Scientific Research Publishing

Open Journal of Business and Management, 2024, 12, 1411-1428
https://www.scirp.org/journal/ojbm
ISSN Online: 2329-3292
ISSN Print: 2329-3284

Research on the Impact of Internet Industry Agglomeration on Regional Innovation Capability: A Perspective from the Chinese Academic Community

Jun Deng

School of Economics and Management, Zhaoqing University, Zhaoqing, China
Email: dengjun@zqu.edu.cn

How to cite this paper: Deng, J. (2024). Research on the Impact of Internet Industry Agglomeration on Regional Innovation Capability: A Perspective from the Chinese Academic Community. *Open Journal of Business and Management, 12,* 1411-1428.
https://doi.org/10.4236/ojbm.2024.123076

Received: March 2, 2024
Accepted: April 21, 2024
Published: April 24, 2024

Abstract

The Chinese internet industry had witnessed a trend towards concentrated development, with the high-tech, high-knowledge, and high-value-added sectors of the internet industry playing a pivotal role in driving regional innovation and development. This article, grounded in a thorough review of recent literature, provided a macro and micro-level depiction of the developmental landscape of the Chinese internet industry. This encompasses the concepts of internet industry concentration and regional innovation capacity, exploring the impact of the aggregation of the Chinese internet industry on regional innovation capabilities. Through literature examination, this paper revealed that the concentration of the Chinese internet industry tended to occur in urban clusters with higher levels of economic development. However, due to variations in basic conditions such as industrial development and resource allocation in each city, the influence of internet industry concentration on innovation might differ by region. Simultaneously, reinforcing the aggregation of the internet industry within regions emerged as a crucial aspect for enhancing regional innovation capabilities and driving high-quality regional development. In conclusion, this paper, from the perspective of literature review, posited the developmental disparities in the Chinese internet industry and regional innovation, along with suggesting policies for regional innovation development.

Keywords

Industry Concentration, Regional Innovation, Regional Development, Review

1. Introduction

Innovation stands as the primary driving force behind China's economic development and a crucial factor for achieving high-quality economic growth. The "14th Five-Year Plan" outline for 2020 emphasizes the comprehensive shaping of new advantages in China's development, reaffirming the core position of innovation in the overall landscape of modernization. As China steadily enters the "14th Five-Year Plan" period in 2022, there is a continual enhancement in innovation capability and technological strength, with China's contribution to technological progress now steadily surpassing 70%. The "14th Five-Year Plan" represents a pivotal period for China's innovative development, marked by an emerging new wave of technological and industrial revolution. The complexity of the external development environment faced by China has significantly increased, accompanied by profound changes in internal development conditions. At this new historical juncture, the nation's demand for innovation becomes more urgent. China increasingly needs to persist in innovation-driven development, accelerate technological and industrial revolutions, and elevate industrial competitiveness and regional innovation capabilities. However, from a practical standpoint, China's regional innovation faces two challenges. Firstly, the growth rate of regional innovation capabilities is sluggish. Despite the dual impetus from policy guidance and real-world demands, the innovation capabilities and efficiency of urban clusters have shown a slowdown in growth (Sun et al., 2021). Secondly, there exists an imbalance in internal regional innovation capabilities, with the "intra-group differences" in innovation capabilities contributing significantly to the "overall differences" (Xiao et al., 2017). Ordinary prefecture-level cities exhibit weaker innovation capabilities, while provincial capitals, first-tier cities, and some coastal cities demonstrate higher innovation capabilities compared to others. Therefore, it remains imperative to focus on the development of regional innovation. We must identify industries with stronger innovativeness in China.

In China, with the rapid integration of information technologies represented by the Internet of Things, digital economy, and big data with traditional industries, a new wave of global industrial and technological revolution is flourishing, giving rise to the Industrial Internet. As a crucial engine propelling the production of new technologies and knowledge in the information age, the Internet industry's high-tech, high-knowledge, and high-value-added characteristics have garnered widespread attention regarding their impact on regional innovation capabilities. Furthermore, the Internet industry is gradually exhibiting features of spatial concentration. Scholarly theoretical research and empirical analysis indicate that the development of the Internet industry has a certain influence on regional innovation capabilities. Industries with a high level of technological proficiency in aggregation generally exhibit knowledge spillover effects and technological diffusion, enabling regional innovation entities to share innovation resources and elements, facilitate the exchange of technology and knowledge,

reinforce healthy competition among regional innovation entities, and drive the development of regional innovation capabilities. Based on these premises, this paper aims to address the following questions: What are the research outcomes regarding the aggregation of China's Internet industry? What issues related to China's regional innovation capabilities attract attention in the literature? And how does the academic community study the impact of Internet industry aggregation on China's regional innovation capabilities? Through this research, we hope to elucidate the influence of China's Internet industry aggregation on regional innovation capabilities.

The significance of this article lies in the systematic review of relevant literature on the aggregation of the Internet industry and regional innovation capabilities. It elucidates the impact mechanism of China's Internet industry aggregation on the development of regional innovation, enriching the theoretical literature related to the aggregation of the Internet industry and regional innovation development. This contribution aids in enhancing the global academic community's enthusiasm for researching the aggregation of China's Internet industry and regional innovation.

The methodology mainly adopted in this article is literature research method. Firstly, through the systematic review of relevant literature, the article clarifies the impact mechanism of industrial aggregation development and regional innovation capabilities, analyzing the interrelationship between existing industrial aggregation and regional innovation. Secondly, by further analyzing research literature, it comprehends the current status of the development of China's Internet industry aggregation, elucidating the context and achievements of the aggregation of the Internet industry and regional innovation capabilities. Lastly, the article investigates relevant literature on the impact of Internet industry aggregation on regional innovation capabilities, exploring the relationship between Internet industry aggregation and regional innovation capabilities. It also provides insights into how the academic community can conduct future research on the aggregation of the Internet industry and regional innovation.

2. Theoretical Review

2.1. Industrial Agglomeration

Following a comprehensive review of the literature, we observe that research on industrial agglomeration primarily focuses on three dimensions: economic effects, social effects, and environmental effects.

Firstly, regarding the economic effects of industrial agglomeration, findings based on Chinese data lack unanimity. Sun et al. (2013), utilizing panel data from nearly 300 prefecture-level cities in China, investigated the relationship between industrial agglomeration and labor productivity. The results indicate that the development of industrial agglomeration exhibits a certain stage-wise pattern. Early-stage industrial agglomeration, due to congestion effects outweighing agglomeration effects, leads to a decrease in labor productivity. However, in later

stages, the agglomeration effects promote regional economic development. Wang (2017) contends that industrial agglomeration and economic growth interact, with industrial agglomeration driving economic development. Conversely, economic growth, to a certain extent, acts as a feedback mechanism, propelling industrial agglomeration, thus establishing a cyclical interdependence.

Secondly, concerning the social effects of industrial agglomeration, it primarily manifests in its impact on wage levels. Examining the manufacturing industry as an example, the agglomeration of the manufacturing industry reduces regional wage levels, while the agglomeration of the service industry significantly elevates regional wage levels (Yang, 2013). Xie (2015) found that the agglomeration of the manufacturing industry not only enhances local manufacturing wage levels but also brings about significant spillover effects to adjacent areas. These studies further underscore the spatial heterogeneity of the social effects of industrial agglomeration.

Thirdly, in the context of environmental effects, scholars have turned their attention to the environmental impact of industrial agglomeration, given the increasing global concern for environmental issues. However, there is evident disparity in research conclusions. In contrast to the findings of Wang and Nie (2016), who assert a significant correlation between industrial agglomeration and environmental pollution, suggesting that industrial agglomeration exacerbates regional environmental pollution, other scholars argue for uncertainty in the relationship. Yan et al. (2011) propose that, in the short term, industrial agglomeration can ameliorate environmental pollution issues. Yet, from a long-term perspective, the impact of industrial agglomeration on environmental pollution remains uncertain. Yang (2013) suggests a non-linear relationship, asserting that industrial agglomeration can, to a certain extent, improve environmental pollution.

2.2. Aggregation of the Internet Industry

The advancement of internet technology has profoundly influenced human society, exerting far-reaching impacts on social development and progress. Presently, scholarly research on the aggregation of the internet industry is relatively scarce. Based on the literature review, existing studies predominantly explore the current status of internet development and its macroeconomic, sectoral, and microeconomic impacts.

Firstly, examining the current status of internet development, scholars have analyzed the situation in China. Utilizing four aspects, including internet infrastructure, advanced applications, and widespread usage, Yu (2005) established an index system to measure the level of internet development in China. This provided a scientifically comparative research method for analyzing disparities in internet development across different regions. Cui (2010) focused on analyzing the development status of China's internet industry and, based on the conclusions drawn from the research, conducted an analysis and study

on the trends of internet development. Wang and Pan (2018), using panel data at the provincial level, examined various sub-indicators reflecting the level of regional internet development, employing the entropy method for weighting. The research revealed a notable widening trend in the gap of regional internet development amid the rapid improvement of China's overall internet development.

Secondly, considering the macroeconomic impact of the internet, Sun et al. (2010) conducted a study based on internet resources and provincial economic development data from the decade around 2005. They found no apparent pattern in the impact of internet resource growth on provincial economic development. Xie and Zou (2012), from a theoretical perspective, researched the impact of internet development on financial economies, asserting that the internet industry can enhance financial development by improving the efficiency of resource allocation and thereby reducing transaction costs. Shen (2021) investigated the impact of internet popularization on the efficiency of capital market information. Lin and Lin (2022) concluded that the emergence and development of "Internet+" significantly propel the development of China's urban foreign trade, influencing the conditional and spatial spillover aspects of urban foreign trade development.

Thirdly, in terms of the impact of the internet on industry sectors, especially in finance, the internet is not merely an emerging technological tool for auxiliary work (Xie et al., 2015), but also an effective means to expedite fund allocation and reshape the traditional financial system (Li & Zhao, 2014). Huang (2015) proposed strategies for rebuilding the cultural industry's ecological chain by integrating high-tech products such as big data, digital economy, and the internet. Wang et al. (2020) argued that the development of the internet industry significantly promotes the transformation and upgrading of the current industrial structure, with notable spatial differences in internet development within the context of industrial structural transformation and upgrading.

Fourthly, examining the impact of the internet on micro-enterprises, Yue et al. (2017) systematically analyzed the effects of the internet on enterprise imports and the mechanisms and channels through which the internet operates in this context. Through empirical analysis using five years of industrial enterprise data and customs data, they found that the internet significantly stimulates enterprise imports, leading to an increase in import volumes. Wang et al. (2018) contended that the internet alters the combination and connection of enterprise innovation resources, reducing transaction and contractual costs incurred in the innovation process and enhancing the innovation capabilities of enterprises. Xie et al. (2021) proposed that the internet, primarily by opening up new markets, reduces the survival risks of enterprises.

2.3. Regional Innovation

Regarding the study of regional innovation, the current status, and influencing factors of regional innovation are primarily examined from macro and micro

perspectives.

Firstly, from a macro perspective, research on regional innovation is prominently reflected in two aspects: the measurement of the current state of regional innovation and the exploration of factors influencing regional innovation. Shi et al. (2011) and Yan (2012) discussed the measurement methods, regional differences, and trends of regional innovation performance indicators. They concluded that China's regional innovation level is relatively low, displaying significant disparities and a noticeable trend of convergence. Various scholars such as Dang et al. (2008), Wei et al. (2010), and Li & Wang (2014) explored factors influencing regional innovation from different angles, including the quality of the innovation environment, the degree of regional marketization, regional cooperation levels, industrial cluster environment, labor quality, technological opportunities, absorptive capacity, industrial structure, and geographic proximity.

Secondly, from a micro perspective, the measurement of regional innovation capability has been a focal point for researchers, with emphasis on industrial and high-tech enterprises. Cheng et al. (2010) measured the innovation performance of China's high-tech enterprises, while Feng et al. (2011) and Zhang & Zhu (2012) studied the innovation performance of China's industrial enterprises. These studies indicated that the innovation performance of relevant enterprises in China remains relatively low, with significant regional disparities, but considerable growth potential. Research on influencing factors of regional enterprise innovation is also extensive. Cheng et al. (2010) found that factors such as the level of human capital, trade development, and financial support significantly promote technological progress in state-owned enterprises. Feng et al. (2011) and others suggested a weak negative correlation between government investment levels and technological efficiency in innovation development, while the degree of marketization significantly positively influences the improvement of technological efficiency in innovation. Xiao et al. (2012) demonstrated the clear role of regional industrial structure and the quality of workers in the commercialization efficiency of technological achievements. They highlighted the substantial impact of the financial environment and government support on the overall efficiency of regional technological innovation. Gu and Zhai (2012) conducted research based on the financing constraint index, revealing that financing constraints can, to a certain extent, reduce agency costs and their negative impact on innovation performance in high-tech enterprises.

3. The Impact of Industrial Agglomeration on Regional Innovation

3.1. Impact of Industrial Agglomeration on Regional Innovation

The classic agglomeration theory proposed by Marshall was the earliest exploration of the relationship between industrial agglomeration and innovation. Marshall asserted that industrial agglomeration enhances proximity among enter-

prises, fostering communication and collaboration, thereby facilitating technological diffusion and knowledge spillover (Marshall, 2011). The Chinese academic community has primarily focused its research on industrial agglomeration and regional innovation in the following aspects.

Firstly, examining the impact of industrial agglomeration on regional innovation from the perspective of the entire industry, Wu (2012) concluded through empirical analysis that industrial agglomeration enhances innovation capability. He further argued that industrial agglomeration alters the innovation environment by influencing the behavior of enterprises. Cheng (2015), utilizing provincial-level panel data from China, employed static and dynamic spatial econometric models. The study revealed that agglomeration in manufacturing and market potential both positively influence regional innovation capability. However, the promoting effect of agglomeration in productive service industries on regional innovation capability is less apparent. Du & Li (2015), based on enterprise sample data, investigated the impact of industrial agglomeration on innovation from perspectives such as new product development and enterprise innovation decisions. The research found that industrial agglomeration plays a positive role in innovation, and under suitable policies, technology research and development also exhibit agglomeration effects, driving technological innovation and optimizing the regional industrial structure. Zhao and Xu (2020) utilized System GMM and selected provincial panel data from 2001 to 2016 for empirical analysis. They found that industrial agglomeration significantly promotes the improvement of regional innovation levels. The higher the degree of industrial agglomeration, the stronger its role in promoting innovation. Moreover, different regions demonstrate distinct paths through external mechanisms by which industrial agglomeration affects innovation.

Secondly, examining the impact of industrial agglomeration on regional innovation from the perspective of industrial sectors, Han et al. (2015) conducted empirical research on dynamic panel data. The analysis from the overall manufacturing industry perspective showed that increasing the level of industrial agglomeration effectively promotes the enhancement of innovation efficiency. From the perspective of factor intensity, only agglomeration in technology-intensive manufacturing industries significantly promotes the improvement of innovation efficiency, while the impact of agglomeration in labor-intensive and capital-intensive manufacturing industries is less evident. Du et al. (2018) focused on the Beijing-Tianjin-Hebei and Yangtze River Delta economic circles. The empirical study found that industrial agglomeration has a certain promoting effect on innovation capability. Shi and Xu (2018), based on provincial panel data for five categories of strategic emerging industries, conducted empirical analysis. The research showed that industrial agglomeration has a noticeable driving effect on the innovation capability of the innovation ecosystem and innovation network in four strategic emerging industries, such as high-end equipment manufacturing and new energy. However, for the overall innovation environ-

ment of the innovation ecosystem in strategic emerging industries, industrial agglomeration did not exhibit a clear promoting effect. Xie and Bu (2018) pointed out that agglomeration in the technology service industry significantly promotes the enhancement of regional innovation capability and economic levels. In the long term, economic growth and innovation capability are greatly influenced by agglomeration in the technology service industry. Zhang (2019) proposed that industrial agglomeration in different sectors has variations in promoting regional innovation. The positive effect of agglomeration in the primary industry on regional innovation is relatively weaker compared to agglomeration in the secondary and tertiary industries.

Thirdly, analyzing the impact of industrial agglomeration on regional innovation from the perspective of diversified and specialized industrial agglomeration. Cheng and Lyu (2015) employed spatial econometric models to empirically analyze the impact of industrial agglomeration on innovation in the manufacturing industry. The results showed that intra-industry competition and diversified agglomeration both facilitate the improvement of innovation efficiency in manufacturing. However, specialized agglomeration does not significantly enhance the innovation effects in manufacturing. Lyu and Shang (2017) noted that the innovation output of the electronic communication equipment manufacturing industry, in the short term, is positively influenced by the regional spatial spillover effects of specialized agglomeration and market competition. At the same time, it is negatively affected by the overall spatial spillover effects of diversified agglomeration. Wang et al. (2022), from the external perspective of industrial agglomeration, examined the impact of high-tech industrial agglomeration on regional innovation capability based on 30 Chinese provinces. The research results indicated that both specialized and diversified agglomeration patterns in high-tech industries significantly enhance regional innovation capability.

Fourthly, the adverse impact of industrial agglomeration on regional innovation. Industrial agglomeration exhibits an optimal scale, and deviations, whether too low or too high, are detrimental to innovation development. Yang (2013) found that in regions with relatively high industrial agglomeration in the manufacturing sector, excessive imitation of innovative behaviors, intensified by market competition, leads to insufficient motivation and low enthusiasm for innovation among enterprises. Particularly when the number of competitive enterprises within the region exceeds its capacity to sustain such entities, intense competition for limited resources and facilities ensues, resulting in vicious competition that inhibits innovation development. Zhu and Gu (2017) argued that agglomeration in the technology service industry achieves significant positive effects on elevating regional innovation levels through knowledge and technology spillover and competitive effects. However, it also exerts a certain inhibitory effect on innovation levels in neighboring areas, demonstrating a pronounced interregional inhibitory effect. Wei & Li, (2018) indicated that industrial agglomeration brings

about negative impacts on innovation. Firstly, excessive agglomeration leads to intense competition, hindering the play of agglomeration externalities and suppressing innovation. Secondly, with the increase in the number of enterprises in agglomeration areas, enhanced communication and connections lead to the phenomenon of "free-riding" and even give rise to legal issues such as imitation infringement. Lai and Wang (2022), through research on the electronic and communication equipment manufacturing industry, found that industrial agglomeration hinders the improvement of regional innovation efficiency and impedes regional innovation development. At the stage of outcome transformation, it impedes the enhancement of regional innovation efficiency.

Fifthly, the existence of a certain non-linear relationship between industrial agglomeration and regional innovation. Chen et al. (2013) discovered that the impact of different degrees of agglomeration in the high-tech service industry on innovation varies. For specialized agglomeration, the influence on innovation increases with the degree of agglomeration. Its impact on innovation changes from a promoting effect to an inhibitory effect. However, the situation is the opposite for diversified agglomeration. Low agglomeration is unfavorable for innovation, while high agglomeration has a promoting effect on innovation (Zhou, 2013). Zhang and Qi (2016) suggested that the impact of specialized agglomeration and enterprise competition on regional innovation capability follows an inverted U-shaped curve. With changes in regional scale, the effects of specialized agglomeration and diversified agglomeration on regional innovation capability vary. Lyu et al. (2017) argued that industrial agglomeration can inhibit regional green innovation, and its influence strengthens with the increase in agglomeration level. The negative impact of industrial agglomeration on green innovation is gradually weakening, and when the agglomeration level reaches a certain fixed value, industrial agglomeration has the function of stimulating green innovation. Du et al. (2017), through constructing a benchmark panel threshold model and spatial Durbin model, demonstrated through empirical analysis using provincial panel data from China that there is a non-linear relationship and spatial spillover effects between industrial agglomeration and regional technological innovation. Wu & Shen (2019), by analyzing the relationship between equipment manufacturing agglomeration and green innovation efficiency, found that the role of equipment manufacturing industrial agglomeration in different regions in China in promoting green innovation efficiency varies. The agglomeration of high-tech service industries under different agglomeration patterns exerts varying degrees of impact on innovation efficiency, with a decreasing trend in the impact degree under highly agglomerated patterns (Wang & Wang, 2021).

In addition, there is significant regional heterogeneity in the level of Internet development among Chinese provinces, with a spatial pattern gradually decreasing from east to west (Qiu & Zhu, 2022). In more developed cities along the eastern coast, Internet development has a strong positive impact on regional in-

novation (Tao & Liu, 2022). The latest empirical analysis research indicates that Internet development has a positive impact on urban innovation capability, showing significant regional heterogeneity and positive spatial spillover effects (Dai & Yu, 2023). Through the above literature review, it can be observed that there is still relatively limited existing research on the impact of Internet industry agglomeration on regional innovation capability. However, from another perspective, the influence of industrial agglomeration on regional innovation capability varies with time, region, and industry. According to the theory of the industrial agglomeration life cycle, the industrial cycle consists of four stages: formation, growth, maturity, and decline. During different development stages of the industry, the impact of industrial agglomeration on relevant factors varies. Although the Internet industry in China has seen robust development in recent years, it is still in the growth stage, exhibiting initial agglomeration effects and has not yet matured.

3.2. The Impact of Internet Industry Agglomeration on Regional Innovation

In general, Internet industry clusters tend to concentrate in major metropolitan areas and city centers. Discussions on the direct impact of Internet industry agglomeration on regional innovation capability at the urban cluster level are limited, with most studies exploring the mechanisms of the impact of Internet development on innovation factors from different perspectives.

Firstly, an analysis of the impact of Internet industry agglomeration on regional innovation capability from the micro perspective of enterprises. Looking at the manufacturing sector, a study on the relationship between informationization and technological innovation capabilities in manufacturing enterprises reveals that innovation capabilities increase with the improvement of information capital. The enhancement of informationization can reduce information transmission costs in aspects such as product innovation, decrease uncertainty in the R&D process, and consequently promote the improvement of innovation performance in enterprises (Bi et al., 2012). In the electronic information industry, research based on China's top 100 electronic information enterprises indicates that the improvement of enterprise informationization significantly promotes the development of innovation (Dong, 2013). However, some studies have found that the development of Internet informationization does not directly impact enterprise innovation capabilities (Chen et al., 2017). In summary, from the micro perspective of Internet development, this paper believes that the development of Internet informationization has a certain positive impact on enterprise innovation capabilities.

Secondly, an analysis of the impact of Internet industry agglomeration on regional innovation capability from a macro perspective. Song and Li (2018) believe that the service industry has gradually become a new driving force for the development of regional innovation capability in the new era. Compared with

traditional service industries, the modern service industry has a strong correlation with regional innovation capability, with the Internet industry being the most active in terms of innovation (Bai & Li, 2015). Regarding the development of China's Internet industry, there is regional diversity in the impact of informationization on technological progress. Informationization development does not significantly affect technical innovation in the central region but has a notable impact on local technical innovation in the eastern and western regions (Chu & Chu, 2016). Zhang et al. (2017) further analyze the mechanism of Internet industry agglomeration affecting regional innovation, conducting empirical research on the temporal and spatial correlation of Internet development in provincial regions and its impact on regional innovation. The results indicate that Internet industry development significantly promotes regional innovation. Hui and Xie (2019), using 14 years of time-series data from Shaanxi Province (2004-2017) for empirical analysis, conclude that the level of Internet development has a long-term stable positive relationship with innovation investment and output, driving the growth of regional innovation input and output in the short term. In summary, the analysis of the macro-level impact of Internet development on innovation reveals a positive relationship between Internet development and innovation.

Currently, the development of China's Internet industry has gradually formed a clustering phenomenon and has become an important influencing factor driving innovation development. On the one hand, Internet industry agglomeration enhances information exchange and knowledge sharing among various innovation entities within the region, reducing time costs for information search and communication, and gradually forming economies of scale, thus promoting the improvement of regional innovation capability. On the other hand, Internet industry agglomeration intensifies cooperation and competition among various innovation entities within the region. Cooperation can fully leverage their respective specialization advantages, and competition can enhance the innovation vitality of innovation entities, thereby promoting the development of regional innovation capability. However, Internet development has certain spatial spillover effects on regional innovation. The investment in Internet informationization significantly positively impacts the innovation output of enterprises. When R&D investment is included in the empirical analysis, it is found that Internet informationization has a negative impact on the innovation output of relevant enterprises within the region (Dong, 2013). The informationization development of the Internet industry sector also has a certain impact on industrial enterprises in China, and the level of informationization has a significant positive impact on the efficiency of industrial technological innovation in China (Han et al., 2014, 2019). Some studies have constructed an evaluation index system for Internet development from the perspectives of construction, popularization, and application, finding that the comprehensive evaluation index of the Internet industry has a certain nonlinear impact on regional innovation capability (Hui et al.,

2021). With the continuous development of the Internet industry, the Internet industry has gradually formed agglomeration effects. On the one hand, the Internet industry itself has characteristics such as high technology, high added value, strong communicability, and knowledge spillover. These features demonstrate the rapid dissemination of information in Internet industry agglomeration, with low time costs, which can quickly enhance technological progress in enterprises and thus affect the spatial spillover effects of regional innovation capability. On the other hand, both regional innovation capability and Internet industry agglomeration have certain spatial dependence. The development of the Internet industry can break down barriers to information transmission, and the innovation entities of regional innovation capability rely on timely information resources, cooperate and compete with each other. While enhancing the regional innovation capability of the local area, it also has a positive spatial spillover effect on the regional innovation capability of adjacent areas.

4. Conclusion and Prospects

4.1. Conclusion

Based on a comprehensive review of existing literature, current research by Chinese scholars mainly focuses on industrial agglomeration, the development of the internet industry, regional innovation development, and the impact relationship between industrial agglomeration and regional innovation development, resulting in a rich body of research outcomes. Summarizing the existing research in China reveals:

Firstly, regarding the development of the internet industry, emphasis has been placed on constructing an evaluation index system from the perspective of internet infrastructure and measuring the level of internet development. Studies explore the impact of internet development on macroeconomics and industrial sectors. Research on industrial agglomeration primarily concentrates on the economic, social, and environmental effects generated by industrial agglomeration. Studies on regional innovation analyze the current status and influencing factors of regional innovation development from both macro and micro perspectives. By reviewing the mechanisms and conclusions of these studies, a theoretical foundation is provided for further analysis by other scholars on the impact relationship between internet industry agglomeration and regional innovation capability.

Secondly, the relationship between industrial agglomeration and regional innovation is complex, with existing research indicating positive, negative, and nonlinear impact mechanisms. Limited research has been conducted on the impact of internet industry agglomeration on regional innovation, and the development of the internet industry may differ from other industrial agglomerations. Therefore, it is necessary to further explore the impact relationship between internet industry agglomeration and regional innovation capability.

Thirdly, there is no unanimous consensus on the impact relationship between

industrial agglomeration and regional innovation capability, and most Chinese studies are based on provincial panel data. Empirical research on panel data at the level of urban clusters is still relatively scarce. Considering the varying development situations of industrial sectors in different regions, the impact relationship of internet agglomeration on regional innovation may also differ, and the conclusions of existing literature may not be applicable to a specific region.

Fourthly, current research on the relationship between industrial agglomeration and regional innovation capability mostly utilizes ordinary benchmark regression models. There is limited research on the impact of internet industry agglomeration on regional innovation, with most literature focusing on the study of the impact of internet development on relevant elements of regional innovation. As industrial development often exhibits stage-specific and spatial effects, whether China's internet industry has formed a clustering level and whether it will have spatial spillover effects on regional innovation capability remains unknown. Therefore, it is essential to explore the spatial impact relationship of internet industry agglomeration on regional innovation capability.

4.2. Prospects

Based on the comprehensive review conducted in this article, it is evident that the agglomeration of the internet industry has an impact on regional innovation capability. However, given the current complex development environment, both internet industry agglomeration and regional innovation are influenced by various comprehensive factors. The overall development status highlights two issues in current Chinese regional innovation: the slow growth of regional innovation capability and the uneven development of innovation capability within regions. From the perspective of the literature review, several future research directions can be proposed.

Firstly, there is a need to emphasize the development of the internet industry to overcome the bottleneck of slow regional innovation capability growth. China is currently at a crucial point in the "14th Five-Year Plan," and under the dual impetus of policy guidance and practical demands, the innovation capability of urban clusters and their scale efficiency has shown a slowing growth rate. This study reveals that internet industry agglomeration not only promotes regional innovation development but also enhances the innovation capability of other regions. It serves as a driving force to boost regional innovation capability in China. Therefore, attention should be given to the role of internet industry agglomeration in the enhancement of regional innovation capability. Efforts should be directed towards strengthening the construction of industrial clusters in the "Internet+" field, elevating the level of internet industry agglomeration, and maximizing the knowledge spillover effects of internet development. This can stimulate the diffusion and absorption of knowledge in other innovation entities and regions, facilitate the transformation of outcomes, and enhance the overall regional innovation capability, providing significant momentum for technologi-

cal development and transformation.

Secondly, efforts should focus on enhancing the radiating effect of central cities to reduce regional development disparities in innovation. While attention is directed towards the continuous improvement of internet development levels, sparking knowledge spillover effects, it is equally important to address regional disparities. Leveraging the positive spatial spillover effects of internet industry agglomeration on regional innovation capability, there is a need to reduce disparities in regional innovation capability. This involves not only enhancing the innovation capability within a local region but also strengthening the driving role of central cities within urban clusters. By constructing internet industry clusters, establishing internet communication platforms, and building a regional innovation network system, central cities can attract various innovation entities from different regions, such as enterprises, universities, research units, and individuals. This approach aims to narrow the developmental disparities in innovation and share the technological dividends brought about by regional innovation.

Thirdly, it is crucial to provide tailored and dynamic policies for regional innovation development. Regional innovation capability exhibits a certain degree of spatial dependence, where the innovation capability of one region influences others. The improvement in the internet industry agglomeration level in a local region can enhance its regional innovation capability. It is hoped that in the future, the improved internet industry agglomeration level in a local region will significantly enhance the regional innovation capability of surrounding areas, with the diffusion effect surpassing the return effect. All these research directions require continuous attention and exploration by scholars in the future.

However, it is clear that focusing on the empirical data of key geographical regions could more significantly contribute to understanding the dynamics of internet industry agglomeration and innovation.

Founding

This research was funded by a grant of Zhaoqing Philosophy and Social Science 14th Five Year Plan in China (grant number: 23GJ-29).

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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