



Research on Coordinated Development of Digital Economy and Regional Economy

—Empirical Analysis Based on Panel Data Model of 21 Prefecture level Cities in Guangdong Province

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Abstract. In the reform and opening up, Guangdong Province has gradually achieved vigorous economic development, with its total economic output ranking first in the country for 34 consecutive years, and its economic strength has greatly improved. However, the phenomenon of economic polarization still exists in Guangdong Province, and the economic development gap between regions is quite obvious. How to further achieve coordinated regional economic development is the key to building a modern economic development pattern in Guangdong Province. This article summarizes the impact mechanism of the digital economy on regional economic coordinated development in different dimensions in recent years, and proposes hypotheses; Then, referring to the existing research of scholars and the actual situation in Guangdong Province, the development level of digital economy and the coordinated development level of regional economy were calculated, and based on this, the current situation of digital economy development and coordinated development of regional economy in Guangdong Province were evaluated. Finally, a model was established using panel data from 21 prefecture level cities in Guangdong Province from 2013 to 2022. Through empirical research and analysis, the important position of digital economy in promoting coordinated development of regional economy in Guangdong Province was summarized, and a series of suggestions were put forward based on the actual situation.

Keywords: Digital economy; Coordinated development of regional economy; Panel data; Guangdong Province

1 Introduction

Guangdong has gradually achieved vigorous economic development, with its total economic output ranking first in the country for 34 consecutive years, and its economic strength has greatly improved. However, there is still a significant regional development imbalance in Guangdong Province, especially reflected in the regional economy. From a regional perspective, the per capita gross domestic product (GDP)

in the eastern and western wings of Guangdong Province in 2021 was 47228.11 yuan, 55464.44 yuan, and 128263.65 yuan, respectively, which is more than twice as high as that in the eastern and western wings; From the perspective of prefecture level cities, the gross domestic product (GDP) of Shenzhen in 2021 was 30664.85 yuan, Guangzhou was 28231.97 yuan, Yunfu was 1138.97 yuan, and Chaozhou was 1244.85 yuan. In comparison, the GDP of Shenzhen and Guangzhou was more than 20 times higher than that of Yunfu and Chaozhou. This shows that the phenomenon of economic polarization still exists in Guangdong Province, and the economic development gap between regions is quite obvious. How to further achieve coordinated regional economic development and build a modern economic development pattern is currently a development challenge faced by Guangdong Province.

In recent years, the digital economy has emerged and there has been an increasing amount of research on it by scholars both domestically and internationally. Since American scholar Don Tapscott first conducted in-depth research on the concept of "digital economy" in 1996 and regarded it as a completely new economic relationship^[1], From the perspective of Ganichev N.A. and Koshovets O.B. on the development environment of the Russian economy, it is proposed to rethink the role of the digital sector in the Russian economy, and to comprehensively count and reconstruct key economic indicators in the field of information and communication technology to identify significant imbalances and problems^[2], foreign scholars are conducting increasingly in-depth research on the digital economy. Many scholars in China are also concerned about the impact of the digital economy on the coordinated development of regional economies.

As a major province in the digital economy, Guangdong Province has ranked first in the country in terms of digital economy scale for five consecutive years, with obvious digital advantages. Therefore, in the context of uneven regional economic development in Guangdong Province, in-depth research and exploration of how the digital economy in Guangdong Province affects the coordinated growth of the regional economy, and based on this, proposing corresponding development suggestions, plays an important role in the current situation.

2 Measurement and Analysis of the Coordinated Development of Digital Economy and Regional Economy in Guangdong Province

2.1 Principles of Measurement and Evaluation

The entropy method, as a scientific weight determination method, can significantly improve the objectivity of evaluation results. The optimized entropy weight method further integrates time and regional variables, making the analysis more comprehensive. Therefore, this article adopts this method to measure the level of digital economy development and regional economic coordinated development in Guangdong Province from 2013 to 2022. Firstly, set the total number of years involved in the

study as t , the total number of regions as m , and the number of indicators as n . The specific operation steps are as follows:

2.1.1 List the Original Evaluation Index Matrix.

$$.X = (\alpha_{ij})_{m \times n} (i=1,2,\dots,m; j=1,2,\dots,n) \quad (1)$$

In equation (1), m is the evaluation index; N is the evaluation object; The value corresponding to the i -th evaluation indicator on the j -th evaluation object.

2.1.2 Data Standardization Processing.

Use equation (2) to normalize the indicators:

$$x_{ij} = \frac{\alpha_{ij} - \min \alpha_{ij}}{\max \alpha_{ij} - \min \alpha_{ij}} \quad (2)$$

In equation (2), α_{ij} is the indicator value of the j -th region that has not been standardized; x_{ij} is the indicator value of the j -th and i -th regions, as there are no negative indicators, no negative normalization treatment will be performed.

2.1.3 Calculate the Proportion of the j -th Indicator in the i -th Region p_{ij} .

$$p_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} \quad (3)$$

2.1.4 Calculate the Entropy Value of the j -th Indicator e_j .

$$.e_j = \frac{1}{\ln m} [\sum_{i=1}^m p_{ij} \ln p_{ij}] (j = 1, 2, \dots, n) \quad (4)$$

2.1.5 Determine the Entropy Weight of each Indicator w_j .

$$w_j = \frac{(1-e_j)}{\sum_{i=1}^n (1-e_j)} \quad (5)$$

2.1.6 Calculate Comprehensive Index.

$$E = \sum_{j=1}^n w_j x_{ij} \quad (6)$$

2.2 Construction and Measurement of Digital Economy Development Index System in Guangdong Province

This article analyzes various indicator systems through literature research, and ultimately follows the principles of scientificity, systematicity, comparability, and operability in constructing indicator systems, Drawing on the perspective of Wang Tianjiao

(2023)^[3], three indicator layers were established: digital infrastructure, digital application level, and digital innovation capability, to measure the level of digital economic development in Guangdong Province, and Table 1 was obtained.

Table 1. Indicator System and Indicator Weights for Digital Economy Development

Indicator layer	Indicator weight	Specific indicators	Indicator direction	weight coefficient
Digital infrastructure	6.64%	Internet users per 100 people (10000/100 people)	just	3.13%
		Number of mobile phone users per 100 people (10000 households/100 people)	just	3.51%
Digital application level	43.39%	Per capita total telecommunications services (10000 yuan/person)	just	2.89%
		Number of on-the-job employees in the information transmission, software, and information technology services industry at the end of the year (in 10000 people)	just	21.61%
		Number of employees in the scientific research and technology service industry at the end of the year (in 10000 people)	just	17.39%
		Digital Financial Inclusion Index (%)	just	1.50%
Digital innovation capability	49.97%	Fiscal technology expenditure (in billions of yuan)	just	17.98%
		Internal R&D expenditure (in billions of yuan)	just	16.66%
		Number of students enrolled in regular higher education institutions (in 10000)	just	15.33%

Data source: Calculated based on raw data

2.3 Comprehensive Evaluation and Current Analysis of the Development Level of Digital Economy in Guangdong Province

Based on the obtained indicator weights, the entropy method was used to obtain the comprehensive index of the overall digital economy development level in Guangdong Province, as shown in Table 2. Overall, the level of digital economy development in Guangdong Province and its various prefecture level cities has shown an upward trend year by year, indicating a good trend in their digital economy development. In addition, among the 21 prefecture level cities in Guangdong Province, Shenzhen has the highest level of digital economy development. The annual level of digital economy development in Shenzhen, Guangzhou, and Foshan is higher than the average level in Guangdong Province. Looking at the data for 2022, the comprehensive index of digital economy development in Shenzhen is 0.762, making it the prefecture level city with the highest level of digital economy development in the province. The comprehensive index of digital economy development in Shanwei is 0.023, making it the prefecture level city with the lowest level of digital economy development in the province. It can be seen that there is a significant gap in the development level of digital economy in Guangdong Province, with a serious phenomenon of discontinuity. In addition, in the past five years, only four prefecture level cities have exceeded the average level of digital economy development in the province, and the development of digital economy regions is unbalanced and insufficient.

Table 2. Comprehensive Index of Digital Economy Development in Various Level Cities of Guangdong Province from 2013 to 2022

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Guangdong Province	0.050	0.059	0.067	0.077	0.082	0.094	0.105	0.108	0.118	0.121
Shenzhen City	0.294	0.305	0.364	0.474	0.475	0.633	0.679	0.654	0.735	0.763
Guangzhou City	0.361	0.390	0.427	0.450	0.494	0.528	0.591	0.655	0.688	0.669
Foshan City	0.051	0.063	0.068	0.080	0.089	0.100	0.130	0.126	0.141	0.142
Dongguan City	0.046	0.051	0.075	0.079	0.089	0.093	0.130	0.117	0.131	0.142
Zhuhai City	0.044	0.060	0.061	0.074	0.078	0.092	0.092	0.095	0.094	0.097
Huizhou City	0.024	0.042	0.045	0.046	0.040	0.046	0.055	0.066	0.064	0.068
zhongshan	0.019	0.029	0.041	0.048	0.049	0.053	0.048	0.053	0.062	0.063
Jiangmen City	0.015	0.031	0.028	0.035	0.040	0.037	0.054	0.055	0.064	0.066
Zhanjiang City	0.025	0.022	0.041	0.050	0.042	0.044	0.041	0.042	0.055	0.050
Zhaoqing City	0.021	0.027	0.027	0.041	0.039	0.039	0.040	0.045	0.055	0.051
Maoming City	0.015	0.012	0.037	0.037	0.028	0.037	0.040	0.048	0.044	0.056
Shantou City	0.022	0.028	0.024	0.020	0.034	0.031	0.043	0.039	0.036	0.051
Shaoguan City	0.024	0.023	0.022	0.030	0.035	0.033	0.031	0.040	0.038	0.046
Qingyuan City	0.009	0.016	0.030	0.018	0.030	0.027	0.029	0.029	0.037	0.048
Yunfu City	0.010	0.029	0.017	0.014	0.022	0.036	0.025	0.035	0.030	0.040
Meizhou City	0.012	0.022	0.016	0.025	0.023	0.025	0.030	0.027	0.039	0.036
Chaozhou City	0.014	0.023	0.018	0.018	0.017	0.020	0.029	0.037	0.041	0.031
Shanwei City	0.010	0.016	0.016	0.015	0.029	0.033	0.035	0.023	0.042	0.023
Heyuan City	0.015	0.019	0.014	0.017	0.020	0.025	0.032	0.036	0.027	0.039
Jieyang City	0.013	0.014	0.022	0.030	0.024	0.021	0.032	0.026	0.029	0.030
Yangjiang City	0.003	0.011	0.016	0.020	0.022	0.017	0.028	0.028	0.027	0.035

2.4 Construction and Measurement of the Indicator System for Coordinated Development of Regional Economy in Guangdong Province

This article follows the principles of scientificity, systematicity, comparability, and operability in constructing an indicator system, based on the research of Zheng Haiyan, Cui Chunshan (2019)^[4], and Zhang Jianwei (2019)^[5], an indicator system covering three levels of economic development, social progress, and ecological civilization has been constructed. Based on this, the level of coordinated development of regional economy in Guangdong Province was measured, and Table 3 was obtained.

Table 3. Indicator System and Indicator Weights for Coordinated Development of Regional Economy

Indicator layer	Specific indicators	Indicator direction	weight coefficient
economic development	Per capita regional GDP (yuan)	just	18.02%
	The proportion of the secondary industry to GDP (%)	just	7.35%

	The proportion of the tertiary industry to GDP (%)	just	4.56%
social progress	Per capita disposable income of all residents (yuan)	just	17.28%
	Number of hospital beds per 10000 people	just	7.08%
	Total retail sales of consumer goods (in billions of yuan)	just	37.02%
Ecological Civilization	Green coverage rate in built-up areas (%)	just	1.09%
	Wastewater treatment rate (%)	just	1.74%
	Per capita park green area (square meters)	just	5.85%

Data source: Calculated based on raw data

2.5 Comprehensive Evaluation and Current Analysis of the Coordinated Development Level of Regional Economy in Guangdong Province

Based on the obtained indicator weights, the entropy method is used to obtain the comprehensive index of the coordinated development level of regional economy in Guangdong Province, and a trend chart is shown in Figure 1. Overall, the level of coordinated regional economic development in Guangdong Province and its various prefecture level cities has shown an upward trend year by year, indicating a good trend of coordinated regional economic development.

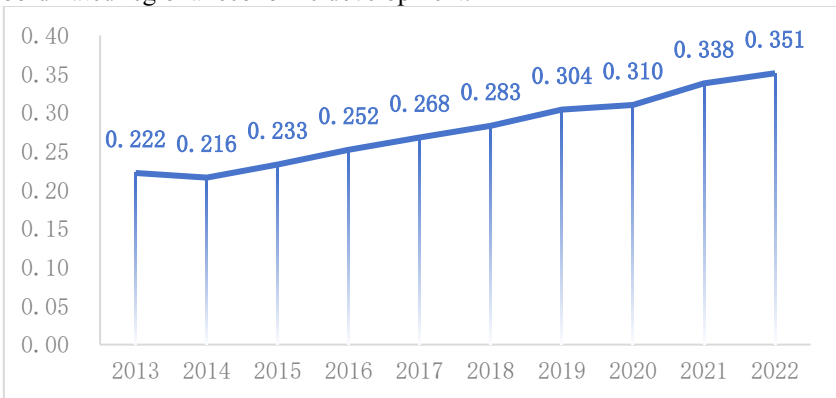


Fig. 1. Trend of Regional Economic Coordinated Development Level in Guangdong Province from 2013 to 2022

In summary, it was found that the overall level of digital economy development in Guangdong Province has shown an upward trend in the past decade, and although the degree of coordinated regional economic development fluctuated slightly between 2013 and 2014, the overall development trend still shows an upward trend. The level of digital economic development and the level of coordinated regional economic development measured in this chapter will be added as core explanatory variables and dependent variables respectively to subsequent empirical analysis.

3 Empirical Analysis

3.1 Research Hypothesis

Hypothesis 1: The digital economy in Guangdong Province directly affects the coordinated development of regional economy.

Hypothesis 2: The digital economy in Guangdong Province indirectly affects the coordinated development of regional economy through technological innovation^[6].

Hypothesis 3: The digital economy in Guangdong Province indirectly has a positive impact on the coordinated development of regional economy through technological innovation.

3.2 Variable Selection and Model Setting

3.2.1 Variable Selection.

To avoid bias caused by omitted variables, this article sets three control variables based on Tang Qin's (2022)^[7] variable selection: degree of openness to the outside world (open), level of industrial structure (ind), and level of household consumption (con).

In order to explore the mediating effect of technological innovation on the impact mechanism of digital economy on regional economic coordinated development, this study chooses the number of patent authorizations as the mediating variable.

3.2.2 Model Settings.

The panel regression model set in this article is as follows:

$$y_{it} = \alpha_0 + \alpha_1 X_{it} + \beta P_{it} + \varepsilon_{it} \quad (7)$$

Among them, i represents the prefecture level city, t represents the year, y_{it} is the dependent variable, X_{it} is the explanatory variable, P_{it} is the control variable, and ε_{it} is the random interference term.

3.2.3 Data Description.

The data used in this study covers panel data from 21 prefecture level cities in Guangdong Province from 2013 to 2022. These data mainly come from the China Urban Statistical Yearbook, Guangdong Provincial Statistical Yearbook, and the China Economic Database. In addition, some data was also obtained from the statistical yearbooks of various prefecture level cities in Guangdong Province and the official website of the Guangdong Provincial Administration for Market Regulation.

3.3 Descriptive Statistics, Correlation Analysis, and Collinearity Test

3.3.1 Descriptive Statistics.

Based on the collected data, use Stata software to organize and analyze it. The descriptive statistical results of the variables are described in detail in Table 4:

Table 4. Descriptive Statistical Results

variable		Sample size	mean value	median	standard deviation	minimum value	Maximum value
Dependent variable	recd	210	0.278	0.212	0.169	0.101	0.878
Explanatory variables	dig	210	0.088	0.037	0.153	0.003	0.763
control variable	open	210	3374	413.50	6966	75.76	36738
	ind	210	1.142	1.065	0.407	0.458	2.753
	con	210	2.177	1.854	0.916	0.998	4.629
Intermediary variable	tech	210	2.188	0.543	4.251	0.044	27.92

Data source: Compiled by the author using Stata software

3.3.2 Correlation Analysis and Collinearity Test.

After conducting correlation analysis on the dependent variable, core explanatory variable, and control variable, the following results were obtained. According to Table 5, it can be seen that there is a significant correlation between the coordinated development of regional economy and the development of digital economy, degree of opening up to the outside world, level of industrial structure, and residents' consumption level.

Table 5. Correlation Analysis Results

variable	recd	dig	open2	ish	con
recd	one				
dig	0.871***	one			
open	0.754***	0.806***	one		
ind	0.425***	0.608***	0.250***	one	
con	0.939***	0.713***	0.684***	0.287***	one

Data source: Compiled by the author using Stata software

Multiple collinearity tests were conducted on the selected four independent variables, and according to the test results in Table 6, the VIF values of all independent variables were below 10. This indicates that in the multicollinearity test, all selected variables passed the test and no significant multicollinearity issues were observed. Therefore, it can be considered that these variables can provide effective and independent information in subsequent analysis.

Table 6. Results of multicollinearity test

independent variable	VIF	1/VIF
dig	6.660	0.150
open	3.960	0.252
con	2.240	0.447
ind	2.200	0.455
Mean VIF	3.770	

Data source: Compiled by the author using Stata software

3.4 Benchmark Regression

After Hausman's test, the obtained P-value is 0.000, which is below the significance level of 0.050. Therefore, a fixed effects model should be used for subsequent analysis. This study used a two-way fixed effects model for in-depth exploration to verify hypothesis 1, and the regression results are shown in Table 7.

Table 7. Benchmark Regression Results

	recd	
	Model (1)	Model (2)
dig	0.642*** (9.53**)	0.396*** (5.89**)
open	—	0.000*** (4.31**)
ind	—	-0.03*** (-2.3***)
con	—	0.067*** (3.59**)
_cons	0.106*** (18.5***)	zero point zero two six (0.82**)
Time * fixed effect	control	control
Individual fixed effect	control	control
N	two hundred and ten	two hundred and ten
R-squ***d	zero point nine eight six	zero point nine nine two

Note: ***, **, * respectively indicate significance at the 1%, 5%, and 10% levels.

Table 7 shows the results of the baseline regression, where model (1) is not affected by the control variables, and model (2) considers the influence of the control variables. Before and after introducing control variables, the estimated coefficients of the core explanatory variables were significant at the 1% significance level and were all positive, indicating that the development of the digital economy has a significant and positive promoting effect on the coordinated development of regional economies. Secondly, according to the results of model (2), when the level of digital economic development increases by 1 unit, the level of coordinated regional economic development will correspondingly increase by 0.396 units; Once again, after introducing the

control variables, the R² value in the model increased, indicating that the three selected control variables are applicable. Therefore, this article assumes that hypothesis 1 holds true, and that the development of digital economy in Guangdong Province has a direct impact on the coordinated development of regional economy.

3.5 Robust Test

To verify the reliability of the benchmark regression results, this study conducted a lagged one period test on the robustness of the core explanatory variable dig and analyzed it as the instrumental variable L.dig. From the results in Table 8, it can be observed that the instrumental variable L.dig has a significant impact on the coordinated development of regional economy at a significance level of 1%. This result further demonstrates the robustness of benchmark regression, which is reliable and effective.

Table 8. Results of robustness test

variable	Lagged explanatory variable for one period
	recd
L.dig	0.421*** (7.85***)
open	0.000*** (3.13***)
ind	-0.03*** (-2.5***)
con	0.075*** (3.59***)
_cons	zero point zero six five (1.49***)
Time * fixed effect	control
Individual fixed effect	control
N	one hundred and eighty-nine
R-squ***d	zero point nine nine five

Note: ***, **, * respectively indicate significance at the 1%, 5%, and 10% levels.

3.6 Heterogeneity Analysis

This article conducts regression analysis on Guangdong Province, which is divided into four regions: eastern Guangdong, western Guangdong, northern Guangdong, and the Pearl River Delta. The test results are shown in Table 9.

Table 9. Results of Regional Heterogeneity Analysis

Area name	Eastern Guang-dong region	Western Guang-dong region	Northern Guangdong region	Pearl River Delta region
variable	recd	recd	recd	recd
dig	0.641** (0.286)	1.005*** (0.287)	0.555* (0.290)	0.384*** (0.051)
open	0.000** (0.000)	0.000*** (0.000)	-0.000 (0.000)	0.000*** (0.000)
ind	0.031** (0.012)	0.024 (0.014)	-0.015 (0.009)	-0.011 (0.017)
con	0.049*** (0.010)	0.055*** (0.016)	0.070*** (0.009)	0.098*** (0.007)
_cons	0.016 (0.018)	0.002 (0.015)	0.058*** (0.013)	-0.010 (0.023)
N	40.000	40.000	40.000	90.000
R-squared	0.831	0.882	0.890	0.934

Note: ***, **, * respectively indicate significance at the 1%, 5%, and 10% levels.

The regression results in Table 9 show that the degree of openness to the outside world and the improvement of residents' consumption levels in the western Guangdong and Pearl River Delta regions have played a significant positive role in promoting the coordinated development of their regional economies. The consumption level of residents in the northern Guangdong region has a significant positive impact on the coordinated development of the regional economy. Overall, the impact of Guangdong's digital economy on regional economic coordinated development exhibits regional heterogeneity.

3.7 Analysis of Intermediary Effect

This article adopts the mediation effect analysis method proposed by Wen Zhonglin and Ye Baojuan (2014)^[8]. Based on this, by introducing the level of technological innovation as a mediating variable, a mediation effect model for the coordinated development of regional economy in Guangdong Province is constructed, and its mechanism is deeply studied.

Table 10. Results of the Mediating Effect Test of Technological Innovation

	Model (1)	Model (2)	Model (3)
	recd	tech	recd
dig	0.409*** (0.038)	37.762*** (1.540)	0.259*** (0.077)
open	0.000*** (0.000)	0.001*** (0.000)	0.000*** (0.000)
ind	-0.001	-0.366	0.001

	(0.007)	(0.295)	(0.007)
con	0.090*** (0.005)	0.523*** (0.189)	0.088*** (0.005)
tech	—	—	0.004** (0.002)
_cons	0.008 (0.010)	-4.628*** (0.411)	0.026** (0.013)
N	210.000	210.000	210.000
R-squared	0.908	0.920	0.911

Note: ***, **, * respectively indicate significance at the 1%, 5%, and 10% levels.

The specific test results are shown in Table 10, where Model (1) directly demonstrates the role of the digital economy in promoting coordinated regional economic development; Model (2) illustrates the impact of the digital economy on technological innovation; Model (3) further analyzed the role of the digital economy in promoting coordinated regional economic development, taking into account the mediating factor of technological innovation. From the test results, it can be concluded that in models (1), (2), and (3), the regression results are significant at the 1% level. Therefore, hypothesis 2 of this article holds, that the digital economy in Guangdong Province indirectly affects regional economic coordinated development through technological innovation.

Further observation shows that the regression coefficient between digital economy and technological innovation in model (2) is significantly positive, indicating that the digital economy has a significant driving effect on technological innovation. In addition, after adding the mediating variable of technological innovation in model (3), the regression coefficient of the digital economy remained significantly positive and decreased compared to the benchmark regression results. This discovery indicates that the digital economy can indeed have a positive impact on the coordinated development of regional economies by promoting technological innovation. Therefore, this article assumes that hypothesis 3 is true, and that the digital economy in Guangdong Province indirectly has a positive impact on the coordinated development of regional economy through technological innovation.

4 Research Conclusions and Recommendations

4.1 Main Conclusions

Firstly, the overall development trend of the digital economy in Guangdong Province is good, but the differences are prominent. Within the research interval selected in this article, over two-thirds of the prefecture level cities in Guangdong Province have not reached the average level of Guangdong Province. This shows that the development gap of the digital economy in Guangdong Province is quite wide and uneven, and the "digital divide" feature is significant.

Secondly, the digital economy has a significant positive impact on the coordinated development of regional economy in Guangdong Province, and can indirectly affect the coordinated development of regional economy in Guangdong Province through tech-

nological innovation. From the analysis of benchmark regression results, it can be seen that before and after adding control variables, the digital economy has brought significant positive effects on the coordinated development of regional economy; From the analysis of mediating effects, it can be seen that when considering technological innovation as a mediating variable, the regression coefficients of digital economy and technological innovation, as well as the regression coefficients of technological innovation and regional economic coordinated development, are both significantly positive. Therefore, the digital economy can have a positive impact on the coordinated development of regional economies through technological innovation.

Thirdly, the impact of the digital economy on the coordinated development of regional economy in Guangdong Province exhibits regional heterogeneity. The previous text has divided various prefecture level cities in Guangdong Province into four major regions: eastern Guangdong, western Guangdong, northern Guangdong, and the Pearl River Delta, in order to explore in more detail the differentiated impact of the digital economy on the coordinated development of different regions. Empirical evidence shows that the development of the digital economy has had a positive impact on all regions of Guangdong Province, with the strongest promoting effect on the coordinated development of the regional economy in western Guangdong.

Fourthly, through the robustness test of lagged core explanatory variables as instrumental variables, it can be found that the digital economy still has a significant positive impact on the coordinated development of regional economy in Guangdong Province. In addition, the regression coefficient of the digital economy on the coordinated development of regional economy in the robustness test has a small difference from the regression coefficient in the previous benchmark regression analysis, indicating that the results of this study have good robustness.

4.2 Suggestion

Firstly, accelerate the construction of digital infrastructure. A good digital infrastructure is an important prerequisite for the development of the digital economy, while also promoting equalization of public services and promoting coordinated regional economic development. On the one hand, Guangdong Province needs to introduce advanced technology and management experience, increase investment in digital infrastructure construction, and adapt to the different development situations of various regions in the province by scientifically deploying digital infrastructure construction in different areas; On the other hand, in the process of promoting infrastructure construction, Guangdong Province should pay attention to the complementary advantages between traditional infrastructure and digital infrastructure, and accelerate the transformation and upgrading of traditional infrastructure. In addition, it is necessary to continuously expand the coverage and application scenarios of digital infrastructure, and promote innovative development of infrastructure construction.

Secondly, strengthen the leading and radiating role of the Pearl River Delta region, and alleviate the significant regional differences in the coordinated development of digital economy and regional economy. In this regard, Guangdong Province can rely on a solid industrial foundation to build a more dynamic new ecosystem of digital indus-

tries, encourage the Pearl River Delta region to expand its industrial chain through cross regional industrial cooperation, bring advanced productive forces to other regions, and promote regional economic linkage in Guangdong Province; In addition, Guangdong Province should further optimize its industrial layout, improve the quality of industrial development, accelerate the construction of a modern industrial system, and continue to strengthen the opening up level of the Pearl River Delta region to the outside world, and enhance two-way exchanges with other regions.

Thirdly, increase investment in technological innovation and stimulate innovation momentum. This article concludes that the digital economy plays an important role in promoting the coordinated development of regional economy in Guangdong Province through technological innovation. In response to this, Guangdong Province can formulate targeted measures to guide regional innovation and development, improve the application level of digital technology, and promote the positive interaction between technological innovation and digital industry, based on the current situation of scientific and technological innovation in various regions; In addition, Guangdong Province can also deepen the integration of industry, academia, and research by supporting enterprises, schools, and research institutes to jointly build collaborative innovation platforms, and promote the transformation and industrialization of scientific and technological innovation achievements to a higher level; Finally, Guangdong Province should further improve the property rights protection system, safeguard the interests of participating entities, and increase efforts to cultivate innovative talents, fully leveraging the leading role of innovation.

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