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Industrial Spatial Development in Urban Renewal of Old Cities-A Case Study of Shibi Area in Guangzhou South Railway Station

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Abstract: In recent years, with China's rapid development, industrial economy has grown rapidly, but it has also led to contradictions between land supply and demand. Many urban villages emerged under this context. How to resolve or improve urban village issues has become a critical strategy in contemporary China. During the urban village renewal process, industrial transformation and innovation inevitably occur. Taking Guangzhou City in Guangdong Province as an example, this paper focuses on the area around Guangzhou South Railway Station, supplemented by an analysis of Guangzhou's overall urban village renewal, to deeply explore the industrial spatial development in old city renewal. By combining literature analysis and field research methods, this study conducts a quantitative investigation into the industrial spatial evolution of the Shibi area near Guangzhou South Railway Station. Through comparative analysis of land use change data from 2015 to 2023, it is found that the proportion of commercial land in the area increased from 12% to 38%, and the area of commercial service facilities expanded by 270%. The research demonstrates that adopting the "Hub + Headquarters Economy" model has increased the tax contribution per unit land in Shibi by 4.2 times compared to pre-renewal levels, forming a new industrial layout dominated by modern commerce and cross-border e-commerce.

Keywords: Urban renewal, Industrial development, Industry-city integration, Guangzhou South Railway Station.

1. Introduction

Under the backdrop of rapid global urbanization, urban renewal has become a vital pathway to promote industrial spatial development. Domestic cases such as Shanghai's Bund transforming from an industrial port into an international financial hub [1,2], Guangzhou's Zhujiang New Town evolving from old factories into the core of Tianhe CBD, and Ningbo's Tianyi Square transitioning from old residential areas into a central commercial plaza all validate the reshaping effect of urban renewal on industrial economies [3]. Urban renewal is not merely a spatial renovation but a strategic optimization of urban economic structures and an inevitable path toward modernization. Its economic benefits have shifted from single projects to regional synergies.

With massive passenger flow and frequent mobility, Guangzhou South Railway Station has become a critical gateway connecting Guangzhou to domestic and international destinations.

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However, as the station's development progresses, issues such as ambiguous industrial positioning, insufficient industry-city integration, and delayed withdrawal of traditional industries in surrounding areas have emerged. The Guangzhou government has introduced policies like the Guangzhou South Railway Station Area Industrial Development Plan (2019–2025) (hereinafter referred to as the Plan), which emphasizes the urgent need to elevate industrial development levels (Guangzhou Development and Reform Commission, 2020), and the Guidelines on Promoting Urban Village Renewal in Mega-cities (hereinafter referred to as the Guidelines), addressing contradictions and key tasks in renewal [4]. Against this backdrop, this study aims to analyze the industrial spatial restructuring mechanisms driven by mega-transport hubs during urban renewal. By constructing a three-dimensional framework of "policy tools–spatial response–economic effects" and employing spatial syntax modeling and industrial correlation analysis, this research reveals the interaction patterns between hub economies and urban renewal, providing replicable paradigms for similar regions.

2. Theoretical foundations of urban village renewal and challenges in Guangzhou South Railway Station's renewal

2.1. Policy guidance for Guangzhou's Urban Village Renewal

The Guangzhou Urban Village Renewal Regulations (hereinafter referred to as the Regulations) position "high-quality development" as the core principle, shifting from expansion-driven growth to stock optimization [5]. The regulations emphasize organic renewal and sustainable development, advocating "avoiding large-scale demolition and construction" to preserve low-cost housing, improve public services, balance migrant housing needs with urban quality enhancement, and protect local culture and industrial ecosystems.

2.2. Spatial development theories

The "industry-city integration" and "hub economy" models have become focal points in contemporary spatial development. Industry-city integration reflects an inevitable trend in modern urban development, emphasizing the balance between economic efficiency and spatial quality. It leverages geographic proximity to foster knowledge spillovers, shared labor resources, and industrial chain synergies [6, 7]. The Plan outlines a hierarchical spatial structure for the South Railway Station area-"core commercial zone-business office zone-living service zone"-to extend the hub's radiating effects and urban service functions. As a national high-speed rail hub, the station and its vicinity are designated as a "station-city integration demonstration zone," adjusting spatial layouts based on functional zoning and industrial clustering.

However, according to Weber's Industrial Location Theory, low-end industries cluster in informal spaces like urban villages due to land and transportation cost constraints, while Transit-Oriented Development (TOD) prioritizes high-value-added service industries near hubs to enhance spatial efficiency [8,9]. This contradiction highlights the challenges in upgrading old urban areas.

2.3. Spatial structural imbalance in renewal around Guangzhou South Railway Station

Shibi Village, a typical urban village near Guangzhou South Railway Station, exhibits chaotic industrial functions dominated by low-end housing, small traditional businesses, and outdated manufacturing, conflicting with the station's strategic positioning. Such issues reflect broader spatial challenges in urban renewal.

Synergetics Theory provides methodological guidance for renewal, advocating a "hub + industry + community" approach. The Regulations propose a multi-stakeholder governance mechanism ("government–market–society") to resolve land fragmentation and property disputes [10]. These

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theories underscore the need to address the "spatial efficiency–social equity–cultural continuity" triad in urban renewal.

3. Current development status of Guangzhou South Railway Station and surrounding areas

3.1. Historical development of the station

Guangzhou South Railway Station, located in Shibi Subdistrict, Panyu District, commenced construction in December 2004 with a total investment of RMB 13 billion. It became operational on September 25, 2010, alongside Guangzhou Metro Line 2. Currently, it integrates 100+ bus routes, three metro lines (Lines 2, 7, 22), and long-distance coach stations, serving the Pearl River Delta and western regions [11].

3.2. Hub location and strategic positioning

According to Guangzhou's statistics, the station handles 738,000 daily passengers, connecting 18 provinces via high-speed rail, with 92% of major cities accessible within 8 hours. Its strategic positioning includes three dimensions:

Forming a "four vertical and four horizontal" national rail network via trunk lines like Beijing-Guangzhou and Guangzhou-Shenzhen-Hong Kong High-Speed Rail.

Linking Foshan's Robotics Valley and Guangzhou International Innovation City, supporting 37% of the Greater Bay Area's high-tech industrial parks.

Synergizing with the China-Europe Freight Train (Guangzhou), achieving 126,000 TEUs of cross-border freight in 2024 (a 27% year-on-year increase) [12]. The "high-speed rail + freight train" intermodal system enables 72-hour delivery of high-value goods (e.g. electronics, biopharmaceuticals) to Europe, reducing time costs by 60% compared to traditional shipping.

3.3. Development challenges

Persistent urban villages around the station exhibit low development intensity and land use efficiency, hindering industry-city integration. Additionally, commercial development remains stagnant, relying on limited dining options within the station. The lack of large-scale shopping centers or high-end venues fails to meet passenger consumption demands, resulting in untapped economic potential despite massive.

4. Industrial spatial patterns around the station: a case study of Shibi Village

4.1. Current industrial land use and issues

The 2023 business format distribution map of Shibi Village reveals a dominance of low-tier services: catering (26.18%) and living services (25.28%) jointly account for over 51% of industries, as shown in figure 1. While these meet the immediate needs of transit passengers, they reflect a "space-industry mismatch" under current development.

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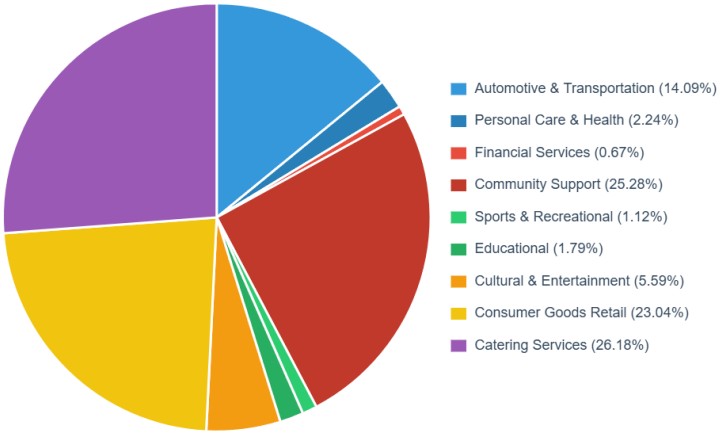

Figure 1: Business format distribution map of Shibi Village
Data source: digital observation 2023 statisticsa

4.2. Key drivers for industrial development in Shibi's renewal

The Plan prioritizes high-end industries like headquarters economy, modern commerce, and exhibition services in the South Railway Station area, requiring Shibi to absorb core functional spillovers and achieve industry-city integration [13]. A "demolition-integration" approach is adopted, reserving land for affordable housing and high-end services to promote intensive land use.

Guangzhou South Railway Station's massive passenger and logistics flows drive consumption and industrial linkages. The Plan proposes extending the "South Station Commercial Avenue" to channel passenger flow into local commerce and tourism. As one of the station's "seven functional clusters," Shibi complements core zones by focusing on living services and industrial support, establishing a 15-minute living circle with comprehensive education and healthcare facilities.

5. Implementation pathways for industrial spatial optimization in urban renewal

A "government-led, market-operated, public-participated" governance model is established per the Plan and Guidelines. Mixed-use land development policies are implemented to integrate commercial, office, and residential functions. Industrial guidance funds are allocated to attract high-end services and tech enterprises, fostering industrial clusters. The "Hub + Headquarters Economy" industrial chain is prioritized.

Leveraging the station's hub advantages, modern commerce, exhibition services, and cross-border finance are developed. Drawing lessons from Shanghai's Bund and Zhujiang New Town, traditional formats in Shibi are upgraded to smart retail and cultural tourism to meet high-end retail consumption demands. The logistics network of the China-Europe Freight Train is utilized to form cross-border e-commerce and supply chain clusters.

TOD-inspired spatial strategies, referencing Shenzhen's Longhua New District "rail + urban renewal" model, are applied to Shibi. A "TOD high-intensity development zone" within 500 meters of the station allows mixed-use layouts. Floor-area ratio incentives encourage developers to build public transport facilities and pedestrian systems. Elevated corridors connecting commercial complexes and transit hubs, along with affordable housing, mitigate gentrification.

This practice proposes a systematic "functional restructuring–institutional innovation–interest balancing" solution, expanding industry-city integration theory. It positions hubs not merely as transit

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nodes but as catalysts for urban value chain restructuring, requiring precise industrial alignment, policy accuracy, and inclusive governance.

6. Conclusion

The renewal of Shibi Village near Guangzhou South Railway Station exemplifies transportation hub-driven urban renewal with dual-circulation characteristics. According to the Plan, land plots undergoing renewal from 2015 to 2023 saw floor-area ratios rise from 1.2 to 3.8. Mixed-use projects increased land premiums to approximately RMB 4,529/m², tripling value-added output per mu. Commercial land rose to 38%, and service facilities expanded by 270%, generating significant economic benefits through cross-border e-commerce and headquarters economy. The study finds that Shibi's "Hub + Headquarters Economy" model, supported by district-town investment platforms, transformed low-value industries into modern commerce and cross-border e-commerce clusters. TOD principles enhanced spatial restructuring, intensive development, and social equity. However, challenges persist in industrial upgrading, social stratification, and traffic congestion. Solutions include traffic restrictions, microcirculation optimization, and smart transportation systems. Future strategies involve extending industrial chains vertically. This research deciphers the interaction between mega-hubs and urban renewal through a "policy tools–spatial response–economic effects" framework, offering a replicable "functional adaptation–institutional innovation–interest sharing" paradigm for the Greater Bay Area.

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