Breaking Boundaries: How China’s Science and Technology Innovation Corridors Are Shaping Urban Industry

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Breaking Boundaries: How China’s Science and Technology Innovation Corridors Are Shaping Urban Industry

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Policy Background

Innovative cluster policies within specific regions have been pivotal in driving regional industrial development by focusing on enhancing economic activities through innovation-driven growth (Falck et al., 2010). The regional Science and Technology Innovation Corridors (STICs), a form of regional innovative cluster, leverages its geographical concentration to facilitate resource exchange across industries or clusters, thereby fostering high-quality industrial development.

As industrial development is the primary purpose for regional innovative clusters, it is highly necessary to clarify the trade-off between specialization and diversification in industrial landscapes (Duranton & Puga, 2000). We define industrial specialization as a city's high concentration of economic activity in a few industries. Conversely, industrial diversification refers to the expansion of economic activity across a broader range of industries within a city (i.e., a more balanced distribution of employment across multiple sectors).

The primary research questions are: How do regional innovative cluster policy influence urban industrial development, particularly in terms of specialization and diversification? And do these policies exhibit spatial effects on surrounding regions and heterogeneity effects on specific industries? This study seeks to empirically examine these questions within the context of China's burgeoning Science and Technology Innovation Corridors (STICs) by analyzing data from 75 cities in China from 2006 to 2022.

Findings

Employing SDM-DID model, we discovered interesting evidence suggesting that the construction of the STICs promotes local industries and neighboring industrial specialization to realize regional industrial development. These results might be attributed to the distinct mechanisms of knowledge dissemination: Specialization often relies on clearly defined technological fields and closely related industry chains, facilitating effective network interactions and spillovers between regions. Diversification typically requires a broader resource base and a more inclusive local industrial ecosystem, limiting rapid outward diffusion and thus constraining spatial spillover.

The dynamic heterogeneity analysis reveals a clear temporal trajectory for industrial specialization: central cities experience an initial three-year dip

followed by a significant boost in industrial specialization as the STICs mature. Conversely, surrounding areas demonstrate significantly positive indirect effects only in the initial three-year period, indicating early-stage benefits from spillovers which diminish over time as central cities solidify their internal specialization.

In contrast, the dynamics of diversification present a distinct pattern. Central cities benefit immediately, evidenced by significant positive direct effects in the initial years post-STICs establishment. Surrounding cities initially exhibit negligible or slightly negative indirect effects; however, by the fourth year, these indirect impacts strengthen, becoming significantly positive by the sixth year.

Furthermore, this dual effect exhibits heterogeneity across temporal dynamics, industries, and geographical distances, driving industrial transformation. Industrial heterogeneity analyses suggest that the impacts of STICs differ in three types of factor-intensive industries (technology-intensive, capital-intensive, and labor-intensive industries).

Discernible variations are also observed in the geographical distance effects. The influence of the corridors on industry specialization is most significant within a 100-to-250-kilometer radius extending outward from the corridor. Beyond 250km from the corridor, the spillover impact on surrounding cities' industrial specialization is negligible.

Wider Policy Implications

Our findings have three implications for the theory and practice of regional innovative cluster policy and urban industrial development. First, our findings advocate for the continued promotion and strategic development of regional innovative clusters supported by robust cross-regional collaboration frameworks. Policymakers are encouraged to establish strong institutional arrangements that facilitate effective coordination, resource integration, and cooperative strategic planning across administrative boundaries (Barzotto et al., 2019).

Second, given the heterogeneity results observed in our study, we suggest that the construction and policy formulation for regional STICs across different industries, temporal dynamics, and varying geographical distances should carefully acknowledge the diversification in industrial layout and employment. Future innovative cluster policies should aim to find equilibrium between local characteristics and coherent national policy frameworks (Kristensen & Pugh,

2023; Rocchetta et al., 2022).

Third, we emphasise the importance of flexible and strategically designed economic incentives — such as tailored tax policies and optimal land resource allocation — in promoting synergistic cluster development. Policymakers should design and implement these economic incentives with clear, transparent, and rigorous criteria, ensuring balanced and sustainable regional development outcomes.

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