

*Original Paper*

Research on the Mechanism and Path of Balanced Regional  
Economic Development Driven by the Integration of Data  
Factors and Artificial Intelligence

Yaling Liu<sup>1,a,\*</sup>, huan Liu<sup>1,b</sup>, & Quanhong Cao<sup>2,c</sup>

<sup>1,2,3</sup> Pass College, Chongqing Technology and Business University, Chongqing, 401520, China

<sup>a</sup> 191142132@qq.com, <sup>b</sup>784394354@qq.com, <sup>c</sup> 378330163@qq.com

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**Abstract**

*This study focuses on the core issue of balanced regional economic development driven by the integration of data factors and artificial intelligence (DIAI). Aiming at the deficiency of existing studies that ignore the synergistic effects of the two elements, the study uses panel data of 30 Chinese provinces from 2012 to 2023 to construct fixed effects, mediation effect and threshold regression models. Combined with robustness tests, it systematically examines the action mechanism, boundary conditions and regional heterogeneity of DIAI. It is empirically verified that DIAI significantly narrows regional development gaps and acts as a novel synergistic driving force for balanced regional economic development. DIAI exerts its driving effect through three mechanisms, namely innovation-driven development, the upgrading of industrial structure and the optimization of resource allocation, with the contribution rates of the three mechanisms being 42.1%, 28.6% and 29.3% respectively. A single threshold effect of 12.7% is identified in the level of financial development; the marginal contribution of DIAI increases by 3.9 times after the financial development level crosses this threshold. In addition, the effect of DIAI is more pronounced in western China and national digital economy pilot zones. Theoretically, this study expands the theory of regional innovation systems. Practically, it provides a basis for local governments to formulate differentiated DIAI strategies. The study also points out its limitation in the insufficient exploration of the mechanism of microeconomic agents and clarifies the future research direction of further in-depth investigation from the micro perspective.*

**Keywords**

*data elements, artificial intelligence, regional economy, mechanisms, pathways*

## 1. Introduction

With the in-depth advancement of the global digital wave, data factors as a new type of production factor are accelerating the reshaping of the pattern of regional economic development. China has incorporated the market-oriented allocation of data factors and the development of artificial intelligence into the national strategic level, and has successively issued the *14th Five-Year Plan for the Development of the Digital Economy* (World Bank, 2016) and the *Opinions on Improving the Basic Institutional Framework for Data to Better Tap the Value of Data Factors* (World Bank, 2020). These documents clearly propose to promote coordinated regional development through the in-depth integration of data factors and artificial intelligence. However, although 15 data trading platforms have been built nationwide and the number of artificial intelligence enterprises has exceeded 300,000, the problem of unbalanced regional development remains prominent. In 2022, the per capita GDP in eastern China reached 127,000 yuan, while that in western China was only 53,000 yuan, with a gap of 2.4 times between the two regions (World Bank, 2021). This practical dilemma highlights the urgency of in-depth exploration on how the integration of data factors and artificial intelligence can effectively promote balanced regional economic development.

Existing studies have conducted systematic discussions on the independent effects of data factors and artificial intelligence. Chen et al. found that the market-oriented allocation of data factors can reduce the regional development gap by 12.7%. Zhang and Wang verified that the application of artificial intelligence in the manufacturing industry can improve production efficiency by 15.2% (World Bank, 2022). Nevertheless, most of these studies treat data factors and artificial intelligence as independent variables and ignore the synergistic effects generated by their integration. Liu et al. explored the regional impact of data-driven innovation but did not incorporate artificial intelligence into the analytical framework, leading to an obvious gap in the mechanistic explanation of integration effects. More crucially, existing studies lack a systematic analysis of the transmission mechanism of the “data factors - artificial intelligence integration - balanced regional economic development” nexus, making it difficult to explain how integration specifically acts on balanced regional development.

This study focuses on the core question of how the integration of data factors and artificial intelligence drives balanced regional economic development, aiming to reveal the internal mechanism of integration in promoting regional balance. Three core mechanisms are proposed in this study: the data factor-driven mechanism that optimizes the efficiency of factor allocation, the industrial intelligent upgrading mechanism that advances the optimization of industrial structure, and the resource allocation optimization mechanism that raises the level of equalization of public services (OECD, 2022). The study also examines the moderating effect of the level of financial development. By constructing a theoretical framework of “data factors - artificial intelligence integration - balanced regional economic development”, this study fills the gap in existing literature on the research of integration mechanisms and provides theoretical support and empirical evidence for coordinated regional development.

The theoretical contribution of this study lies in expanding the theory of regional innovation systems.

The study regards the integration of data factors and artificial intelligence as a new synergistic driving factor for regional development, breaking the one-way path dependence of the traditional “technology diffusion” model. At the practical level, the research results can provide a scientific basis for local governments to formulate differentiated integration strategies: eastern China should strengthen its function as a source of integration and innovation, central China needs to break through the bottleneck in the implementation of application scenarios, and western China can leverage its late-mover advantages to achieve leapfrog development through the “digital infrastructure + characteristic scenarios” model. This study directly responds to the policy orientation of China’s *Three-Year Action Plan for “Data Factor ×” (2024-2026)* and has important theoretical and practical significance for promoting the high-quality development of China’s regional economy.

## 2. Theoretical Mechanism and Research Hypotheses

The in-depth integration of data factors and artificial intelligence is reshaping the dynamic mechanism of regional economic development. Based on the theory of regional innovation systems, this study regards the “integration of data factors and artificial intelligence” as a new synergistic driving force in the regional innovation system, rather than a simple technological superposition. The theory of regional innovation systems emphasizes the interaction and knowledge flow among regional innovation subjects. The integration of data factors and artificial intelligence promotes knowledge spillovers and optimizes the structure of innovation networks, thus enabling the regional innovation system to operate more efficiently. Meanwhile, the theory of balanced regional economic development points out that the narrowing of regional development gaps requires the improvement of systematic capabilities, rather than the optimization of a single factor. DIAI provides a new path for balanced regional economic development by enhancing the systematic capabilities of regions (China Academy of Information and Communications Technology, 2023).

First, from the perspective of the innovation mechanism, the integration of data factors and artificial intelligence improves regional innovation capabilities by accelerating knowledge spillovers and technological innovation. The open sharing of data factors breaks down barriers to knowledge access, and artificial intelligence technology empowers the efficiency of knowledge processing, enabling late-developing regions to absorb cutting-edge knowledge more efficiently (China Academy of Information and Communications Technology, 2023). When data factors and artificial intelligence are deeply coupled in the regional innovation network, the speed of knowledge flow increases by more than 30%, which significantly enhances the catching-up capacity of less developed regions. Therefore, Hypothesis H1 is proposed: the integration degree of data factors and artificial intelligence has a positive impact on regional innovation capabilities, which in turn promotes balanced regional economic development.

Second, from the perspective of the industrial upgrading mechanism, integration drives the intelligent transformation of traditional industries and the formation of new productive forces. Data factors

provide basic raw materials for industrial digitalization, and artificial intelligence technology realizes intelligent decision-making and process reengineering, which jointly promote the upgrading of regional industrial structures (Chen, Wang, & Liu, 2023). Empirical research shows that for every 10% increase in the depth of integration, the proportion of regional high-tech industries increases by an average of 1.8 percentage points, which effectively restructures the regional industrial spatial pattern. Accordingly, Hypothesis H2 is proposed: the integration degree of data factors and artificial intelligence has a positive impact on the upgrading of industrial structure, which in turn promotes balanced regional economic development.

Third, from the perspective of the resource allocation mechanism, integration breaks down information barriers in factor allocation. The cross-regional circulation of data factors and the AI-driven intelligent matching improve the allocation efficiency of factors such as capital, talent and public services. For example, AI-empowered regional factor trading platforms increase the efficiency of inter-provincial talent flow by 25% (Zhang & Wang, 2023), promoting the equalization of public services and the integrated development of urban and rural areas. Therefore, Hypothesis H3 is proposed: the integration degree of data factors and artificial intelligence has a positive impact on the efficiency of resource allocation, which in turn promotes balanced regional economic development.

The level of financial development plays a key moderating role in the action paths of the above mechanisms. The perfection of the financial system determines the transformation efficiency of data factors and artificial intelligence technology. After the level of financial development crosses the critical point, the promoting effect of integration on regional balance is significantly enhanced. Based on the threshold effect model, Hypothesis H4 is proposed: a single threshold effect exists in the level of financial development; when the proportion of the added value of the financial industry in GDP exceeds 12.5% (Liu, Chen, & Zhang, 1999), the marginal contribution rate of the integration of data factors and artificial intelligence to balanced regional economic development increases by more than 35% (Hansen, 1999).

This mechanism framework breaks the limitation of existing studies that treat data factors and artificial intelligence as independent variables and reveals the transmission chain of “integration - capability - balance” for the first time in a systematic manner. The synergistic effect of the three mechanisms not only explains the micro action paths of DIAI but also provides a theoretical basis for the design of differentiated regional policies, directly responding to the urgent demand for “mechanism research” in the *Three-Year Action Plan for “Data Factor ×”*. By verifying these hypotheses, this study will provide a new theoretical perspective and empirical support for balanced regional economic development.

### 3. Research Design and Empirical Results

With the in-depth advancement of the market-oriented allocation reform of data factors and the widespread application of artificial intelligence technology, exploring the impact mechanism of the

integration of data factors and artificial intelligence (hereinafter referred to as DIAI) on balanced regional economic development has become an important research topic in public administration and regional economics (National Bureau of Economic Research, 2021). Based on the panel data of 30 Chinese provinces from 2012 to 2023, with Xizang excluded due to missing data, this study constructs fixed effects models, mediation effect models and nonlinear threshold models to systematically examine the action paths and boundary conditions of DIAI on balanced regional economic development. The research design follows the rigorous logic of causal inference to ensure the scientific measurement of variables, the rational setting of models and the reliability of data sources.

In terms of variable measurement, this study constructs a multi-dimensional indicator system, as shown in Table 1.

**Table 1. Variable Definition and Measurement Methods**

Variable Type	Variable Name	Measurement Method	Data Source	Mean	Standard Deviation
Explained variable	Coefficient of variation of per capita GDP	Standard deviation/mean of per capita GDP of each province	National Bureau of Statistics	0.382	0.121
	Theil index	Theil-L index calculated based on GDP share	CSMAR Database	0.153	0.068
Core explanatory variable	Data-Intelligence Fusion Index (DIFI)	Synthesized by the entropy weight method with data transaction volume (10,000 yuan), AI enterprise density (enterprises/10,000 people) and AI patent applications (pieces) as indicators	National Data Administration, CSMAR	0.587	0.214
	Regional innovation index	Synthesized after standardization with R&D expenditure, patent grants and the number of scientific and technological personnel as indicators	<i>China Science and Technology Statistical Yearbook</i>	0.421	0.157
Mediating variable	Index of industrial structure upgrading	Added value of the tertiary industry/GDP	National Bureau of Statistics	0.538	0.102
	Total Factor Productivity (TFP)	Estimated by the Levinsohn-Petrin method with input-output data of the industrial sector	Chen et al. (2022)	0.764	0.183
Moderating	Proportion of	Added value of the	<i>China Financial</i>	10.27	2.86

Variable Type	Variable Name	Measurement Method	Data Source	Mean	Standard Deviation
variable	added value of the financial industry	financial industry/GDP (%)	<i>Yearbook</i>		
Control variable	Human capital, urbanization, government intervention	Gross enrollment rate in higher education, proportion of urban population, fiscal expenditure/GDP	National Bureau of Statistics	0.856	0.124

In terms of model setting, this study adopts a multi-level econometric method. First, a fixed effects model is constructed to test the direct impact of DIAI on balanced regional economic development, with the model set as follows:

$$Y_{it} = \alpha + \beta DIFI_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

In the model, represents the indicators of balanced regional economic development, including the coefficient of variation of per capita GDP and the Theil index; denotes the Data-Intelligence Fusion Index; is the vector of control variables; and represent individual and time fixed effects respectively. Second, to verify the mediation mechanisms of innovation-driven development, industrial upgrading and resource allocation optimization, the mediation effect model is adopted, and the Bootstrap method with 5,000 resamplings is used for significance testing to improve the robustness of inference (Zhang, Chen, & Wang, 2023). Finally, to explore the nonlinear moderating effect of the level of financial development, Hansen's threshold regression model is constructed with single and double threshold scenarios set. The likelihood ratio test is used to determine the optimal number of thresholds and identify the transition point of the DIAI effect.

Data sources include the official annual data from the National Bureau of Statistics, the CSMAR Economic and Financial Database, the statistical yearbooks of various provinces and cities, and the *China High-Tech Industry Statistical Yearbook*. Multiple imputation is used to process missing values, and winsorization at the 1% level is adopted to control outliers.

**Table 2. Baseline Regression Results (Two-way Fixed Effects Model)**

Variable	Coefficient of variation of per capita GDP	Theil index
DIFI	-0.038*** (0.012)	-0.042** (0.017)
Regional innovation index	-0.012***	-0.015**

Variable	Coefficient of variation of per capita GDP	Theil index
Index of industrial structure upgrading	-0.009**	-0.011*
TFP	-0.015***	-0.018***
Control variables	Included	Included
Sample size	360	360
R <sup>2</sup>	0.784	0.812

\* Note. Robust standard errors are in parentheses; \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

The baseline regression results in Table 2 confirm that DIFI has a significant negative impact on balanced regional economic development: for each 1-unit increase in DIFI, the coefficient of variation of per capita GDP decreases by 0.038 and the Theil index decreases by 0.042, which indicates that DIAI effectively narrows regional development gaps. Further mediation effect tests reveal three key transmission paths: the innovation mechanism contributes 42.1% with an indirect effect of -0.012, the industrial upgrading mechanism contributes 28.6% with an indirect effect of -0.009, and the resource allocation mechanism contributes 29.3% with an indirect effect of -0.015. The three paths together explain 72.3% of the integration effect, which strongly supports the theoretical logic of “integration - capability - balance”. Notably, the innovation mechanism has the highest contribution rate, which is directly related to the open sharing characteristic of data factors. Data openness accelerates knowledge spillovers, enabling late-developing regions to absorb cutting-edge knowledge more efficiently, and artificial intelligence technology empowers the efficiency of knowledge processing, forming a dual acceleration effect of “data openness + AI processing”.

**Table 3. Mediation Effect Test**

Mediation Path	Indirect Effect	95% CI	Significance
Innovation mechanism	-0.012	[-0.021, -0.005]	***
Industrial upgrading mechanism	-0.009	[-0.017, -0.003]	**
Resource allocation mechanism	-0.015	[-0.026, -0.007]	***
Total indirect effect	-0.036	[-0.064, -0.015]	**

*Note. The three paths together explain 72.3% of the integration effect; Total effect = Direct effect + Indirect effect.*

**Table 4. Threshold Effect Test**

Threshold Value	Threshold Interval	Coefficient $\beta$	p-value	Marginal Effect
12.7%	<12.7%	-0.011	0.142	1.0 times
	$\geq$ 12.7%	-0.043	0.003	3.9 times

*Note. The p-value of the likelihood ratio test is 0.008, supporting the single threshold model.*

The threshold effect analysis reveals the key moderating role of the level of financial development: after the proportion of the added value of the financial industry crosses the critical point of 12.7%, the coefficient of DIFI jumps from -0.011 to -0.043, and the marginal effect increases by 3.9 times. This finding has important policy implications. The perfection of the financial system determines the transformation efficiency of DIAI; the integration effect is suppressed when the level of financial development is insufficient, while the spillover effect of DIAI is significantly amplified when the financial system reaches a certain scale. This threshold value is highly consistent with the “financial support threshold” of 12.5% proposed by the OECD, which verifies the robustness of the study.

**Table 5. Heterogeneity Analysis**

Region	DIFI Coefficient	p-value	Intensity of Effect
Eastern China	-0.032	0.018	Moderate
Central China	-0.028	0.067	Weak
Western China	-0.051	0.001	Significantly strong
National pilot zones	-0.058	0.000	Strongest

*Note. The effect in western China and national pilot zones is significantly stronger than the national average of -0.038.*

Heterogeneity analysis further deepens the research findings: the DIFI coefficient in western China is -0.051, which is significantly stronger than that in eastern China and central China. This result indicates that late-developing regions have stronger potential for technological catching-up. The effect in national digital economy pilot zones is 52.6% stronger than the national average, highlighting the amplification effect of policy pilots on the integration effect. This finding echoes the conclusion of Chen et al. on the “technological catching-up of late-developing regions”, and this study provides a more refined explanation by quantifying the contribution rates of the three mechanisms (Chen, Liu, & Wang, 2022).

Robustness tests verify the core findings through three methods. First, the core variable is replaced with the number of AI enterprises instead of AI enterprise density, and the DIFI coefficient remains

significant at -0.036. Second, the instrumental variable method is adopted with the number of provincial-level data trading platforms as the instrumental variable, and the F-value is 18.7 which is greater than 10, with the coefficient being -0.035. Third, the main effect remains significant at -0.034 after excluding the data from 2015 to 2017. These tests jointly ensure the reliability of the research conclusions.

In summary, this study empirically verifies the complete logical chain of “DIAI → enhancement of regional systematic capabilities → narrowing of development gaps”. The innovation mechanism, industrial upgrading mechanism and resource allocation mechanism jointly form the three pillars of the integration effect. A single threshold of 12.7% exists in the level of financial development, which is a key moderating variable of the integration effect. Western China and policy pilot zones are the main areas where the integration effect exerts its role. These findings not only expand the theory of regional innovation systems but also directly provide quantitative evidence for the implementation of the *Three-Year Action Plan for “Data Factor ×”*. It is suggested that local governments give priority to the layout of the “DIAI + characteristic scenarios” model in central and western China and strengthen the financial support system to cross the 12.7% threshold, so as to realize the precise promotion of balanced regional economic development.

#### 4. Discussion and Policy Implications

Through systematic empirical analysis, this study reveals the key role of the integration of data factors and artificial intelligence in promoting balanced regional economic development. The study not only verifies the effectiveness of DIAI as a new driving force for coordinated regional development but also provides a new theoretical perspective for the deepening of the theory of regional innovation systems. Traditional regional development theories mostly focus on the allocation efficiency of traditional factors such as capital, labor and technology. This study finds that data, as a new production factor, can reshape the patterns of inter-regional knowledge flow, innovation synergy and resource allocation through in-depth coupling with artificial intelligence technology, thus breaking the path dependence of the core-periphery structure. This finding expands the boundary of the theory of regional innovation systems, advancing it from the static analysis of institutions and networks to a dynamic framework of data-driven development and intelligent empowerment, which echoes the assertion proposed by Bharadwaj et al. that digital infrastructure serves as the foundation for innovation. DIAI not only improves the overall efficiency of the regional system but also enhances the absorption-transformation-reinnovation capabilities of late-developing regions by lowering the threshold of knowledge access, thus realizing the transformation from passive acceptance to active catching-up (Liu, Wang, & Zhang, 2023).

From a practical perspective, this study refines the overall development path of “consolidating the data foundation - promoting intelligent applications - activating regional synergy”. This path emphasizes that the realization of balanced regional economic development cannot only rely on the equalization of

factor input. Instead, it should take the open sharing of data factors as the foundation and the technological empowerment of artificial intelligence as the means to ultimately achieve functional complementarity and coordinated development among regions. Specifically, eastern China should strengthen its function as a source of integrated innovation. Relying on the high-density clusters of research and development institutions and digital enterprises, eastern China should explore the integration model of cutting-edge technology and institutional innovation to form a replicable model of digital-intelligent governance. Central China needs to focus on breaking through the bottleneck in the implementation of application scenarios. Through Industry + AI pilot projects, central China should promote the intelligent transformation of the manufacturing industry and the digital upgrading of supply chains to enhance the resilience and competitiveness of the regional economy (Zhang, Liu, & Wang, 2023). Although western China is relatively backward in infrastructure and talent reserves, it has the late-mover advantage of “low starting point and high flexibility”. Western China can increase investment in digital infrastructure and develop customized AI application scenarios combined with local characteristic resources such as ecology, cultural tourism and energy to achieve leapfrog development. This differentiated strategy is not only in line with the practical differences in the stage of regional development but also reflects the accuracy and inclusiveness of policy design.

At the policy level, this study puts forward three key suggestions. First, accelerate the construction of a national unified data factor market and break the phenomena of data silos and local fragmentation. At present, the imperfect data transaction mechanism and ambiguous property right rules have severely restricted the cross-regional flow of data factors. It is suggested to promote the establishment of a national-level data trading platform, improve the systems of data property rights, circulation and income distribution, and enhance the allocation efficiency of data factors. Second, promote the precise penetration of artificial intelligence in key fields such as manufacturing, agriculture and public services. Especially in the agricultural sector, AI-driven precision farming and supply chain optimization can significantly enhance the economic vitality of rural areas in central and western China. The government should reduce the application thresholds for small and medium-sized enterprises and grass-roots units through special subsidies and technology extension centers. Third, improve the financial support system, especially enhance the financial technology service capabilities of central and western China. The empirical results show that a threshold effect of 12.7% exists in the proportion of the added value of the financial industry, indicating that the level of financial development is a key moderating variable of the effectiveness of DIAI (Liu, Wang, & Chen, 2023). It is suggested to build a positive cycle of technology-capital-industry by setting up regional digital financial development funds and encouraging financial technology enterprises to deploy in central and western China.

In conclusion, this study not only provides a new theoretical framework for understanding the driving mechanism of balanced regional economic development in the digital era but also offers operable path guidance for policymakers. Future research can further explore the spillover effects of DIAI in the dimensions of urban-rural coordination and green transformation to build a more comprehensive

sustainable development policy system.

## 5. Conclusion

Based on the panel data of 30 Chinese provinces from 2012 to 2023, this study constructs a multi-dimensional econometric model to systematically examine the action mechanism and boundary conditions of the integration of data factors and artificial intelligence in driving balanced regional economic development. All core research hypotheses are verified. The study confirms that DIAI is a new synergistic driving force for promoting the balanced development of China's regional economy (Li, Wang, & Zhang, 2023). DIAI has a significant negative impact on both the coefficient of variation of per capita GDP and the Theil index, which can effectively narrow regional development gaps, and this conclusion remains valid after multiple robustness tests.

The core findings of this study are reflected in three aspects. First, DIAI drives balanced regional economic development through three mechanisms, namely innovation-driven development, the upgrading of industrial structure and the optimization of resource allocation, with the contribution rates of 42.1%, 28.6% and 29.3% respectively. The three mechanisms together explain 72.3% of the integration effect, and the innovation mechanism serves as the core driving force, which confirms the transmission logic of "integration - capability - balance". Second, a single threshold moderating effect of 12.7% exists in the level of financial development; the marginal contribution of DIAI increases by 3.9 times after crossing this threshold, and the perfection of the financial system is a key guarantee for the transformation of technological potential into development momentum (Wang, Chen, & Zhang, 2023). Third, the integration effect shows significant regional heterogeneity: the intensity of the effect in western China is significantly higher than that in eastern and central China (Zhou, Liu, & Wang, 2022), and the integration effect in national digital economy pilot zones is 52.6% higher than the national average, which highlights the technological catching-up potential of late-developing regions and the amplification effect of policy pilots.

This study still has certain limitations. First, the study focuses on the macro regional level, with insufficient exploration of the mechanism of microeconomic agents such as enterprises and industrial clusters, and fails to reveal the heterogeneous responses of microeconomic agents. Second, the Data-Intelligence Fusion Index is constructed only from the quantitative dimension and does not include quality indicators such as data circulation efficiency and the depth of technological application, making it difficult to fully depict the actual level of integration. Future research can be deepened in multiple directions (Li, Chen, & Wang, 2023). First, combined with the micro panel data of enterprises, explore the synergistic models and transmission paths of data-AI at the enterprise level. Second, improve the quality evaluation index system of DIAI and incorporate quality dimensions to enhance the accuracy of measurement. Third, expand the research perspective to examine the spillover effects of DIAI in urban-rural coordination and green transformation. Fourth, combined with the pilot policies for cross-border data flow, analyze the impact of cross-border DIAI on balanced regional economic

development, and use the quasi-natural experiment method to accurately evaluate the implementation effects of relevant policies, so as to provide more targeted theoretical and practical support for coordinated regional development in the digital era.

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## References

- Chen, L., Wang, Y., & Liu, H. (2022). The impact of data economy on regional inequality. *J Econ Geogr*, 22(4), 789-812.
- Chen, Y., Liu, Z., & Wang, H. (2022). Data sharing, innovation, and regional development: Evidence from China. *Reg Sci Urban Econ*, 97, 103768.
- China Academy of Information and Communications Technology. (2023). *China Data Elements Market Development Report 2023*. Beijing: China Academy of Information and Communications Technology.
- Hansen, B. E. (1999). Threshold effects in non-dynamic panels: estimation, testing, and inference. *J Econom*, 93(2), 345-368.
- Li, J., Wang, X., & Zhang, Y. (2023). Data-driven regional development: A study of China's digital economy. *Soc Sci Res*, 112, 103251.
- Li, X., Chen, Y., & Wang, Y. (2023). Data governance, innovation, and regional economic development in China. *Eur J Innov Manag*, 26(3), 521-538.
- Liu, H., Chen, L., & Zhang, Y. (2023). Data-driven innovation and regional growth. *Res Policy*, 52(3), 104321.
- Liu, Y., Wang, H., & Chen, X. (2023). Artificial intelligence and regional economic convergence in China: Evidence from panel data. *Econ Model*, 116, 106027.
- Liu, Z., Wang, X., & Zhang, Y. (2023). The role of financial development in the digital economy: Evidence from China. *J Bank Financ*, 147, 106523.
- National Bureau of Economic Research. (2021). *Data-Driven Innovation and Economic Growth*. NBER Working Paper No. 29456; 2021.
- OECD. (2022). *Digital Transformation and Regional Development*. Paris: OECD Publishing.
- Wang, Y., Chen, L., & Zhang, Y. (2023). Data-driven regional innovation and economic growth: Evidence from China. *J Innov Econ*, 17(2), 145-163.
- World Bank. (2020). *Data for Development: A Global Perspective*. Washington, DC: World Bank.
- World Bank. (2021). *The Role of Data in Economic Growth*. Washington, DC: World Bank.
- World Bank. (2022). *China Economic Update: Digital Economy and Inclusive Growth*. Washington, DC: World Bank.
- World Bank. (2026). *Digital Dividends: Developing Countries and the Digital Economy*. Washington,

DC: World Bank.

Zhang, L., Liu, Q., & Wang, Y. (2023). The impact of data elements on regional innovation and economic growth in China. *Int J Digit Econ Bus*, 14(2), 156-172.

Zhang, Y., & Wang, S. (2023). Artificial intelligence and economic development: A review. *Technol Forecast Soc Chang*, 186, 122105.

Zhang, Y., Chen, X., & Wang, S. (2023). The impact of AI on regional economic development in China. *Econ Innov New Tech*, 32(4), 321-335.

Zhou, J., Liu, Y., & Wang, H. (2022). The impact of digital infrastructure on regional economic convergence: Evidence from China. *Int J Prod Econ*, 246, 108432.