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Future Industrial Park: Integrated Development and Prospects Driven by Innovation

PLENARY 1: URBAN DEVELOPMENT: CITY, INDUSTRY AND PEOPLE

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EXECUTIVE SUMMARY

In the context of rapid economic development and continuous urban evolution, traditional industrial parks have increasingly faced challenges such as brain drain and the misalignment between industry and urban functions. The emergence of future industrial parks offers innovative solutions to these issues by emphasizing the integrated development of talent, industry, and cities. Through innovation-driven approaches, these parks achieve cohesive growth and are gradually becoming new engines for high-quality regional economic development. This paper focuses on the Zhongguancun Virtual Reality Industrial Park and the Shijingshan AI Large Model Industrial Cluster as case studies, providing an in-depth analysis of their transformation and upgrading processes under the impetus of innovation. Key pathways explored include targeted talent services, collaborative industrial innovation, and the integration of urban functions. The study reveals that the two parks achieved remarkable economic performance in 2024, with a combined total output value of approximately 5.2 billion yuan, and around 141 resident enterprises. They have successfully attracted leading industry players, including the Zhongguancun Shuzhi Artificial Intelligence Industry Alliance, Beijing Cheetah Mobile Technology Co., Ltd,. These developments have solidified Zhongguancun Shijingshan Science Park's position as a key industrial hub for the artificial intelligence and virtual reality sectors.

THE DILEMMA AND TRANSFORMATION DEMANDS OF TRADITIONAL INDUSTRIAL PARKS

1.1 Quantitative Analysis of Development Bottlenecks in Traditional Parks

According to the authoritative data from the 2023 White Paper on the Development of China's Industrial Parks, traditional industrial parks across the country generally encounter numerous development bottlenecks.

In terms of talent, brain drain is a particularly severe issue, with an average annual attrition rate of 18%. In the high-tech sector, this figure rises to 25%, indicating a continuous outflow of highly qualified and skilled professionals. This talent exodus significantly weakens the innovation capacity and growth momentum of these parks. For instance, in a traditional electronics information industrial park located in a coastal region of eastern China, enterprises were initially drawn by low labor costs and preferential policies. However, as the demand for industrial upgrading continues to grow, the enterprises in the park are increasingly in need of high-end technical talent. Due to the absence of a robust talent cultivation and incentive mechanism, many experienced technical professionals are being recruited by companies in major cities that offer more competitive salaries and better career prospects. As a result, R&D projects in these enterprises frequently face setbacks, leading to stagnation in industrial development.

From the perspective of industrial structure, 78% of the dominant industries in the parks remain concentrated in low-value-added manufacturing and processing, with R&D investment intensity below 2%. This places them at the lower end of the global industrial chain, making it difficult to achieve high-profit returns while exposing them to intense significant international competition. For instance, in some traditional garment processing parks, most enterprises operate as original equipment manufacturers (OEM), lacking independent design and branding capabilities, which results in extremely low product value addition. If raw material costs rise or labor expenses increase, profit margins shrink considerably, placing enterprises at risk of financial losses or even bankruptcy.

Regarding the integration of industry and urban functions, a significant disconnect persists. Only 42% of industrial parks have achieved a residential and commercial facility ratio exceeding 30%. Meanwhile, 67% of employees endure daily commutes of over one hour. This industry-urban separation not only increases employees' living and commuting costs, and diminishing their quality of life and job satisfaction, but also hinders the sustainable development of the parks. For instance, in a traditional industrial park located in central or western China, supporting facilities in the surrounding area are severely inadequate. Employees have limited options for leisure and entertainment after work, resulting in a monotonous lifestyle. Furthermore, due to the considerable distance from urban centers and the poor transportation accessibility, employees spend excessive time commuting, resulting in reduced work efficiency and worsening talent retention issues.

1.2 Typical Challenges of the Zhongguancun Shijingshan Science Parks

In recent years, both the Zhongguancun Virtual Reality Industrial Park and the Shijingshan AI Large Model Industrial Cluster have encountered significant challenges.

Regarding workforce structure, the shortage of specialized VR algorithm engineers in the Zhongguancun Virtual Reality Industrial Park exceeds 90%. In particular, recruiting engineers skilled in large models and markerless algorithms has proven exceptionally difficult. This severe talent gap makes it extremely challenging to fill core VR positions, significantly constraining the development of the VR industry in the park. Furthermore, the supply-demand ratio of algorithm engineers in both parks is 1:10, indicating that only one qualified candidate is available for every ten job openings. The acute shortage of high-end talent has led to slow progress in technology research and innovation among AI enterprises operating in the parks.

From the perspective of the industrial chain, 70% of the enterprises in the Zhongguancun Virtual Reality Industrial Park are concentrated in content development, while core upstream technologies such as sensors and optical modules are heavily reliant on imports. This reliance places park-based enterprises in a passive position in the industrial chain, making them susceptible to high import costs and fluctuations in the global market.

In terms of urban functionality, the proportion of commercial supporting facilities surrounding the Zhongguancun Virtual Reality Industrial Park is relatively low compared to the total planned area. An employee satisfaction survey indicates that the convenience of daily life in the park is rated at only 6.2 out of 10. The severe shortage of commercial facilities presents numerous challenges for employees, diminishing their sense of belonging and commitment to the park. Furthermore, the low level of convenience also hampers the attraction of external talent, thereby restricting the further development of the park. For instance, employees in the park have reported that their daily shopping and dining needs are not adequately met. After work, if they wish to dine out or socialize with colleagues, they often have to travel long distances to the city center, which greatly impacts their quality of life and work enthusiasm.

SYSTEMATIC SOLUTIONS DRIVEN BY INNOVATION

2.1 Talent Development: Establishing an Ecosystem for Precise Professional Title Assessment
In 2021, the Beijing Municipality pioneered the establishment of a professional title classification system for virtual reality, a groundbreaking initiative that introduced scientific and standardized criteria for talent evaluation in the VR sector. The Zhongguancun Virtual Reality Industrial Park and the Shijingshan AI Large Model Industrial Cluster actively collaborated with the Zhongguancun Shuzhi Artificial Intelligence Industry Alliance to implement specialized training programs aimed at enhancing the professional skills and competencies of the workforce in the parks. By 2023, the density of professionals who had successfully obtained the title certifications in the parks had increased significantly. For instance, Dr. Wu Lun's team serves as a representative case. After being awarded a senior professional title in VR, Dr. Wu Lun experienced a substantial rise in industry recognition and influence. Capitalizing on his technical expertise, he led HiAR (Beijing) Information Technology Co., Ltd in developing an innovative smart industry solution. This solution integrates advanced VR technology to provide intelligent production management and equipment maintenance services for industrial enterprises. Currently, the solution has been adopted by more than ten leading enterprises, including Haier and GAC Honda, thereby not only generating substantial economic benefits for these companies but also making significant contributions to the industrial development of the park.

Image 1 –Training course site

2.2 Industrial Collaboration: Fostering Innovation Communities in Vertical Fields

2.2.1 Collaborative Research and Development of Key Technologies

The Zhongguancun Virtual Reality Industrial Park actively facilitates technological collaboration and innovation among enterprises in the park, encouraging join efforts in addressing key technological challenges. For instance, Silkroad Visual Beijing Center and Beijing Virtual Point Technology Co., Ltd collaborated to develop a film-grade motion capture system. Throughout this partnership, both companies leveraged their respective technological expertise. After multiple rounds of research, development, and testing, they successfully reduced the special effects production cycle by 40% and lowered costs by 35%. The application of this technology has significantly enhanced the efficiency and quality of film production and has been employed in several renowned films. As its usage continues to expand in the film industry, it has driven growth in the park's VR film sector, establishing itself as a new engine for industrial development.

2.2.2 Empowerment through Computing Infrastructure

The NCMatch computing platform, located in the Shijingshan AI Large Model Industrial Cluster, integrates over 6,000 PFlops of computing power resources, thereby offering substantial computational support to enterprises in the park. To date, the platform has served more than 115 enterprises, assisting them in overcoming computing bottlenecks associated with big data processing and AI algorithm training.

Image 2 –NC Match computing platform

For instance, Effyic has achieved a 30% improvement in government data processing efficiency after integrating with the NCMatch computing platform. With its enhanced data processing capabilities, Effyic successfully secured several government contracts in 2023, including projects for public security agencies, and has continuously expanded its business scope. Similarly, after gaining access to the computing platform, Smart-Ruiwen improved the interaction response speed of digital humans, reducing it from over 5 seconds to as fast as 2 seconds, significantly enhancing user experience. Furthermore, its coverage of government services has expanded from a limited number of regions to five provinces and cities—Beijing, Tianjin, Hubei, Jiangsu, and Shandong—providing intelligent solutions for a broader range of government services.

2.3 Integration of Industry and City: From Industrial Enclaves to Vibrant New Cities

2.3.1 Upgrading of Functional Facilities

The Zhongguancun Virtual Reality Industrial Park is actively advancing the integration of industry and urban development, with a commitment to enhancing urban functions and improving the quality of life

in the park. By increasing the construction of commercial support facilities, adding more canteens, and introducing new food vendors, high-end beverage establishments, and boutique hotels, the park has significantly improved the scale and diversity of its commercial amenities, effectively meeting the residential and lifestyle needs of employees. As living facilities continue to improve, employee satisfaction has risen substantially, reaching 8.7 out of 10. Additionally, the enhanced living environment and comprehensive amenities have attracted an increasing number of innovation-driven enterprises to establish a presence in the park.

Image 3 –Zhongguancun Virtual Reality Industrial Park

2.3.2 Leap in Urban Capacity

In 2023, the Zhongguancun Virtual Reality Industrial Park and the Shijingshan AI Large Model Industrial Cluster played a pivotal role in regional economic development, emerging as a crucial engine for economic growth in the region. Furthermore, these parks, with their conducive industrial development environment and innovative atmosphere, attracted a multitude of high-caliber overseas talents, thereby infusing new vitality into the parks' technological innovation and industrial advancement.

Regarding urban influence, the Shijingshan AI Large Model Industry Summit, as a flagship event of the park, has consistently expanded in both scale and influence. By hosting this summit, the park has forged extensive cooperative relationships with numerous enterprises and institutions, both domestically and internationally. The technological influence in the urban landscape has been continually enhanced, further elevating the park's reputation and competitiveness.

Image 4 –the Shijingshan AI Large Model Industry Summit

SUMMARY OF EXPERIENCE AND INSIGHTS

3.1 Innovative Measures Yield Significant Results

Following a series of innovative development initiatives, the Zhongguancun Virtual Reality Industrial Park and the Shijingshan AI Large Model Industrial Cluster have achieved remarkable progress in economic scale, enterprise growth, and technological innovation capability. The consistent growth in total output value has facilitated rapid industrial development and strengthened the economic capacity in the parks. The increase in the number of resident enterprises and national high-tech enterprises has further enhanced the parks' appeal to businesses, with the effects of industrial agglomeration becoming increasingly pronounced. Additionally, the rising talent density and increasing number of patent authorizations underscores the parks' exceptional accomplishments in talent cultivation and technological innovation.

Image 5 –Office scene of enterprises in the park

3.2 Replicable Experience

Firstly, policy innovation should take precedence, with a tailored professional title system serving as a crucial solution to the absence of standardized talent evaluation criteria. By establishing a professional title assessment framework that aligns with the needs of industrial development, parks can provide professionals with clear career progression pathways and incentive mechanisms, thereby attracting and retaining more specialized talents. Other parks can draw from this experience to formulate corresponding talent evaluation and incentive policies that are in harmony with their unique industrial characteristics.

Secondly, collaborative infrastructure development—including the development of the computing platform and other essential facilities—can significantly lower technological barriers for small and medium-sized enterprises (SMEs), thereby enhancing their innovation capability and competitiveness. Parks should leverage resource integration across multiple stakeholders to establish shared infrastructure platforms that provide technical support and services to enterprises.

Thirdly, implementing a closed-loop industrial ecosystem, with a comprehensive framework covering the entire value chain from R&D to application deployment, can facilitate the creation of a fully integrated industrial ecosystem. This approach promotes collaborative innovation and resource sharing among enterprises, strengthening industry-wide synergy. In the planning and development process, industrial parks should focus on building interconnected ecosystems, guiding enterprises in making strategic placements across various segments of the industrial value chain to ensure a well-structured and sustainable development model.

3.3 Reflection and Improvement

Currently, the level of technological collaboration among the parks remains relatively low, primarily due to barriers in data sharing. The lack of uniform data formats and standards across different parks, coupled with enterprises' concerns over data security, complicates the effective exchange and circulation of data. To address this issue, it is essential to establish cross-regional innovation alliances, develop standardized data protocols and sharing frameworks, and implement enhanced data security measures to promote collaborative technological innovation among the parks.

Additionally, both parks show a low proportion of overseas revenue and significant shortcomings in internationalization efforts. To make the parks more international, they should strengthen international technological cooperation networks, actively engage in cross-border collaboration and exchanges, introduce cutting-edge foreign technologies and expertise, and facilitate enterprise expansion into overseas markets. For instance, organizing park-based enterprises to participate in international technology exhibitions and academic conferences, while strengthening partnerships with globally renowned companies and research institutions, can bolster the parks' international visibility and competitiveness.

CONCLUSION

The Zhongguancun Virtual Reality Industrial Park and the Shijingshan AI Large Model Industrial Cluster have achieved significant advancements across three key dimensions—talent density, industrial added value, and urban integration—through a series of systematic reform initiatives, including targeted talent services, collaborative industrial innovation, and the integration of urban functions. This successful implementation validates the"innovation-driven—ecosystem reconstruction—value co-creation" paradigm for future industrial parks, providing a practical and replicable framework for the transformation and upgrading of other industrial parks.

Looking ahead, with the continuous advancement of science and technology and the ongoing upgrading of industries, an increasing number of industrial parks are expected to adopt this model to

foster innovation-driven development and promote high-quality growth in both China's industrial economy and global industrial landscape. To remain competitive in an increasingly dynamic global environment, industrial parks must proactively track emerging technologies and trends, continuously refine their innovation ecosystems, and strengthen international cooperation to enhance their adaptability and ensure long-term sustainable development.