, focus on smart planting, precision breeding, and agricultural product traceability; third, integrate AI with modern service industries, covering smart tourism, smart healthcare, and smart education.

In the realm of regional characteristic industries, scholars commonly agree that when developing AI application scenarios, small and medium-sized cities should not blindly pursue "high-end, sophisticated, and cutting-edge" technologies. Instead, they should rely on local industrial foundations and resources to make their efforts, aiming for a different and unique development path. For instance, a few researchers have taken Jingdezhen's ceramics industry as a case study to examine the application prospects of AI in ceramic design, firing control, and quality inspection. Other researchers took the Anxi Tieguanyin tea industry as an example, analyzing the application value of IoT and AI technologies in tea garden management, tea processing optimization, and brand anti-counterfeiting. These studies offer valuable insights that can be applied to the development of AI application scenarios for Wuzhou's characteristic industries.

3. Major Problems and Constraining Factors

3.1. Insufficient Exploration of Scenario Demands and Weak Integration with Industries

Wuzhou has a lot of resources for industrial applications, but the current exploration of these application scenarios is not thorough. On one hand, enterprises have a limited awareness of AI technology, and many business managers don't clearly understand the problems AI can solve or the value it can bring. On the contrary, technology service providers lack a thorough understanding of the characteristics and pain points of Wuzhou's industries, and their solutions are often not able to adapt to local conditions, making it hard to meet enterprises' actual needs truly. This information asymmetry between supply and demand has resulted in a phenomenon where AI technology and industrial integration are disconnected.

Taking Liubao tea industry as an example, although some tea enterprises have introduced intelligent equipment, most of these devices only address problems at one link in the production process, which fails to achieve full-chain intelligentization from tea garden planting and processing to marketing. A deeper issue is that Liubao tea's quality evaluation system mainly relies on sensory assessment, and lacks quantitative standards and supporting data. It greatly restricts the application of AI in quality control and product development.

3.2. Weak Technical Supply Capacity and Underdeveloped Local Ecosystem

Wuzhou's local capacity for supplying artificial intelligence technology is severely inadequate. From the R&D perspective, Wuzhou has only one undergraduate institution - Wuzhou University - that offers AI-related programs, and even this institution suffers from weak faculty strength and limited experimental conditions, making it difficult to produce high-level research outcomes. From the industrial perspective, Wuzhou has almost no local AI algorithm companies or technology solution providers. The vast majority of AI products and services must be procured from outside the region, which not only incurs high costs but also makes it difficult to guarantee after-sales service and customized development.

More critically, Wuzhou has yet to form a sound AI innovation and entrepreneurship ecosystem. The lack of supporting innovation elements such as incubators, accelerators, and venture capital funds makes it very difficult for locally competitive AI startups to emerge. At the same time, due to the absence of industrial agglomeration effects, it is also challenging to attract outstanding AI enterprises from outside the region to establish operations and develop in Wuzhou.

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3.3. Underutilized Value of Data Elements and Prominent Sharing Barriers

Data is the "fuel" of artificial intelligence. Without high-quality data, even the most advanced algorithms struggle to function effectively. However, Wuzhou exhibits obvious shortcomings in the development and utilization of data resources.

Because there are worries about data security and departmental interests, a lot of departments are either not willing or not doing it, so cross-departmental data integration is hard to advance. For instance, the transportation department holds vehicle traffic data, the health commission holds medical health data, and the civil affairs bureau holds elderly care service data. These are all valuable resources for developing AI applications. But, since there are inadequate sharing mechanisms, these data are currently in a "dormant" state.

The degree of data standardization is low. Data collected by various departments and enterprises has a big variation in format, standards, and quality. There's a lack of unified data specifications and interface standards, which makes it a big challenge for data integration and usage.

Enterprises show weak willingness to open up their data. Most enterprises regard their production and operation data as core trade secrets and worry that opening up data may lead to leakage of business confidential information or expose them to security risks. Consequently, they adopt a cautious or even resistant attitude toward data sharing.

3.4. Severe Shortage of Professional Talents and Need for Enhanced Policy Coordination

As mentioned, Wuzhou has a severe imbalance between supply and demand for AI professionals. The root causes of this problem are a lot. From the viewpoint of talent development, local universities can't train AI professionals, there's a structural mismatch between graduates' skills and market demand. From the viewpoint of talent attraction, Wuzhou's economic and social development, and its salary packages, are not as competive as those of more developed regions, so it's hard to attract and retain high-level talent. From the perspective of talent utilization, even if talent is recruited, they usually leave because there are no strong development platforms and growth opportunities.

Wuzhou also encounters a challenge in advancing AI application scenarios: the lack of effective policy coordination. The construction of AI application scenarios requires a multitude of government departments, such as the Development and Reform Commission, the Bureau of Industry and Information Technology, the Science and Technology Bureau, the Big Data Administration, the Administrative Approval Bureau, the Culture and Tourism Bureau, the Health Commission, and the Education Bureau. But, the communication and coordination mechanisms among these departments are not yet well developed, so they are prone to problems like fragmented management, policy conflicts, and policy gaps. For instance, the Bureau of Industry and Information Technology offers subsidies for technological transformation, the Science and Technology Bureau supports scientific research projects, and the Finance Bureau distributes funds. But, the coordination and linkage between these three bodies is not smooth, which impacts the effectiveness of policy implementation.

3.5. Social Awareness and Acceptance Need Improvement

The promotion and application of artificial intelligence technology can't be separated from the understanding and support of all sectors. But currently, in Wuzhou's society, the level of awareness and acceptance of AI is usually low.

At the enterprise level, many entrepreneurs have two extreme attitudes towards AI: one is an "indifferent mindset," which believes AI is still far from their own businesses, and there's no need to invest in it now; the other is a "fearful mindset," worrying that introducing AI will cause layoffs or increase operating burdens. Both mindsets are bad for AI promotion and application.

ISSN: 2688-9323

At the public level, many citizens' understanding of AI is limited to consumer-grade products like "smart speakers" and "robot vacuum cleaners." They lack sufficient awareness about AI's potential and value in healthcare, education, and elderly care. Some people have misunderstandings and worries about AI, thinking it will replace human jobs or harm humanity's survival and safety.

At the government level, some grassroots officials don't have a deep understanding of AI, initiative, and creativity, and they are used to waiting for directives and instructions from higher authorities.

4. Conclusion and Policy Recommendations

This study centers on the main issue of constructing typical AI application scenarios in Wuzhou. Based on a review of relevant theories and practices, both domestically and internationally, Wuzhou faces major problems and constraints, and it does this by employing artificial intelligence to empower industrial development.

Research findings show that artificial intelligence is a key representative of new quality productive forces, and it's profoundly reshaping the global economic structure. Advanced cities at home and abroad, like Singapore, Shenzhen, and Hangzhou, have experienced successful experiences. This shows that the development of AI application scenarios requires support from key elements, such as top-level design guidance, data resource sharing, active market enties, and an inclusive innovation environment. But Wuzhou still has five major bottlenecks to advance AI application scenarios: first, the exploration of scenario demands is lacking, which causes information asymmetry between enterprises and technology suppliers, resulting in a "two-skin" phenomenon industrial integration. Second, the local technical supply capacity is insufficient, there are no indigenous AI enterprises, and there is no innovation and entrepreneurship ecosystem. Third, the value of data elements has not been effectively unleashed, with coexisting problems such as government data silos, low standardization, and a weak willingness of enterprises to share data. Fourth, there is a severe shortage of professional talent, coupled with unsound policy coordination mechanisms and inefficient multi-departmental collaboration. Fifth, social awareness and acceptance are relatively low, with entrepreneurs, the general public, and even grassroots officials all needing to improve their understanding of AI and their willingness to apply it.

In response to the above problems, this paper proposes the following countermeasures and suggestions:

(1) Deepen the exploration of scenario demands and promote precise industrial integration. Professional teams should be organized to go deep into the front lines of the five pillar industries, as well as characteristic industries such as Liubao tea and artificial gemstones, conduct a comprehensive survey of intelligent transformation needs, and establish a "one enterprise, one policy" demand list. Efforts should focus on full-chain intelligentization of the Liubao tea industry, automated sorting of renewable resources, intelligent quality inspection during gemstone processing, and the design of feasible, replicable, typical application scenarios, and on guiding enterprises to actively participate through demonstration projects.

(2) Strengthen technical supply capacity and cultivate a local innovation ecosystem. Relying on local universities such as Wuzhou University, efforts should be made to strengthen the development of AI disciplines and industry-education integration, and explore the establishment of joint laboratories and training bases with enterprises. AI enterprises from inside and outside the region should be actively introduced to set up branches or consortia, and policies such as tax incentives and site support should be used to attract technical teams to settle in Wuzhou. At the same time, an AI public service platform is need to provide enterprises

ISSN: 2688-9323

with low-cost services, like algorithm training, leased computing power, and solution consulting.

(3) Activate the value of data elements and break down sharing barriers. A government data opening system that is graded and classified should be established and improved, with unified standards for data collection, storage, and exchange. Priority should be given to the orderly sharing of data in livelihood areas, like transportation, healthcare, and cultural tourism. The establishment of "data sandboxes" or privacy-computing platforms is need to enable the integration of government and enterprise data, while safeguarding data security. Industry associations should be encouraged to lead in the formulation of industrial data standards, thereby gradually opening up data links across the upstream and downstream of industrial chains.

(4) Enhance both the introduction and cultivation of talent, and improve the coordination mechanisms of policy. An AI Talent Special Program should be implemented to attract high-level talent for short-term service or remote guidance, by employing flexible recruitment methods and project-based collaboration. Local talent cultivation should be enhanced by incorporating AI application technologies into vocational colleges, and implementing "order-based" training programs. A cross-departmental joint meeting system with municipal leaders as the leaders should be established to coordinate resources across departments, like Development and Reform Commission, Bureau of Industry and Information Technology, Science and Technology Bureau, Big Data Administration. This will foster policy synergy and prevent fragmented management.

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(5) Raise social awareness and create a good application atmosphere.AI science should be popularized, and enterprises should conduct training and case-sharing sessions to eliminate the two extreme mindsets — "indifference" and "fear." AI experience centers should be established in communities, schools, and public places to allow citizens to intuitively grasp the convenience AI provides in healthcare, education, and elderly care. Grassroots officials should be given special study sessions, and AI application scenarios should be incorporated into performance assessments to stimulate endogenous motivation.

In short, Wuzhou started developing AI application scenarios relatively late, but it has a weak foundation. However, it does have rich resources in characteristic industrial scenarios and has late-mover advantages. As long as it relies on local realities, follows the combination of problem orientation and goal orientation, and seeks a differentiated and distinctive development path, Wuzhou will definitely transform artificial intelligence into a powerful engine for promoting industrial transformation and upgrading and cultivating new quality productive forces, thereby adding new momentum to the high-quality economic and social development of Wuzhou.

Acknowledgments

This work was financially supported by the 2026 Wuzhou Municipal Social Science Special Project: Research on Creating Typical Application Scenarios of Artificial Intelligence in Wuzhou, and the Wuzhou University Research Foundation for Advanced Talents (Grant No. WZUQDJJ201927107).

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