

The Impact of Industrial Agglomeration on Urban Economic Development in the Context of Digital Economy

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Abstract. Digital economy is the main economic form after agricultural economy and industrial economy, and is the core element of national strategic guidance. As a bridge connecting the development and application of digital economy, emerging technologies are closely related to the optimization and upgrading of industrial structure. In the new era, it is of practical significance to seize new opportunities for digital development, expand new space for economic development, promote industrial agglomeration construction with digital empowerment, and create high-quality and high-end industrial clusters. This paper analyzes the effects of emerging technologies on different industrial agglomeration in the digital economy, and then studies the impact of industrial agglomeration on urban economic development under digital empowerment from the aspects of economic resilience, industrial competitiveness, and green innovation. Through the comparative analysis of literature, it is concluded that digital economy positively promotes urban economic development through industrial agglomeration. At the same time, this paper also analyzes the negative externalities of the digital economy and puts forward corresponding policy recommendations.

Keywords: Digital economy, industrial agglomeration, urban economy.

1. Introduction

In the context of a new round of scientific and technological revolution and industrial transformation, and digital transformation has become a general trend, the huge value of the digital economy is self-evident. The "14th Five-Year Plan" on the development of the digital economy points out that it must base on the new stage of development, completely, accurately and comprehensively implement the new development concept, build a new development pattern, jointly promote digital industrialization and industrial digitalization, empower the transformation and upgrading of traditional industries, cultivate new industries, new business formats and new models, and continuously strengthen, optimize and expand China's digital economy, providing strong support for the construction of digital China [1]. This paper analyzes industrial agglomeration by selecting emerging technologies such as Internet of Things, 5G network and big data under the digital economy, studies the relationship among digital economy, industrial agglomeration and urban economic development, and aims to explore the new path of urban economic development under the new model of digital economy.

2. Literature Review

As for the mechanism of industrial agglomeration on urban economic development, predecessors have studied in different aspects. Zhu Qiaoqiao et al. compared the benefits of industrial synergistic agglomeration in eastern and central China with those in northeast and northwest China for high-quality economic development, and analyzed them from the perspective of environmental regulation, concluding that environmental regulation is conducive to industrial agglomeration to play a positive externality and promote high-quality economic development [2]. Cao Yaqing believes that specialized agglomeration promotes urban economic growth, while diversified agglomeration inhibits urban economic growth [3]. Sun Zhichao et al. found that industrial agglomeration has an intermediary effect on technological innovation promoting economic growth, but the effect of different industrial agglomeration is different [4]. Bao Jinhong et al. found that the synergistic

agglomeration of producer services and high-tech manufacturing has an inverted U-shaped nonlinear relationship with economic development, and most of the provinces in China are in the promotion period [5].

Regarding domestic research in the field of digital economy, scholars mainly discuss the following contents: First, digital economy enables industrial innovation, which can effectively promote high-tech industrial agglomeration and promote sustainable development of regional economy; The second is to analyze the differences in the development and impact of the digital economy in different regions of China, and give improvement strategies from various aspects such as talent introduction, policy incentives, optimizing business environment, and investment in infrastructure and services.

To sum up, most scholars focus on the impact of industrial agglomeration on urban economic development or the impact of digital economy on industrial agglomeration, but lack the correlation between the three. With the in-depth development of economic globalization and digital economy, digital economy is bound to become a key factor leading industrial agglomeration and further promoting urban economic development. Based on this, the marginal contributions of this paper are as follows: (1) Under the digital economy, industrial agglomeration has some negative externalities on urban economic development, but generally plays a positive role in promoting it; (2) There are still disadvantages in the development of digital economy, which need to be improved through the efforts of governments, enterprises, relevant institutions and other parties.

3. The Influence Mechanism of Digital Economy on Industrial Agglomeration

3.1. Internet of Things

In the digital economy, emerging technologies have become an important factor in achieving high-quality economic development. The rapid development of the Internet of Things makes the connection between objects and the network more close, and the intelligent identification, positioning, tracking, supervision and other functions are realized through information exchange and communication between objects. This shows that the use of the Internet of Things will reduce the time and labor costs in different processes of postal transportation, and greatly improve the efficiency of logistics transportation. On this basis, logistics transportation, as the intermediate input of most industries in the city, has a direct impact on the agglomeration benefits of different industries.

In this paper, the industries affected by the logistics industry are roughly divided into two categories: collaborative integrated industry and independent processing industry. (1) Collaborative integrated industry refers to an industry in which products need to be produced, packaged and delivered in a short period of time, emphasizing timeliness, and having a large sale in a short time, such as the flower industry. Take Kunming Dounan Flower Market as an example, flowers from picking and cutting to packaging and transportation need to be completed in a relatively short time in order to ensure the quality of flowers and timely delivery. The logistics industry empowered by the Internet of Things can effectively narrow the information gap between suppliers and commodities, customers, reduce unnecessary costs in the transport link, such as commodity damage and goods loss caused by lax supervision, so that suppliers can obtain higher profits, and ultimately increase the attractiveness of the region through self-reinforcing effects [6]. Attracting related industries in the flower industry chain to further gather. (2) Independent processing industry refers to an industry in which different parts of a product are produced by multiple enterprises, have distinct division of labor links, and ship within a certain period, such as the clothing industry. The agglomeration of button makers and dressmakers helps to shorten face time and reduce modification costs [6]. However, with the prominent role of the Internet of Things in the logistics industry, the opportunity cost caused by the non-agglomeration of the clothing industry will be reduced, which will lead to a decline in the advantage of the agglomeration of the clothing industry.

3.2. 5G Network and Big Data

The popularity of smart phones and 5G networks has increased the number of users, which enable the amount of data to surge, and then big data emerge as the times require. For the online industry, consumers understand and get the products and services they need through different e-commerce platforms, and suppliers make profits by selling their products online. The addition of big data has formed a new business model, which uses its 5V (volume, velocity, variety, value, veracity) characteristics to connect buyers and sellers quickly, improve the efficiency of supply and demand, and break through the traditional geographical agglomeration in the agglomeration model, derive a new form of online agglomeration. For example, if a user searches for "goldfish" online, the platform will push different kinds of goldfish and store the entries in a large database. In subsequent browsing, the tools, equipment, feed, medicine and even books and other pets required for fish farming will be pushed to the user. To a certain extent, interrelated industries will form online virtual agglomeration under the digital background, that is, a new form of agglomeration in cyberspace derived from the digital economy. In this case, agglomeration is affected by both supply side and demand side, and virtual agglomeration provides factor of production for agglomeration [7].

In addition, for offline industries, the coverage of 5G network and the screening and analysis of big data have a significant multiplier effect on their publicity and marketing. For example, agricultural product marketing can rely on digital to explore new ways of marketing innovation, expand product portfolios, and cultivate multiple subjects [8]. In the digital economy, businesses can use the advantages of 5G network and big data to attract the attention of consumers in a short period of time by using network traffic. In order to maximize the utility obtained by purchasing products, consumers choose markets with high quality and variety, which promote the agglomeration of related industries to enhance regional economic competitiveness. This situation can be reflected in the agglomeration of cultural tourism in the life service industry: the synergistic agglomeration of tourist attractions, transportation and accommodation, catering and entertainment, cultural and creative experience and other industries can well meet the different needs of consumers and attract more tourists. With digital empowerment, people's understanding of information channels is broadened, the information gap between consumers and producers is reduced, the willingness to consume is enhanced, and the role of life service industry agglomeration is further highlighted.

4. The Influence Mechanism of Industrial Agglomeration on Urban Economic Development under Digital Economy

Based on the above analysis, the collaborative integrated industry like the flower industry will be further agglomerated under the promotion of the digital economy, the radiation scope of the industry will expand and the influence will be enhanced, which means the industry will attract more and larger markets, and the industrial competitiveness will be significantly improved. According to relevant literature, industrial competitiveness is positively correlated with urban economic development, that is, as the industrial competitiveness increase, the level of urban economic development will be improved. At the same time, the upgrading of logistics industry helps to break the boundary of industrial specialized agglomeration, promote heterogeneous industrial agglomeration, transform the agglomeration economy from a localization economy to an urbanization economy, and then promote technological innovation through knowledge spillover. On the one hand, innovative industrial agglomerations are conducive to promoting industrial upgrading and achieving green and high-quality development [9]. On the other hand, digital economy plays a positive role in boosting urban green innovation by promoting industrial agglomerations [10]. Online virtual agglomeration will provide new opportunities for urban economic development, increase employment, improve urban industrial structure, improve consumers' marginal propensity to consume, and increase urban gross product. Furthermore, virtual agglomeration can get rid of spatial constraints of traditional agglomeration, integrate and transmit a large amount of data and information, which is more in line with the characteristics of modern big economy: informatization and efficiency, and is conducive to

releasing greater economic potential and reducing agglomeration costs. Therefore, the construction of digital virtual agglomeration network is of great importance to urban economy. While the life service industry is closely related to people's lives and closely linked to urban characteristics, the synergistic agglomeration of cultural tourism can effectively stimulate consumer demand, bring sustained and stable economic growth to the city, attract local and foreign capital, promote urban economic flow, and enhance the resilience of urban economy. When cities experience major events (such as after epidemic), consumption in life services can help cities get out of the economic downturn as quickly as possible and reduce the negative impact of insufficient economic resilience.

However, due to the immature development of the digital economy, there are also negative externalities while "escorting" economic development. For example, cloud computing and big data will improve the independent analysis ability of enterprises and form more isolated companies, most of them have inelasticity of supply, which is not conducive to urban economic development in the long run. Secondly, due to the difference in the scientific research level of large and small enterprises, the utilities they obtain through the digital empowerment are different, which will have an impact on the industrial agglomeration, and may also disrupt the market mechanism and cause unfair competition. Finally, the agglomeration of some industries under the digital background will have an impact on the agglomeration of other industries. For example, the agglomeration of logistics industry and online service industry driven by emerging technologies such as the Internet of Things and big data may have negative externalities on the operation of offline markets. Due to the nature of work, housing, transportation and other factors, some consumers choose to increase the cost of money in exchange for the cost of time and energy. The agglomeration benefits of industrial agglomeration places such as food city and large commercial square will be reduced during non-holidays.

5. Conclusion

In conclusion, industrial agglomeration in the digital economy can enhance the competitiveness of some industries, strengthen the resilience of urban economies, release economic potential, and promote green innovation. Industrial agglomeration plays an intermediary role in promoting urban economic development through digital economy, that is, on the whole, digital economy positively promotes urban economic development through industrial agglomeration.

The research conclusion of this paper has certain policy implications. First of all, through policy encouragement, enterprises should be guided to further move towards industrial digitalization and change to new business forms. Digitalization is the top priority of future economic development. For enterprises, taking the lead in realizing digital transformation means taking the lead in seizing new opportunities for development. For countries, the higher the level of digitalization, the faster they can seize the development opportunities of the times; Secondly, the government should increase the investment and improvements of digital infrastructure, provide financial and technical support for some industries, Strengthen digital links between different industries, and bring different industries to a higher level of digitization close to each other as soon as possible, reduce the weakening or even interruption of industrial links due to differences in their own scientific research levels and digital degree gaps, and prepare for the internationalization of the digital economy. Finally, it is necessary to formulate relevant reasonable laws and regulations, prepare emergency response plans, promptly summarize the experience of market mechanisms in the digital economy, prevent the breeding of chaos such as unfair competition in the digital economy, and achieve standardized, healthy and sustainable development.

References

- [1] The State Council of PRC. A Plan to Facilitate Development of the Digital Economy in the 14th Five-Year Plan Period. (2022-01-12) [2024-06-19]. Retrieved from: https://www.gov.cn/zhengce/zhengceku/2022-01/12/content_5667817.htm.

- [2] Zhu Qiaoqiao, Wang Yuqian, Li Zhengbo. Industrial collaborative agglomeration, environmental regulation and high-quality economic development. *Ecological Economy*, 2023, 39 (10): 63-71.
- [3] Cao Yaqing. Study on the influence of industrial agglomeration on urban agglomeration economic growth and enterprise benefit. A Dissertation Submitted for the Degree of Master in Chongqing Jiaotong University, 2023: 1-74.
- [4] Sun Zhichao, Wang Tao, Guo Huiwen et al. Technological Innovation, Industrial Agglomeration and Economic Development. *On Economic Problems*, 2023, (7): 77-86.
- [5] Bao Jinhong, Li Yin. Industrial Co-agglomeration and High-Quality Economic Development: Based on Empirical Analysis of High-tech Industry and Producer Services. (2024-01-19) [2024-06-19]. Retrieved from: <https://doi.org/10.19898/j.cnki.42-1704/C.20240110.04>.
- [6] Arthur O'Sullivan. *Urban economics*. Peking University Press. Beijing, 2015: 8-42.
- [7] Wang Ruyu, Liang Qi. Realistic foundation and application of virtual agglomeration in digital economy. *Journal of Chang'an University (Social Science Edition)*, 2022, 24 (4): 34-52.
- [8] Zhang Bei, Ma Ruqiu, Zhu Jichan. Agricultural Product Marketing Innovation in the Digital Economy: Logics, Models and Paths. *China Business and Market*, 2024, 38 (1): 22-33.
- [9] Jing Guowen. Innovative Industrial Cluster and Green High - quality Development. *Journal of Yunnan University of Finance and Economics*, 2023, (7): 1-15.
- [10] Zhou Jie, Wang Hui. Digital Economy, Industrial Collaborative Agglomeration and Urban Green Innovation. *Journal of Technical Economics and Management*, 2024, (1): 66-71.