A Multi-scale Spatial Analysis of Innovative Enterprise Relocation: A Case Study of High-tech Enterprises

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Abstract

Enterprise relocation provides crucial insights into the locational preferences of innovative firms, reflecting regional industrial shifts and the evolution of urban functional layouts. Using a national dataset of high-tech enterprises that were certified and underwent registered address relocation over the past three years, this paper analyzes migration patterns and networks across three spatial scales: regional, municipal, and intra-urban. Drawing upon a dual-evolution framework of 'firm growth' and 'spatial restructuring,' we explain the underlying migration mechanisms. The findings reveal that: (1) at the regional scale, innovative firms display a co-existence of core city out-migration and cluster-based in-migration, intertwining near-field reorganization with broad-scale restructuring; (2) at the municipal scale, relocation is primarily characterized by diffusion toward strong county economies, supplemented by minor aggregation toward central urban districts; (3) at the intra-urban scale, firms predominantly exhibit a pattern of adjacent-ring outward migration, with the inner suburbs serving as the primary destination. Ultimately, innovative firm relocation represents a dynamic alignment between the spatial demands of firm growth and the shifting comparative advantages across multiple spatial scales, with distinct drivers operating at each level.

Keywords: innovation space; enterprise migration; multi-scale space; industrial transfer; space of flow

1 Introduction

Innovative enterprises serve as key micro-agents in cultivating new quality productive forces. Exploring their locational preferences is essential for precisely aligning space with the developmental needs of the innovation economy and providing an empirical foundation for scientific spatial planning. Enterprise relocation offers a crucial clue for identifying these locational preferences, acting as a tangible manifestation of regional industrial shifts and urban structural evolution. In the contemporary context of national strategic hinterland construction and innovation-driven high-quality development, researching these dynamics is highly valuable. However, existing literature predominantly focuses on static spatial distributions, such as identifying inner-city innovation clusters or mapping spatial disparities across mega-regions [cite: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]. Due to severe data constraints, studies on actual firm relocation remain sparse and are mostly confined to single-city cases or isolated corporate histories [cite: 11, 12, 13]. Although recent attempts have leveraged specialized enterprise databases [cite: 14, 15], they often suffer from a lack of explicit innovation targeting or limited temporal relevance. Furthermore, while classic theories regarding agglomeration externalities, urban amenities, and innovation ecosystems offer generalized explanations, they frequently overlook the evolving spatial demands over a firm's growth lifecycle and the competitive differences across distinct spatial scales. This gap results in a theoretical paradox: strong overall explanatory capacity but weak interpretative power for specific,

multi-tiered relocation phenomena. To address this, this paper leverages data from high-tech firms nationwide that migrated their registered addresses within the past three years to dissect relocation patterns across regional, municipal, and intra-urban scales, introducing a dual-evolution framework of 'firm growth' and 'spatial restructuring' to uncover the underlying migration mechanisms.

2 Research Data and Methods

This study targets enterprises listed in the national high-tech enterprise certification records between October 8, 2021, and October 8, 2024. By cross-referencing registration histories in the National Enterprise Credit Information Publicity System, we filtered out firms that experienced registered address relocation. The final sample comprises 10,680 unique enterprises executing a total of 19,317 relocations. Because firm relocation reflects the phased requirements of corporate growth—regardless of whether the high-tech certification occurred before or after the move—no temporal filtering was applied to the relocation timestamps. According to the National Economic Industry Classification, Scientific Research and Technical Services (hereafter 'tech services') accounted for 40.1% of the total moves, followed by Information Transmission, Software and Information Technology Services (hereafter 'info services') at 25.9%, and Manufacturing at 20.0%.

Data processing and spatial modeling were executed via Python libraries. Text-based registration addresses were geocoded into geographic coordinates to build a comprehensive digital atlas of innovative enterprise migration. The analysis was systematically structured across three spatial scales. At the regional scale, prefecture-level cities served as the baseline spatial units; Global Moran's I was applied to evaluate spatial agglomeration shifts, and complex network modularity algorithms were employed to partition migration communities. At the municipal scale, central urban districts and outlying counties (including county-level cities) were treated as distinct nodes to examine core-periphery diffusion and concentration. At the intra-urban scale, cities were deconstructed into concentric ring zones, and Hierarchical Density-Based Spatial Clustering of Applications with Noise (HDBSCAN) was applied to delineate prominent relocation hot spots.

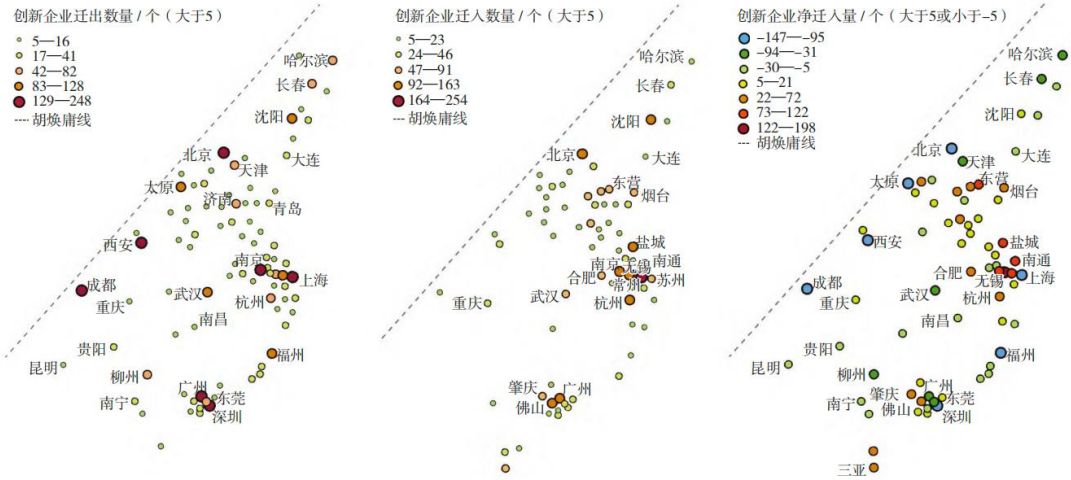

Fig.1 Distribution of net migration of innovative enterprises

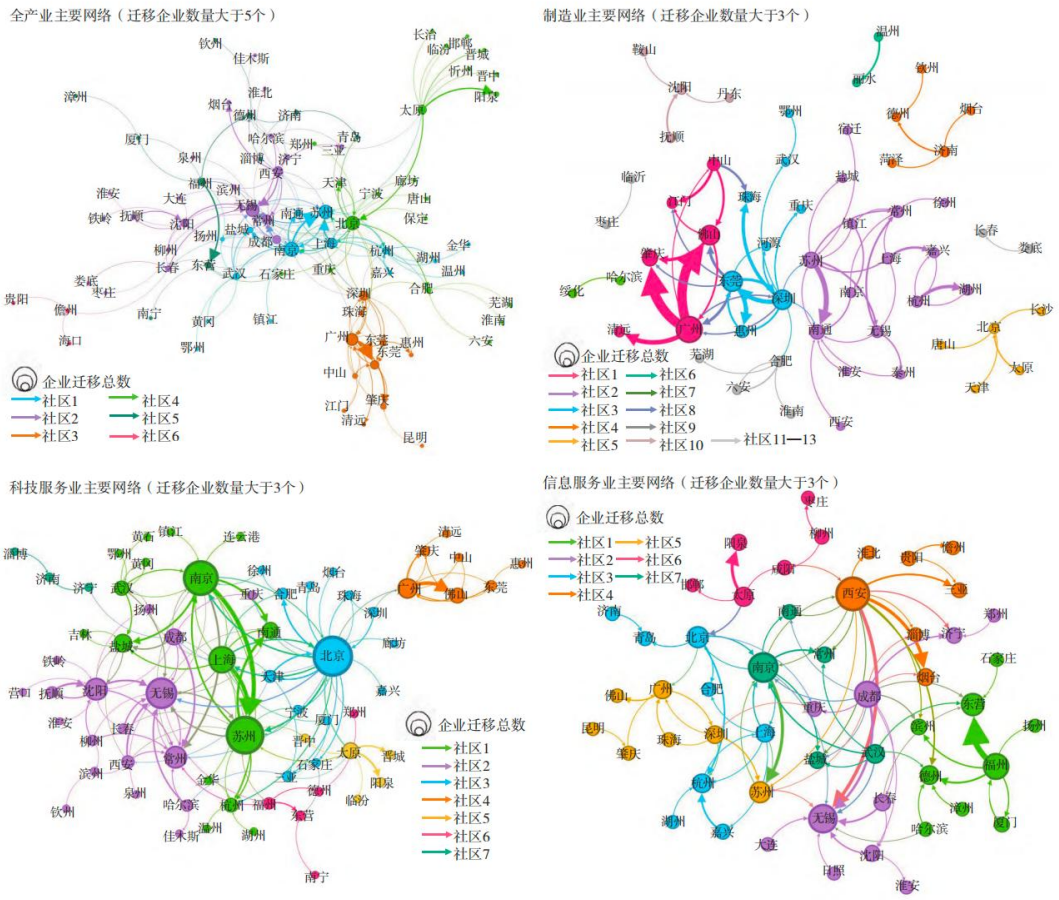

Fig.2 The main network structure of regional migration of innovative enterprises

3 Multi-scale Spatial Characteristics of Innovative Enterprise Relocation

3.1 Regional Relocation Dynamics

A total of 3,103 high-tech enterprises recorded 3,627 regional-scale relocations. Tech services, info services, and manufacturing accounted for 42.7%, 28.9%, and 15.7% of these moves, respectively, highlighting a significantly higher regional mobility among knowledge-intensive service providers.

3.1.1 Spatial Configuration: Core-City Out-migration and Cluster In-migration

In terms of source and destination configurations, out-migration is concentrated in major regional center cities east of the Hu Huanyong Line (defined here as sub-provincial cities or national top-10 cities by GDP). Conversely, destinations are primarily strategic industrial nodes, metropolitan areas, and

economic belts within eastern coastal urban clusters. The top ten cities by out-migration volume are Beijing, Xi'an, Shanghai, Nanjing, Guangzhou, Shenzhen, Chengdu, Taiyuan, Suzhou, and Wuhan. The top ten destination cities are Wuxi, Suzhou, Changzhou, Nanjing, Nantong, Beijing, Yancheng, Hangzhou, Guangzhou, and Foshan. Net migration balances reveal that with few exceptions (e.g., Hangzhou, Hefei, Chongqing, Shenyang), most regional centers are in a state of net out-migration. Continuous net out-migration is also observed across the Harbin-Changchun-Jilin region in the northeast and the Xiamen-Zhangzhou-Quanzhou region on the southeastern coast. Net in-migration is heavily concentrated within the Yangtze River Delta (specifically the Suzhou-Wuxi-Changzhou metropolitan area, the Jiangsu Land-Sea Coordinated Development Belt, and the Shanghai-Jiaxing-Hangzhou corridor), the Pearl River Delta (the Guangzhou and Shenzhen metropolitan areas), and the Shandong Peninsula (the Jinan and Qingdao metropolitan areas). In addition, traditional peripheral zones of coastal clusters (e.g., northern Jiangsu, southern Zhejiang, southern Shandong) and areas surrounding inland provincial capitals like Taiyuan and Xi'an act as net migration sinks.

Overall, regional relocation intensifies the spatial concentration of innovative firms, though distinct sector-specific variations exist. Spatial autocorrelation testing reveals that the Global Moran's I value for enterprise distribution surged from 0.05 pre-relocation to 0.14 post-relocation, indicating a profound escalation in spatial clustering. Sectoral decomposition shows that info services experienced the fastest growth in Moran's I, closely followed by tech services, signifying heightened concentration for both. In contrast, the Moran's I for manufacturing declined slightly, indicating a subtle structural dispersion.

3.1.2 Network Structures: Intertwined Near-field Reorganization and Broad-scale Restructuring

The enterprise migration network displays a dual pattern of intra-cluster near-field reorganization and extra-cluster broad-scale restructuring. The top ten intra-cluster near-field pathways are Guangzhou to Foshan, Nanjing to Suzhou, Shanghai to Suzhou, Taiyuan to Yangquan, Suzhou to Nantong, Guangzhou to Chaoqing, Nanjing to Changzhou, Nanjing to Nantong, Suzhou to Wuxi, Fushun to Shenyang, and Nanjing to Yancheng. Meanwhile, the top broad-scale restructuring pathways include Fuzhou to Dongying, Xi'an to Wuxi, Taiyuan to Beijing, Shenyang to Wuxi, Xi'an to Yantai, Chengdu to Wuxi, Changchun to Wuxi, Beijing to Nanjing, Beijing to Hefei, and Fuzhou to Dezhou. Network community detection via modularity partitioning highlights that the Yangtze River Delta demonstrates the most complex integration of broad-scale and near-field networks: it maintains highly dense internal linkages while extending along the Yangtze River Economic Belt to connect with the Wuhan metropolitan area. Crucially, manufacturing-heavy nodes like Wuxi and Changzhou transcend geographical boundaries to serve as major extra-provincial hubs linking distant centers like Chengdu, Xi'an, and Shenyang. The Pearl River Delta remains a highly self-contained system centered on Guangzhou, Shenzhen, and Foshan. The Beijing-Tianjin-Hebei cluster is strictly organized around Beijing, which manages intra-cluster flows while systematically anchoring channels from Shanxi, Shandong, and Anhui. In the Western Taiwan Strait cluster, Xiamen acts as an inward-drawing node for local reorganization, whereas Fuzhou operates as a critical gateway for broad-scale outward flows. Finally, peripheral communities with limited network intensity form between parts of Hainan, Guiyang in the southwest, and Changchun in the northeast.

Sectoral analysis confirms that manufacturing is heavily governed by near-field reorganization, whereas info and tech services are driven by broad-scale restructuring. Combined with the Moran's I trajectories, manufacturing diffusion manifests as localized spillover, while service-oriented restructuring reinforces macro-level spatial polarization. Specifically, the manufacturing network centers on the localized reorganization within the Yangtze and Pearl River Deltas, supplemented by proximate flows around northern hubs like Beijing, Shenyang, and Harbin. The tech and info service networks, by contrast, revolve around long-range, broad-scale concentration from central and eastern regional cities into the coastal giants. This is further validated by migration distances: manufacturing exhibits the shortest median relocation distance at 114 km (75% within 349 km); tech services follow with a median of 512 km (75% within 1,111 km); and info services register the longest range, with a median distance of 808 km (75% within 1,259 km).

3.2 Municipal Relocation Dynamics

Municipal-scale relocation—defined as migrations moving across central urban districts and surrounding counties—encompasses 922 enterprises and 1,115 recorded events. Tech services and manufacturing dominate this tier, accounting for 36.4% and 33.5% of the total volume respectively, demonstrating that municipal-scale shifts are primarily relevant to asset-heavy or operationally localized firms.

3.2.1 Spatial Configuration: Localization in Powerful County-Level Economies

Municipal relocation is restricted to 106 prefecture-level cities, overwhelmingly concentrated in territories characterized by highly robust county economies. The top ten cities by migration volume are Suzhou, Hefei, Dalian, Taiyuan, Wuxi, Qingdao, Shenyang, China, Fuzhou, and Wenzhou. Relocation intensity exhibits extreme hierarchical polarization: Suzhou and Hefei alone comprise roughly 36% of national municipal flows, and the top ten cities capture 63.8% of the total sample. Excepting Taiyuan and Shenyang, all top-tier nodes govern multiple counties ranked in the national Top 100 Counties (by 2023 metrics), with economies like Suzhou and Wuxi hosting several top-ranking county units. At the provincial scale, Jiangsu, Zhejiang, and Shandong—the traditional strongholds of county-level competitiveness—emerge as the most active arenas for municipal firm reorganization.

3.2.2 Network Structures: County-Directed Diffusion Outpaces Central Aggregation

Within municipal networks, central district-to-county flows constitute 51.2% of migrations, county-to-district central aggregation accounts for 38.6%, and inter-county transfers represent a minor 10.2%. Notably, 59.6% of inter-county transfers are oriented toward peripheral zones increasingly distant from the central urban core. This reinforces a structural paradigm dominated by decentralized county diffusion, with central aggregation playing a secondary role. Although individual cities exhibit bidirectional flows, 63.2% of relevant cities (including Suzhou, Hefei, Wuxi, Fuzhou, and Qingdao) operate in a net out-migration state due to powerful county-bound diffusion, whereas cities showing net central aggregation are few and structurally weak. Sectorally, manufacturing shows the highest propensity for county-bound diffusion and inter-county shifting. Conversely, tech and info services maintain a significantly higher share of central urban district aggregation than manufacturing, indicating

that despite the overall decentralized trend, central districts retain a powerful magnetic pull for knowledge-intensive and digital services.

3.3 Intra-Urban Relocation Dynamics

Intra-urban relocation—occurring strictly within central urban districts or within an isolated county unit—represents the largest segment of the dataset, involving 8,045 enterprises and 14,575 events, yielding an average of 1.8 moves per firm. This indicates that iterative, sequential relocation is a defining characteristic of innovative firms within localized urban environments. Sectoral shares align closely with the macro sample: tech services represent 39.8%, info services 26.1%, and manufacturing 20%.

3.3.1 Spatial Configuration: Dominated by Second-Tier Regional Centers

Intra-urban moves occurred across 384 cities, with inner-district flows commanding 95.2% of the volume, heavily eclipsing intra-county re-positioning. These dynamics are overwhelmingly concentrated in second-tier regional center cities across the eastern and central macro-regions. The top ten cities by intra-urban volume are Wuhan, Nanjing, Suzhou, Shenyang, Tian 天津 (Tianjin), Dalian, Hangzhou, Qingdao, Wuxi, and Beijing, collectively capturing 58.3% of the entire intra-urban dataset. Intriguingly, while first-tier megacities (Shanghai, Beijing, Guangzhou, Shenzhen) possess far higher densities of high-tech firms, their internal migration volumes are remarkably subdued. Excepting Beijing at tenth place, Guangzhou, Shenzhen, and Shanghai rank 18th to 20th respectively, indicating that innovative firms in first-tier megacities exhibit a highly stabilized locational equilibrium.

Using the Nearest Neighbor Index (NNI) based on point densities to analyze cities with more than 30 relocations, we find that NNI values across all cities remain consistently below 1.0 both before and after migration. This demonstrates that intra-urban relocation is not a simplistic process of chaotic dispersion or absolute concentration, but rather a structural transition from one concentrated state to another. Specifically, 56% of analyzed cities (including Nanjing, Hangzhou, Suzhou, and Shenyang) experienced an escalation in spatial concentration post-migration (decreasing NNI), while 44% (including Beijing, Shanghai, Shenzhen, and Wuhan) recorded structural dispersion (increasing NNI). Sectorally, info services exhibit the highest degree of baseline spatial clustering and the most pronounced post-migration concentration. Tech services follow a similar, albeit moderate, pattern of spatial tightening. Manufacturing displays the lowest baseline clustering and exhibits a highly polarized divergence between internal consolidation and outward dispersion.

3.3.2 Network Structures: Suburb-Directed Adjacent-Ring Migration

By defining concentric rings outward from primary urban cores (the principal commercial and cultural centers), we trace the network trajectories of intra-urban firm shifting. The top five cross-ring pathways are 5-10 km to 10-15 km, 0-5 km to 5-10 km, 10-15 km to 5-10 km, 10-15 km to 15-20 km, and 0-5 km to 10-15 km. This vector layout indicates that within a 20 km radius, migration is governed by proximate outward decentralization. Beyond the 20 km threshold, the system switches to adjacent-ring inward consolidation, with the 10-15 km belt acting as a major secondary destination for inbound flows. For instance, the primary and secondary vectors for the 20-30 km belt are directed toward the 15-20 km and 10-15 km belts, respectively; for the 30-50 km belt, toward 20-30 km and 10-15 km; and for the >50 km

zone, toward 30-50 km and 10-15 km. Net volumetric changes confirm that the 0-10 km core is a consistent net exporter, the 10-50 km zone is a net importer, and zones beyond 50 km maintain a stable equilibrium. Crucially, the 10-15 km ring captures the highest absolute volume of inbound firms, while the 15-20 km ring registers the sharpest rate of growth in in-migration. Sectorally, tech and info services mirror this baseline configuration, whereas manufacturing displays a significantly more aggressive centrifugal path, showing net inflows only beyond the 15 km threshold and concentrating its largest growth rate within the outer 20-30 km ring.

The suburban ring is highly heterogeneous, exhibiting substantial spatial differentiation. Detailed hotspot analysis using HDBSCAN was conducted on the top three internal migration engines (Wuhan, Nanjing, Suzhou) along with Beijing. The results delineate a highly polarized landscape within the 10-20 km suburban belt, where high-intensity net in-migration hotspots directly coexist with net out-migration cold spots. Notably, higher-tier centers like Beijing display a significantly larger number of net in-migration hotspots clustered along and beyond the 20 km periphery compared to second-tier cities.

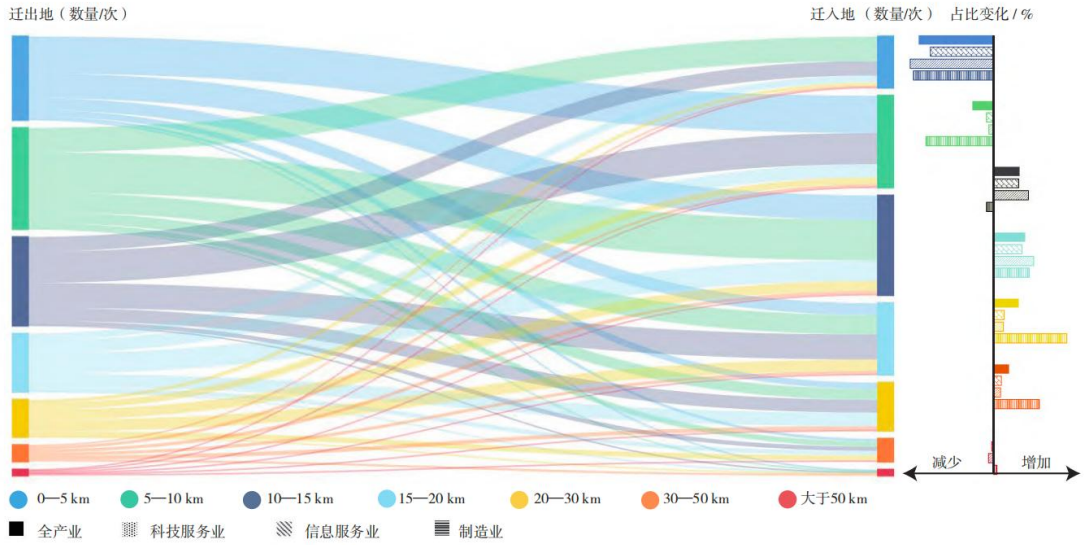

Fig.3 Distribution of cross circle migration of innovative enterprises

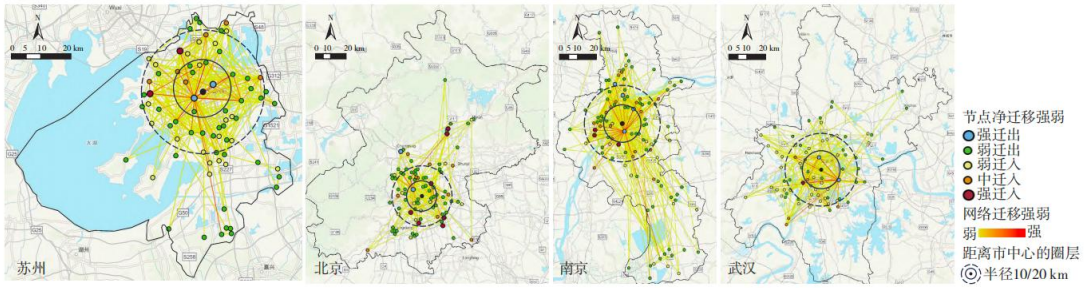

Fig.4 Typical organizational characteristics of urban migration network

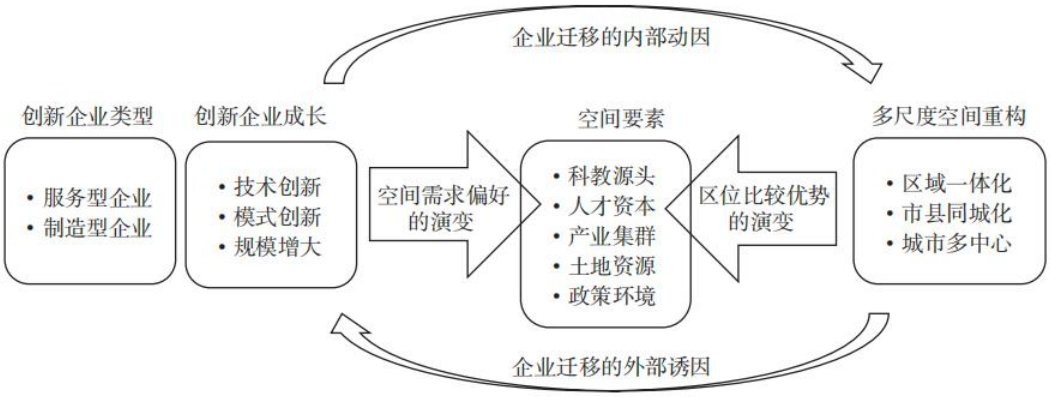

Fig.5 "Dual evolution" framework of enterprise growth and spatial restructuring

4 A 'Dual-Evolution' Explanatory Framework for Innovative Enterprise Relocation

4.1 The Core Logic of Corporate Growth and Spatial Restructuring

The relocation of innovative firms cannot be simplified into linear centralization or decentralization; rather, it represents a dynamic co-evolutionary interaction between firm lifecycles and geographic space. We conceptualize this via a 'dual-evolution' framework, asserting that relocation is the direct outcome of a dynamic alignment between the shifting spatial demands of corporate growth and the evolving comparative advantages of multi-scale spaces. On one hand, as innovative firms scale up, they pursue distinct or combined trajectories of technological innovation, business model innovation, and volumetric scale expansion, which continuously reshapes their operational preferences for academic anchor institutions, industrial clusters, human capital pools, land resources, and institutional frameworks. On the other hand, geographical space is not a static container; across multiple scales, it is continually reshaped by regional integration, municipal-county conurbation, and polycentric urban reconfiguration, which radically updates localized comparative advantages. Firm relocation, therefore, is an iterative spatial re-selection process matching dynamic internal demands with dynamic external spaces.

4.2 Shifting Profiles of Corporate Spatial Demands

Innovative firms exhibit highly differentiated, evolving spatial demands along their growth paths. In the technological innovation trajectory, both manufacturing and service firms face an urgent need to expand R&D teams and deepen collaborative knowledge networks. Manufacturing firms frequently undergo a process of 'headquarterization,' spatially decoupling core R&D and administrative organs from physical manufacturing plants. Consequently, these firms gravitate toward knowledge anchors like universities and research institutes, or high-amenity talent pools.

In the business model innovation trajectory, firms exhibit an intense need to embed within localized industrial clusters, though sectoral priorities diverge. Service-oriented model innovation focuses on customization and integration, requiring close proximity to local market demand and cross-boundary integration with physical production, trade, or logistics—sometimes necessitating the acquisition of secondary physical plant spaces. Thus, service firms require embedding within precise, specialized clusters. Manufacturing model innovation, conversely, prioritizes the adoption of advanced information systems and automation to enhance supply chain agility and smart production. While the physical organization of manufacturing supply chains is highly flexible, it demands immediate supplier responsiveness and absolute logistical security. Consequently, manufacturing innovators adopt a locational posture of 'micro-dispersion within macro-agglomeration,' relying heavily on robust cluster ecosystems.

Innovation and physical scaling operate simultaneously. Along the scale expansion trajectory, service firms remain highly labor-intensive, displaying a profound human capital orientation toward highly attractive metropolitan zones. Manufacturing firms, being asset-intensive, display a strict land resource orientation, steering toward peripheral spaces with abundant, low-cost land parcel availability. Crucially, across all growth trajectories, the policy environment acts as an overarching systemic modifier. Innovative firms consistently seek entry into privileged 'institutional spaces' offering tax incentives, subsidized land, and proactive, entrepreneur-friendly governance.

4.3 Scale-Dependent Evolution of Locational Advantages

4.3.1 Regional Scale: Agglomeration Advantages in Integrated Clusters

Driven by regional integration in mega-regions like the Yangtze and Pearl River Deltas, the agglomeration advantages of integrated industrial clusters have dramatically consolidated, serving as the primary catalyst and constraint for regional relocation. To execute business model innovations, advanced service firms systematically migrate toward regions with deeper industrial foundations. This shifting occurs not merely between peripheral and core regions, but aggressively across and within core clusters. Consider the trajectory of SHEIN, a multi-billion-dollar digital apparel unicorn. Its founder originally launched the startup in Nanjing as a cross-border e-commerce player, capitalizing effectively on Nanjing's rich human capital and academic anchors during its early lifecycle. However, as SHEIN scaled, its model transformed from pure digital retail into an integrated ecosystem combining apparel design and agile, flexible manufacturing ('small-order quick-response'), which requires an unmatched textile industrial cluster and hyper-efficient international logistics. Consequently, SHEIN shifted its corporate headquarters and legal registration from Nanjing to Guangzhou. This underscores a critical structural insight: an innovation economy devoid of deep material industrial support inevitably hits growth ceilings. Academic-rich but industry-weak cities successfully incubate highly potent startups, but face severe structural leakage as these firms scale and seek specialized cluster ecosystems. Conversely, manufacturing innovators, constrained by dense, highly localized supplier networks, rarely engage in long-distance migration, defaulting instead to localized, near-field expansion.

4.3.2 Municipal Scale: Balancing Land and Talent via Municipal-County Conurbation

Cities with competitive county-level economies are undergoing deep municipal-county conurbation, accelerating functional specialization and frictionless factor mobility between central districts and outlying counties. This process reconfigures the comparative advantages of land resources and human capital. Central districts leverage agglomeration economies to offer superior integrated services, maintaining a powerful attraction for elite talent, which draws corporate headquarters and research-heavy service firms inward. Simultaneously, competitive counties offer an elegant blend of cost-effective amenities (compact, highly livable urban environments, lower living costs, reduced stress, and seamless rapid transit to the urban core), which highly appeals to mid-tier technical talent. When paired with abundant, cheap land parcels, counties become highly compelling targets for expanding manufacturing operations and integrated service firms. Thus, municipal relocation manifests as county-directed diffusion supplemented by central district concentration. In Suzhou, for example, the competitive county-level city of Changshu has aggressively drawn innovative enterprises (such as Henry New Energy Technology Co., Ltd.) outward from Suzhou's core districts (particularly adjacent Xiangcheng), while simultaneously exporting mature, scale-up innovators (like Suzhou Westdien New Energy Electrical Goods Co., Ltd.) inward to Xiangcheng and the Tiger Hill high-tech zone.

4.3.3 Intra-Urban Scale: Institutional Spaces and Polycentric Structuring

The structural transition from monocentricity to polycentricity is a vital mechanism for growing second-tier regional centers to optimize spatial efficiency. In the Chinese context, polycentricity is heavily policy-driven rather than purely market-determined. Urban inner suburbs serve as prime canvas for local states to anchor outward expansion and cultivate new innovative growth poles. By establishing specialized development zones, high-tech industrial parks, and new districts, local governments deploy massive public capital investments to construct high-subsidy 'institutional spaces.' These frameworks dramatically elevate suburban amenities while strategically depressing land acquisition costs, radically redefining suburban comparative advantages. The development of the Jiangbo New District Research and Innovation Park in Nanjing offers an illustrative case: backed by institutional formalization and national-level district designation, it rapidly overcame its cross-river geographic friction to emerge as a highly successful municipal innovation hub. Within these suburban belts, service innovators favor inner-ring accessibility to preserve lifestyle amenities, displaying centripetal tendencies, whereas manufacturing innovators prioritize outer-ring land discounts, exhibiting centrifugal paths. Furthermore, to mitigate friction associated with employee commuting, firms strictly optimize their trajectories, resulting in highly structured adjacent-ring migration.

5 Conclusion and Discussion

This study evaluates national records of certified high-tech enterprises undergoing registered address relocation over the past three years to trace innovative enterprise migration across three distinct spatial scales. The findings reveal that regional-scale relocation is characterized by core-city out-migration and cluster-based in-migration, intertwining near-field reorganization with broad-scale restructuring. Out-migration is concentrated within eastern and central regional centers, while destinations are focused within strategic coastal mega-regions like the Yangtze and Pearl River Deltas. Info and tech services migrate over long ranges from regional centers into coastal clusters, substantially heightening overall

spatial polarization, while manufacturing displays localized, near-field diffusion within coastal clusters or around inland centers. At the municipal scale, relocation occurs predominantly within strong county economies, featuring dominant county-directed diffusion and secondary central district aggregation, with manufacturing exhibiting the highest decentralization propensity. At the intra-urban scale, migration centers on the inner suburbs via adjacent-ring pathways, with manufacturing demonstrating an aggressively stronger centrifugal orientation than services.

We introduce a 'dual-evolution' framework of 'firm growth' and 'spatial restructuring' to explain these phenomena, establishing that relocation is driven by the dynamic alignment between the spatial requirements of corporate growth and scale-dependent locational advantages. Regional integration consolidates the agglomeration advantages of integrated industrial clusters, dictating macro-level regional flows. Municipal-county conurbation resets the competitive balance between land resources and human capital, governing municipal-tier shifting. Finally, institutional space advantages created by policy-driven polycentric reconfigurations serve as the primary engine for localized intra-city moves. Critically, this mechanism analysis expands upon descriptive empirical patterns to propose an integrated interpretive framework balancing firm lifecycles and spatial scales. Future research should deepen empirical causal verification, refine theoretical completeness, and explicitly integrate relocation timelines alongside more granular indicators of firm scale.

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