

Digital Economy and Regional Development: Consensus, Controversies, and Prospects — A Case Study of the Yangtze River Delta Region

Xuyan Tang*

School of Economics and Management, Qinghai Normal University, Xining 810000, China

**Corresponding author: Xuyan Tang.*

Abstract

The digital economy has increasingly shaped regional development in China, and the Yangtze River Delta (YRD) is often regarded as one of its most representative regions. This paper reviews recent studies on the regional impacts of the digital economy in the YRD, with particular attention to productivity, industrial upgrading, SME development, green transformation, and spatial interactions. Existing research generally suggests that the expansion of the digital economy has contributed to higher innovation efficiency and the upgrading of manufacturing industries, while also easing financing constraints for small and medium-sized enterprises and encouraging green technological innovation. At the same time, the literature does not reach full agreement on several issues. In particular, studies of spatial effects point to both positive spillover effects and possible siphon effects that may further widen regional disparities. From a methodological perspective, current studies mainly rely on spatial econometric approaches, two-way fixed effects models, threshold models, and mediation analysis. Research on SME digital transformation, however, still tends to remain descriptive and lacks more systematic empirical investigation. Future studies could pay greater attention to the mechanisms behind siphon effects, make wider use of city- and county-level data, and further connect empirical findings with broader theoretical discussions. More work is also needed on issues related to transparency and governance in the digital economy. Overall, the paper aims to contribute to ongoing discussions of digital economy development and regional integration in the Yangtze River Delta.

Keywords

digital economy, Yangtze River Delta, spatial spillover effect, regional coordinated development

1. Introduction

The digital economy is increasingly influencing patterns of regional development. In recent years, its contribution to improving China's productive efficiency has become more visible, reflecting not only the wider application of digital technologies but also their deeper integration with the traditional economy [1]. The Yangtze River Delta (YRD) region is widely regarded as a representative example of this process.

Existing studies still show considerable disagreement regarding the spatial effects of the digital economy, particularly in relation to positive spillover effects and siphon effects, as well as the methodologies used in research on SME digital transformation. This paper reviews the impacts of the digital economy in the YRD across five dimensions: productivity, industrial development, small and medium-sized enterprises, green development, and spatial effects. It aims to summarize current debates and provide a basis for further research on regional integration and digital development.

2. Background

The digital economy has increasingly become an important factor shaping regional development patterns. In the Yangtze River Delta (YRD), it has contributed to industrial upgrading and economic growth, while also bringing about a number of structural challenges that continue to attract academic attention.

From the perspective of regional development, the digital economy in the YRD has expanded rapidly in recent years. Core cities such as Shanghai, Hangzhou, and Nanjing remain ahead in both digital industrialization and industrial digitalization, while cities including Suzhou, Wuxi, and Ningbo occupy a secondary tier, and a number of other cities still lag behind [2]. This uneven distribution suggests that the digital economy in the YRD has not developed through balanced regional diffusion but instead reflects a relatively clear “core-periphery” structure. Although existing studies generally argue that the digital economy helps strengthen urban economic resilience and supports the high-quality development of manufacturing industries [3–4], its spatial effects are not always entirely positive. Some studies point to positive spatial spillover effects, whereas others emphasize possible “siphon effects” caused by the concentration of capital, talent, and technological resources in core cities, which may further weaken the development position of surrounding areas [5–7].

At the same time, considerable debate remains in the existing literature across several dimensions. For instance, it is still unclear whether the digital economy narrows regional productivity gaps or instead widens them. Questions also remain over whether its influence on industrial agglomeration follows a linear pattern or an inverted U-shaped relationship. Research on the digital transformation of SMEs likewise remains controversial: while some studies suggest that digitalization can ease financing constraints, related research is still heavily descriptive in many cases. In the area of green development, scholars have also discussed whether the digital economy simultaneously produces both a “green dividend” and a possible “green paradox.” These disagreements suggest that no clear consensus has yet been reached regarding the regional effects of the digital economy in the YRD. In addition, much of the existing research remains focused on single-dimensional empirical analysis and lacks a more integrated theoretical framework.

Against this background, this paper reviews the impacts of the digital economy in the YRD from five perspectives: regional productivity, industrial development, SMEs, green development, and spatial effects. It further summarizes the main areas of agreement and disagreement in the literature, identifies current research limitations, and discusses possible directions for future studies. The broader aim is to provide theoretical support for further research on digital development and regional integration in the YRD.

3. Research Objectives

This paper reviews the existing literature on the regional impacts of the digital economy in the YRD. The main objectives are as follows:

- (1) to examine the main findings, areas of disagreement, and research methods in studies related to regional productivity, industrial development, SMEs, green development, and spatial effects;
- (2) to discuss several ongoing debates in the literature, including issues surrounding spatial spillovers and siphon effects, regional productivity gaps, and the possible “green paradox,” while also identifying limitations in current research methods;
- (3) to outline possible directions for future research and explore the construction of a more integrated analytical framework for studies of digital economy development and regional integration in the YRD.

4. Literature Review

The impact of the digital economy on regional development can be understood through several major strands of economic theory. Endogenous growth theory [8] highlights the role of technological progress and knowledge accumulation in sustaining long-term economic growth, while the emergence of data as a production factor in the digital economy can be seen as an extension of this framework. Technology diffusion theory [9] explains how innovation spreads across regions and provides a useful basis for understanding intercity knowledge spillovers in the YRD. New economic geography [10] draws attention to the spatial processes of agglomeration and diffusion, which helps explain why the digital economy may produce both positive spillover effects and siphon effects at the same time. Transaction cost theory [11–12] further suggests that digitalization can reduce information asymmetry and lower the costs of cross-regional coordination, while theories of network externalities [13] emphasize how platform expansion and user scale influence value creation. Based on these perspectives, the following sections review the literature from four dimensions: technological innovation, industrial upgrading, spatial spillovers, and regional coordination.

4.1 Technological Innovation: a Core Driver of the Digital Economy

Technological innovation is widely regarded as one of the main channels through which the digital economy affects regional development. According to endogenous growth theory [8], sustained growth depends on the interaction between R&D investment, human capital accumulation, and knowledge spillovers. Within the YRD, the growing role of data as a production factor has reduced the costs of knowledge codification and cross-regional transmission, which in turn has accelerated technological diffusion and innovation activities. Existing empirical studies generally find that the digital economy improves innovation efficiency in high-tech enterprises, with stronger effects observed among non-state-owned enterprises and firms located in eastern China [14].

Human capital accumulation is often identified as an important transmission mechanism. Some studies show that employment in computer services and software industries contributes more strongly to the development of the digital economy than many other indicators, suggesting that talent concentration remains an important source of regional advantage [2]. From the perspective of skill-biased technological change (SBTC), the expansion of the digital economy also increases demand for high-skilled labor and strengthens wage premiums for skilled workers, which may further encourage investment in education and professional training. In addition, digital platforms help reduce coordination and transaction costs in collaborative R&D activities [11–12], making it easier for enterprises, universities, and research institutions to participate in cross-regional innovation networks. In theoretical terms, this process can also be understood as an expansion of the range of knowledge spillovers within endogenous growth models.

4.2 Industrial Upgrading: From Technological Empowerment to High-quality Manufacturing

Industrial upgrading can also be examined through the perspective of techno-economic paradigm shift theory [15], which argues that each major technological revolution reshapes production systems and industrial structures. As an important carrier of new general-purpose technologies, the digital economy has pushed manufacturing in the YRD away from simple scale expansion and toward higher-quality development through both human capital accumulation and the upgrading of physical capital.

At the regional level, manufacturing digital transformation in the YRD shows clear differences. Shanghai maintains the strongest overall position, while Jiangsu and Zhejiang display comparative advantages in different industrial sectors. Existing studies suggest that equipment-oriented digital investment remains significantly higher than information-oriented investment. Jiangsu performs more strongly in equipment digitization, whereas Zhejiang shows greater potential in information-based digital transformation [4]. From the perspective of transaction cost theory [11–12], digital platforms reduce firms' costs in information searching, contracting, and supervision, enabling enterprises to concentrate more on core business activities while outsourcing or platformizing non-core operations. This process further reshapes the division of labor within industrial chains.

In terms of neoclassical growth theory, the idea of “capital deepening” can also be reflected in the substitution and complementarity between digital capital and traditional capital, which contributes to

improvements in total factor productivity. Some studies find that the digital economy promotes the development of new quality productive forces in the YRD through technological innovation and employment structure optimization [16]. At the same time, research on the relationship between the digital economy and the tourism economy points to a generally positive trend in coupling and coordination, with Shanghai remaining in a leading position. Internet penetration and tourism revenue are often identified as two major constraining factors in this process [17]. Overall, these studies suggest that the industrial effects of the digital economy differ considerably across sectors and regions within the YRD.

4.3 Spatial Spillovers: Capital Flows and Radiation Effects

Spatial effects are a key dimension in understanding how the digital economy influences regional development in the YRD. From the perspective of new economic geography [10], the interaction between scale economies, mobility of production factors, and (broadly defined) transportation costs tends to generate a core–periphery spatial structure. In the context of the digital economy, these “costs” are no longer limited to physical distance, but also include information frictions and differences in digital connectivity.

In the literature, the spatial impact of the digital economy is often discussed as the result of two competing mechanisms. One is diffusion, or positive spillover, consistent with technology diffusion theory [9], through which knowledge and innovation gradually spread from core cities to surrounding areas. The other is agglomeration, often described as a siphon effect, which is reinforced by network externalities [13]. In this case, core cities tend to attract a disproportionate share of digital resources, high-skilled labor, and infrastructure advantages, forming self-reinforcing growth cycles.

Empirical findings in the YRD generally support the coexistence of these two mechanisms. On the one hand, the digital economy is shown to enhance local manufacturing upgrading and generate measurable positive spillovers to nearby regions [18]. On the other hand, there is also evidence that digital-related factors continue to concentrate in core cities, strengthening their advantage and weakening the relative position of surrounding areas, which is often interpreted as a siphon effect [5–7]. Some studies further note that, although digital economy development is expanding, the overall spatial dependence within the YRD remains relatively limited, and stable patterns of industrial agglomeration have not yet fully formed; in this sense, the radiation capacity of core cities still requires improvement [2].

At a more critical level, it has also been pointed out that digital development in more advanced regions may draw away resources from less developed areas, while intensified interregional competition can widen disparities in growth efficiency [5]. Taken together, these findings suggest that the spatial effects of the digital economy are not inherently equilibrating. Instead, their outcomes depend on differences in regional absorptive capacity, the degree of policy coordination, and the level of supporting infrastructure.

4.4 Regional Coordinated Development: From Local Empowerment to High-quality Integration

The economic basis of coordinated regional development is often discussed in terms of reducing transaction costs across space. According to transaction cost theory [11–12], these costs can be broadly grouped into search, negotiation, and enforcement. In the context of the digital economy, a range of digital tools and platforms helps to ease each of these frictions. For example, online matching systems reduce information asymmetry between regions, while digitalized contracting processes make it easier to standardize agreements. At the same time, platform-based monitoring and digital regulatory systems lower the cost of supervision and enforcement in cases of non-compliance.

When these costs decline to a certain level, market interactions tend to expand beyond traditional regional boundaries, and production becomes more specialized. In such a setting, relationships between regions may gradually shift from simple competition toward more complementary forms of interaction. Within the YRD, coordination among Shanghai, Jiangsu, Zhejiang, and Anhui has increasingly been reflected in areas such as digital governance cooperation, data sharing mechanisms, mutual recognition of professional qualifications, and joint infrastructure planning. These arrangements, to some extent, help reduce institutional frictions and improve cross-regional connectivity.

Empirical research generally suggests that the digital economy strengthens urban economic resilience, with factors such as talent development capacity and industrial agglomeration acting as important transmission channels. However, the magnitude of these effects is not evenly distributed, and tends to be stronger in central cities compared with peripheral areas [3]. From the perspective of new economic geography, regional coordination can be understood as a gradual process of weakening a rigid core–periphery structure. By improving the distribution of digital infrastructure and strengthening policy support in less developed areas, peripheral regions may gain more opportunities for participation in growth processes, and the regional system may slowly evolve toward a more networked and multi-center configuration.

At the same time, existing studies also note that the YRD still faces persistent challenges, including uneven development and structural imbalances across regions. Addressing these issues will likely require continued investment in digital infrastructure, more sustained innovation-driven strategies, and deeper cross-regional policy coordination. Together, these efforts may support the formation of a more integrated and better-balanced digital economy system in the region [2, 19].

5. Core Issues and Main Perspectives: the Impact of the Digital Economy on Regional Development

This section brings together the five main dimensions used in this paper to discuss the regional impacts of the digital economy in the Yangtze River Delta (YRD), based on a synthesis of existing literature. The overall conclusion in the literature is that the digital economy has generally had a positive influence on regional development in the YRD. However, these effects are not uniform across space or sectors. Instead, they tend to vary across regions and are often influenced by threshold conditions, while also showing both beneficial and potentially adverse consequences depending on context. Building on these observations, the discussion is organized around five aspects: regional productivity, industrial development, small and medium-sized enterprises (SMEs), green development, and spatial effects.

5.1 Regional Productivity: Coexistence of Gains and Gaps

A large number of studies suggest that the digital economy has improved innovation efficiency and total factor productivity in the Yangtze River Delta (YRD), especially in high-tech sectors and in firms located in the eastern part of the region [14, 16]. At the same time, this improvement does not appear to be evenly distributed across cities and industries.

Some empirical findings show that technological progress is the main source of productivity growth, while scale efficiency and pure technical efficiency may not always contribute positively, and in some cases even appear to constrain overall efficiency improvement [20]. This suggests that the digital economy in the YRD is still, to some extent, characterized by relatively extensive growth patterns rather than fully efficient upgrading. In addition, the impact of the digital economy on productivity tends to be stronger in already developed cities, which implies a widening gap between high-productivity and low-productivity regions, often described in the literature as a kind of “Matthew effect” [5].

Overall, the literature points to a situation where the expected “digital dividend” is accompanied by a persistent “digital divide.” In less developed areas, limitations in talent concentration, financial support, and fixed asset investment mean that these regions are less able to benefit from digital development. In some cases, they may even experience outflows of key production factors, which further weakens their relative position. For this reason, the impact of the digital economy on productivity should not be interpreted only in terms of aggregate growth. It may be more meaningful to distinguish between overall productivity improvement and the distribution of productivity gains, since reducing regional disparities is likely to require more targeted policy intervention.

5.2 Industrial Development: Coexistence of Empowerment and Crowding-out Effects

The role of the digital economy in promoting high-quality manufacturing development in the Yangtze River Delta (YRD) has been widely confirmed in existing studies, which also find evidence of positive spatial spillovers [18]. At the same time, the relationship does not appear to be simply linear. Some research suggests an inverted U-shaped pattern, where the digital economy first promotes and then, beyond a certain point, may

begin to constrain industrial upgrading [21–22]. This turning point is often linked to differences in digital technology maturity and the level of industrial agglomeration. In the early stages, digitalization helps reduce information frictions and coordination costs, thereby supporting the clustering of manufacturing activities. However, when digital development reaches a more advanced stage, issues such as excessive competition, resource congestion, and local saturation may emerge, and these can weaken the benefits of further agglomeration, even producing crowding-out effects.

There is also clear heterogeneity across regions and industries. For example, Jiangsu tends to have stronger performance in equipment-oriented digital investment, while Zhejiang shows relatively greater potential in information-based digital investment [4]. This difference suggests that industrial upgrading paths are not uniform across the YRD. The effects of the digital economy therefore depend not only on the level of digital development, but also on how well digital investment structures align with existing industrial foundations.

From this perspective, industrial policy cannot rely on a single standardized model. Shanghai is often expected to play a leading and coordinating role, while Jiangsu and Zhejiang may need to pursue more differentiated development strategies based on their own comparative advantages. Such differentiation may help reduce redundant investment and improve the overall efficiency of regional industrial upgrading.

5.3 Small and Medium-sized Enterprises: Reduced Financing Costs but Unclear Mechanisms

At the consensus level, many studies agree that the digital economy can ease financing constraints for SMEs by improving information transparency, and this effect is generally found to be stronger in technology-intensive sectors [23]. However, the explanatory depth of existing research is still relatively limited. A considerable share of the literature focuses on descriptive statistics or standard panel regressions, without fully capturing how internal firm behavior interacts with external digital and financial environments. Only a small number of studies have begun to introduce tools from strategic management, such as SWOT analysis [24], but these efforts remain at an early stage.

From this perspective, the effect of SME digital transformation on financing conditions is unlikely to depend solely on the external digital financial infrastructure. It is also shaped by firm-level factors such as managerial decisions, organizational capacity, and entrepreneurial characteristics. In particular, variables related to “soft information”—including entrepreneurial reputation, social networks, and industry connections—are often underrepresented in current datasets, yet may play an important role in explaining financing outcomes.

For this reason, future research may need to move beyond the question of whether digitalization reduces financing constraints, and instead focus more on how this process works and under what conditions it is more effective. In terms of methodology, this also suggests a need to complement traditional econometric approaches with case studies or qualitative comparative analysis, so as to better capture the complexity of SME behavior in the context of digital transformation.

5.4 Green Development: Coexistence of Green Dividend and Green Paradox

The relationship between the digital economy and green development remains one of the most debated topics in the literature. On the positive side, many studies argue that the digital economy can generate a “green dividend” by supporting green technological innovation, improving energy management efficiency, and reducing emissions associated with commuting and production processes [25]. At the same time, other research highlights the opposite side of the story. The expansion of digital infrastructure itself requires substantial energy consumption, and together with the “rebound effect”—where efficiency improvements lead to increased overall demand—this may offset part of the environmental gains, forming what is often referred to as a “green paradox” [25].

Evidence from the Yangtze River Delta (YRD) suggests that these two effects tend to coexist, rather than one fully replacing the other. Their relative strength appears to vary across regions and stages of development. For instance, in resource-based cities, although digitalization may help reduce carbon intensity, total emissions can still rise due to expanded energy use. In contrast, in more developed core cities, the positive effect of green technological innovation is more likely to dominate [25]. Some studies also point to the presence of threshold

effects in regional absorptive capacity, which may lead to uneven diffusion of green technologies and potentially widen disparities in green innovation across regions [7].

Overall, the existing literature suggests that the digital economy should not automatically be equated with a green transformation. Realizing its potential environmental benefits likely requires additional supporting conditions, including carbon pricing mechanisms, stricter energy efficiency standards, and stronger regional policy coordination. Without such institutional support, the environmental effects of digitalization may remain mixed and context-dependent.

5.5 Spatial Effects: the Tug-of-war Between Positive Spillovers and Siphon Effects

Spatial effects can be seen as the underlying mechanism connecting the previous four dimensions. The main view of this paper is that the spatial impact of the digital economy in the YRD is not simply a process of uniform positive spillovers, but rather the outcome of a continuous interaction between diffusion forces and agglomeration forces.

On the one hand, there is evidence of positive spillovers. Knowledge, capital, and talent can be transmitted from core cities to surrounding areas through digital platforms and industrial linkages [6, 18]. On the other hand, siphon effects are also clearly present. Due to network externalities, better infrastructure, and stronger attraction for high-skilled labor, core cities tend to absorb more production factors from surrounding regions, which in turn reinforces the existing core–periphery structure [5, 7].

Based on existing studies, the current situation in the YRD appears to lean more toward the agglomeration side. Spatial dependence is relatively weak, stable patterns of industrial clustering have not fully formed, and the expected radiating role of core cities is still not strong enough [2]. In this sense, the findings are not fully consistent with the more optimistic expectation that digital development will naturally lead to regional balance.

One possible explanation is that spatial outcomes depend on the relative dynamics between digital connectivity costs and physical mobility costs. While the reduction in digital connection costs makes cross-regional collaboration easier in principle, physical constraints still matter, especially for high-skilled labor. As a result, talent and innovative activity often continue to concentrate in core cities, where interaction density is higher, which reinforces siphon effects at the same time. This suggests that improving digital infrastructure alone may not be sufficient to reduce regional imbalance; supporting measures such as talent policies, incentives for industrial relocation, and more equal access to public services may also be necessary.

6. Future Research Directions

In light of the research gaps discussed above, several directions for future work can be identified.

First, more attention is needed on how the siphon effect of the digital economy is actually formed. While existing studies generally acknowledge its existence, the underlying mechanisms are still not well understood. Future research could focus on identifying threshold conditions and examining how policy tools, including transparency-related mechanisms, may help reduce regional imbalances. In particular, the roles of factor return patterns and administrative boundary constraints deserve closer investigation, as both are often mentioned but not sufficiently unpacked in current studies.

Second, there is still a clear limitation in terms of data resolution. Most empirical work relies on provincial or prefecture-level data, which makes it difficult to observe variation within cities or counties. Moving toward more fine-grained datasets would help reveal more heterogeneous patterns in how the digital economy affects different regions.

Third, existing literature tends to be fragmented across different research perspectives. A more integrated framework may be needed, one that brings together technological empowerment, industrial linkages, spatial restructuring, and institutional change. At present, many studies focus on only one dimension at a time, which makes it difficult to connect firm-level behavior with broader industrial and regional outcomes.

Finally, research on transparency mechanisms remains relatively underdeveloped. This includes both how to measure regional information transparency and how digital platforms may improve coordination across regions. One possible explanation for the persistence of siphon effects is information asymmetry, which tends

to favor core cities where data, resources, and platforms are more concentrated. In this context, transparency mechanisms and digital platforms may play a more important role than is currently recognized, not only in improving coordination but also in supporting entrepreneurial activity and organizational adjustment [26].

7. Conclusion

Overall, the digital economy has played an important role in the development of the Yangtze River Delta (YRD). Existing studies generally suggest that it contributes to regional productivity growth through multiple channels, including technological innovation, changes in employment structure, and spatial spillover effects. These mechanisms have not only supported local economic performance but also, to some extent, facilitated manufacturing upgrading in surrounding areas.

At the same time, the literature also points to a set of emerging problems that should not be overlooked. In particular, the strong concentration of digital economy resources in core cities appears to have reinforced regional disparities. In some cases, rapid infrastructure expansion has also led to concerns about inefficient allocation of resources and possible redundancy in construction across regions.

Looking ahead, many studies emphasize the need for more balanced policy efforts. This includes improving digital infrastructure in a more coordinated way, refining supporting policy systems, and further integrating the digital and real economies. Strengthening the spillover and diffusion capacity of core cities is also frequently mentioned as an important pathway, with the broader goal of supporting more coordinated and integrated regional development in the YRD.

References

- [1] Wang, K. K., Wu, G. B., & Zhang, G. J. (2020). Has the development of the digital economy improved production efficiency? *Economist*, (10), 24-34.
- [2] Chen, L. M., Liu, W., Huo, C. J., & Hong, Z. Q. (n.d.). Measurement, influencing factors, and spatial characteristics of digital economy development level in the Yangtze River Delta urban agglomeration. *Journal of Xinyu University*, 1-13.
- [3] Fang, Y. S., & Cao, Y. T. (2024). Research on the impact of digital economy development on urban economic resilience in the Yangtze River Delta region. *Journal of Hefei Normal University*, 42(04), 49-54.
- [4] Sheng, X. Y., Yin, J. H., & Yan, L. H. (2024). Digital transformation of manufacturing in the Yangtze River Delta: Level measurement and improvement paths. *Decision Consultation*, (03), 86-91+96.
- [5] Zheng, G. Q., & Wan, M. Z. (2023). Productivity growth effect of the digital economy: Dividend or gap? *Contemporary Finance & Economics*, (12), 3-16.
- [6] Cheng, Q. L., & Song, Y. L. (2023). Research on the impact of the digital economy on regional economic development gaps from a spatial spillover perspective. *Journal of Xi'an University of Finance and Economics*, 36(06), 44-57.
- [7] Fang, W. J., Deng, F., & Zheng, C. J. (2025). The double-edged sword effect of the digital economy: Green technology spillover, absorptive capacity threshold, and regional green innovation imbalance. *Exploration of Economic Issues*, (09), 38-58.
- [8] Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2), S71-S102.
- [9] Rogers, E. M. (1962). *Diffusion of Innovations*. Free Press of Glencoe.
- [10] Krugman, P. (1991). Increasing returns and economic geography. *Journal of Political Economy*, 99(3), 483-499.
- [11] Coase, R. H. (1937). The nature of the firm. *Economica*, 4(16), 386-405.
- [12] Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press.

- [13] Katz, M. L., & Shapiro, C. (1985). Network externalities, competition, and compatibility. *The American Economic Review*, 75(3), 424-440.
- [14] Wu, M., & Li, T. (2025). Digital economy and innovation efficiency of high-tech enterprises. *Research in Economics and Management*, 10(2).
- [15] Perez, C. (1983). Structural change and assimilation of new technologies in the economic and social systems. *Futures*, 15(5), 357-375.
- [16] Wu, W. S., Rong, Y., & Wu, H. Q. (2024). Digital economy empowering the development of new quality productive forces: Evidence from the Yangtze River Delta urban agglomeration. *Finance and Economics*, (04), 15-27.
- [17] Yang, L., & Qiu, S. L. (2024). Research on the coupled and coordinated development of digital economy and tourism economy: Evidence from 41 cities in the Yangtze River Delta region. *Science & Technology Entrepreneurship Monthly*, 37(07), 1-9.
- [18] Yi, L., Fu, G. L., & Liu, C. N. (n.d.). Spatial correlation network structure characteristics and evolution mechanism of digital economy levels in the three major urban agglomerations of the Yangtze River Economic Belt. *Economic Geography*, 1-13.
- [19] Wang, Y., & Zhang, Z. C. (2025). The promoting effect and strategic analysis of the digital economy on regional economic development in the Yangtze River Delta. *National Circulation Economy*, (15), 72-75.
- [20] Zhang, Z. X., & Liu, H. Y. (2024). Measurement of total factor productivity empowered by digitalization and its spatiotemporal evolution mechanism. *Shenzhen Social Sciences*, 7(01), 57-67.
- [21] Zeng, G., Wu, M., & Yuan, X. (2024). Digital economy and industrial agglomeration. *Economic Analysis and Policy*, 84, 475-498.
- [22] Ge, J., & Han, J. Q. (2023). Research on the impact of digital technology development on high-tech industry agglomeration. *Energy Technology and Management*, 48(05), 175-177+200.
- [23] Zhou, H., Cheng, Y., Chen, X., & Li, G. (2025). Digital economy and SME financing costs. *Finance Research Letters*, 86, 108448.
- [24] Liang, S. D. (2024). Research on financing constraints of small and micro-enterprise digital transformation based on SWOT. *Journal of Hubei University of Science and Technology*, 44(06), 45-51.
- [25] Luo, H., Yang, B., Liu, Z., Ding, C. J., & Liu, B. (2024). The bright and dark sides: Unpacking the effect of digital economy on resource curse. *Journal of Cleaner Production*, 485, 144351.
- [26] Boroomandi, A., & Sedighi, M. (2025). Competing in the digital economy. *Information Systems Frontiers*, 1-17.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.

Open Access

This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate

credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

