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The Impact of Digital Economy on Industrial Agglomeration

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Abstract

In an era characterized by swift digital economy development, strengthening traditional industries and aiding industrial agglomeration with digital economy. This paper examines the effects and process of the digital economy on industrial agglomeration using by developing an indicator system, employing the entropy weight approach to assess the digital economy, and industrial agglomeration is measured using the location entropy approach. According to research, the digital economy can stimulate the establishment of industrial agglomeration, and this boosting influence is particularly visible in locations located in the eastern region, where marketization, population density and technological innovation is significant. The development of the circulation industry plays a significant promoting role in the process of promoting industrial agglomeration through the digital economy. Therefore, we should actively develop the digital economy and boost infrastructure building; Promote the combination of online and offline industrial clusters, actively build online clusters, shorten the geographical distance between enterprises, and accelerate industrial integration; Develop the circulation industry, reduce production and transportation costs, enhance urbanization level, and attract capital to assist in industrial agglomeration.

Keywords: Digital economy, Circulation industry, Industrial agglomeration, Regulation effect

Introduction

With the emergence of a new technological revolution and industrial change around the world, a novel mode of production with Big data as the focus and digital technology as the engine has emerged. Human society has quickly moved towards the era of digital economy, and has become a horse drawn carriage promote the rapid recovery of the world economy. With its high technology, high penetration, high integration, and high growth features, the digital economy profoundly integrates with the actual economy and accelerates the changes and modernizing of traditional industrial structures. The "2035 Vision Plan Outline" feature a chapter on "accelerating the growth of technology and building a digital China," highlighting the "building of new benefits in the digital economy" and becoming a lighthouse for China's digital economy. Writing a new chapter for the expansion of the digital economy has shown the way forward. It was discovered that China's digital economy has maintained a consistent growing trend by measuring the percentage of the scale of the digital economy to GDP. From 2011 to 2020, the digital economy's share of GDP climbed from 19.47% to 38.6%, showing a clear upward

trend (Fig 1). The digital economy is a fresh impetus for increasing China's economic growth in both quantity and effectiveness, as well as an exciting opportunity for industrial agglomeration [1]. In the 2022 Central Government Work Report, it was proposed to "speed up the development of modern manufacturing agglomerations, implement the national advantageous emerging industry clustering project, provide strong support in the areas of funding, talent, as well as additional aspects, and encourage the industry's transition to the mid to high end". The digital economy will affect the economic geography pattern. On the one hand, the uneven economic geography pattern is caused by incomplete infrastructure and the "digital divide"[2], which leads to uneven information distribution, significant spatial and regional disparities, and imbalanced industrial development; The convergence of the digital and physical economies shortens geographical distance, enables various enterprises to cooperate and develop online, reduces development costs, and is conducive to industrial development.
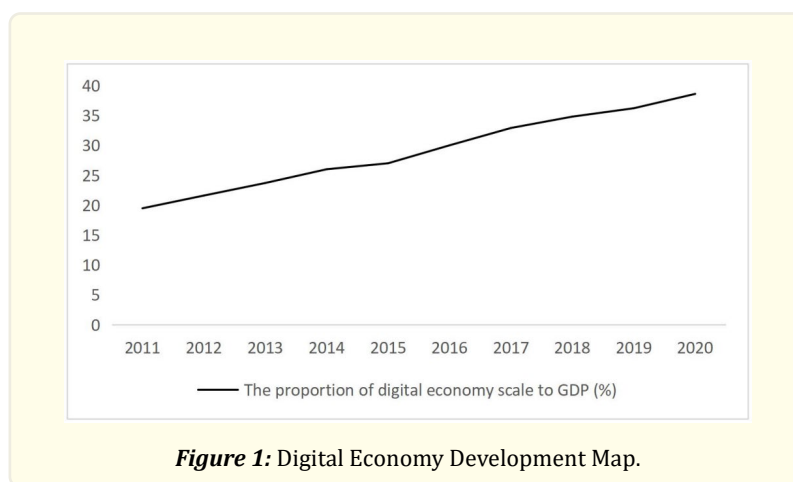

Figure 1: Digital Economy Development Map.

Circulation industry can indirectly guide the optimization of labor force [3], Promote the conversion of foreign trade to domestic sales, generating greater consumption and production capacity [4]. The circulation industry also has a strong ability to absorb employment, accelerate the optimization of land, labor and other factors [5]. At the same time, it has constructed supply chain activities, reduced trade costs, and enabled different industries, different formats, and different enterprises to combine and develop within a certain geographical range [6], further promoting the formation of industrial agglomeration. For example, the rapid growth of Alibaba's digital industry belt has expanded from less than 100 and 52 cities in 2013 to 3000 and 163 cities in 2021. Various provinces have formed digital industry belts with industry attributes. The digital industry belt is a new form of industrial organization that has emerged under the growth of digital economy, it is a "new industrial cluster" development model that integrates the offline industrial chain and online industrial ecology, playing a bridging role in the development of digital industrial clusters and advanced manufacturing industrial clusters, and increasingly becoming an important support for enhancing industrial resilience and vitality. The digital industrial belts developed in various areas varies due to the diverse growth of the circulatory industry in different locations. The digital transformation of Shantou enterprises drives the transformation of traditional wholesale markets to develop the underwear industry; Dongguan is building an "O2O New Wholesale" model in the field of industrial internet to develop the clothing industry, and so on. Therefore, it is critical to clarify the influence of the development circulation industry on the industrial agglomeration of digital economy.

Nowadays industrial agglomeration faces challenges such as technology shortage, high costs, financing difficulties, and low innovation. Existing scholars can reduce coordination costs, promote cooperation and division of labor [7], attract technical talents, capital and other production factors, and help in the transformation of conventional sectors to boost industrial agglomeration formation [8]; Some scholars feel that the digital economy has altered the innovation process within businesses as well as the collaborative innovation mechanism between various industrial organizations. The connection, repercussions, and dissemination effects between the

information and communications sector and other industries are pushing industrial structure upgrades.However, there is no literature directly studying the impact of the development of the communication industry on the digital economy, as well as the link between production and consumption in circulation, Compared with existing literature, this article plays an indispensable role in industrial agglomeration, and its marginal contribution is as follows: (1) as the hub of production and consumption, circulation industry development is used as a moderating variable to study the impact of circulation industry as an intermediate link between production and consumption; (2) further subdivided the impact of marketization level, population density, and technological innovation level on industrial agglomeration.

Literature reviews

Digital economy and industrial agglomeration

The internet based economy is a new motor for industrial agglomeration as well as an exciting opportunity for enhancing the effectiveness of economic development [1]. Digital economy encourages structure upgrading, and growth of the market economy makes the digital economy to play a greater part in industrial structure upgrade [9]. But most scholars on the influence of the digital economy, using the method of empirical analysis of heterogeneity, believe that technology innovation improves the digital economy, that it can promote worker productivity and promote electronic devices transference to promote industrial structure upgrading, that it can also accelerate the evolution and improvement of industrial structure, and that the influence of the industrial structure upgrade has nonlinear characteristics and regional heterogeneity [10]. In the domestic literature research, the relationship between the two believes that the digital economy propels China's manufacturing structure to the medium and high-end [11]. The emerging information technology not only improves the effectiveness of the market but also promotes the scale of production and the refinement of the industrial chain [12]. The complete integration of the digital and real economies has become an innovative catalyst for promoting industrial change and upgrade [13], enterprises can use the internet to accomplish the upgrading and optimization of a single structure, improve resource allocation and utilization efficiency [14], some scholars introduced empirical studies of metrological models and discovered that digital economy showed a significant beneficial correlation with industrial structure [15], it is found that it can indirectly affect structure upgrading by affecting human capital as well as technological and scientific advances [16]; The industrial integration impact may all be used to adapt, change, and upgrade the industrial structure [17]. From the research on the adjustment of industrial structure of different industries in digital economy, digital supports industry structure upgrading by cracking the congestion in the creativity chain, enhancing manufacturing chain quality, maximizing supply chain efficiency, and extending the area of service chain [18]. Moreover, there are geographical variances in the digital economy's modification of industrial structure [19], and nonlinear characteristics and spatial spillover characteristics [20]. Digital economy can greatly reduce the coordination costs of enterprises by attracting a large amount of labor, utilizing its permeability, and promoting division of labor and cooperation between enterprises [21]. By lowering the cost of transactions, expanding the market, and fostering knowledge spillovers can effectively promote the degree of specialization and diversification in various regions, which is also influenced by the size of enterprises and the level of urbanization. It has the potential to impact industrial structure modification under the control of digitalization [22], and the growth of the digital economy has fully unlocked and liberated the high-quality development of industrial agglomeration [23]. From the standpoint of real economy and digital economy integration , the development of digital economy enables regions to enhance their industrial agglomeration level by leveraging their respective endowment advantages, utilizing existing industrial foundations, cultivating and attracting high-tech talents, and establishing high-tech industrial parks [24]. From the perspective of digital technology innovation, cities with higher levels of digital technology innovation have more innovation capital. The aggregation of factors such as human capital and information technology will promote industrial specialization and division of labor [8]. From the perspective of product demand, it is believed that in areas with developed digital economies, the growth of the digital industry will inevitably increase the demand for intermediate goods, leading to the phenomenon of industrial agglomeration [25]. From a macro, meso, and micro perspective, it is believed that the emergence of the Internet is capable of enhancing the overall efficiency of cities along with manufacturing industries [26], and that increasing the intensity of digital technology diffusion between regions will also improve the rectifying impact that industrial agglomeration on resource mismatch, providing better development space for industrial agglomeration [27]. The following is hypothesis in this paper:

Hypothesis 1: The growth of the digital economy promotes the growth of a local industrial agglomeration.

Digital economy and the Development of Circulation Industry

In the field of circulation industry, the digital economy promotes the expansion of the circulation industry and improves circulation efficiency by shortening circulation time and reducing circulation costs [28]. The extensive use of technology in the circulation industry has gradually infiltrated and integrated from the transaction link to the innovative research and development, research and design, application sales and other links, as well as the modernization and optimization of the circulation industry chain [29], improving the circulation industry's informatization level, and maximizing resource allocation. First, improve the digital transformation of the circulation industry, shorten the circulation transaction time through intelligent development, and apply digital technology to enable rapid and accurate feedback of goods or service information [28]. And the time for the circulation industry chain to obtain effective information is shortened, improving the supply and demand matching ability of the circulation industry, enabling goods or services to flow quickly from the production end to the consumer end, and meeting the needs of consumer groups efficiently and accurately, The informatization, digitization, and visualization of the supply chain shortening the time required for the circulation industry and opening up a broader consumer market. Secondly, efficient and precise consumption accelerates circulation and transactions, while also reducing the cost of capital turnover and transaction costs. Nowadays, e-commerce platforms are widely emerging, the information of goods or services is gradually open and transparent, and consumers have more and diversified demands. The application of big data can provide consumers with more appropriate and accurate consumer products [30], which greatly reduces the costs caused by product price differences, information asymmetry, and supply and demand mismatch, and eliminates many barriers in the transaction process, the following is hypothesis in this paper:

Hypothesis 2: The development of the digital economy has promoted the development of the regional circulation industry.

Digital Economy, Development of Circulation Industry, and Industrial Agglomeration

Circulation, as a key link connecting production and consumption, the manufacturing industry's development is greatly influenced by the circulation industry's quick development. Digitalization of circulation promotes industrial agglomeration by providing a better platform for production, circulation, distribution, and consumption to be more efficient [31], and by reducing labor intensity, labor productivity, transportation costs, and land rent costs in the industry, as well as increasing urbanization levels [32]. The circulation industry and the level of urbanization develop together. Areas with a high level of urbanization will attract a large amount of capital, labor and other factor resources, create more jobs [33], develop various infrastructure, expand trade markets, and guide industries to gather in the region [34]. The expansion of the size of cities and towns also increases the capacity for the expansion of industrial clusters [35], the growth of the circulation industry may reduce the industry's production costs by lowering transportation expenses, as well as indirectly improve factor productivity of the manufacturing industry [36], thereby guiding labor optimization [3] and promoting the formation of industrial clusters. However, the traditional circulation industry has many problems in the transaction link, cost, time, and supply and demand matching. It needs to use the penetration of digital technology to complete its own Digital Revolution, apply the high penetration of digital economy, integrate with the traditional circulation industry, drive its upstream and downstream industries' innovative technology, digitization, and informatization [29], and give full play to the regulatory effect of the development of the circulation industry in industrial agglomeration. The development of the circulation industry provides a better production platform and agglomeration environment for industrial agglomeration, making industrial production, product circulation, allocation and sales of factor resources more efficient. In addition, data elements are another important element of modern industry, closely integrated with industrial production,, forming emerging formats, and supporting the growth of the local economy, the following is hypothesis in this paper:

Hypothesis 3: In the digital economy, the development of the circulation industry is crucial for fostering the development of industrial clusters.

A survey of current literature reveals that there are few pertinent mechanism tests and empirical testing, and that the research on the influence of the digital economy on industries begins from the perspective of industrial structure. There hasn't been any research done in tandem with the growth of the circulation sector to examine how the digital economy's impact on industrial agglomeration relates to that growth. The digital economy is rapidly integrating with the circulation industry, and information network technology has developed rapidly in the circulation industry. The development of the circulation industry has reduced industrial production costs and promoted trade exchanges with upstream and downstream industries. This article uses a model to examine relationships and mechanisms between them. Based on differences in spatial regions and different indicators in different regions, a more in-depth analysis of the heterogeneity characteristics of the digital economy on industrial agglomeration is conducted, and relevant recommendations are proposed to improve the formation of industrial agglomeration.

Empirical design

Basic model

The following model is developed to study the impact of digital economy development on manufacturing industry agglomeration:

$$aggl_{it} = \alpha_0 + \alpha_1 dige_{it} + \alpha_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \qquad (1)$$

Among them, agglit representative provinces i t years manufacturing agglomeration level; $dige_{it}$ representative provinces i t years of digital level of economic development; X_{it} representative control variable; μ_i and θ_t represents individual and time fixed effects; ε_{it} represents the random perturbation terms.

To studying the effect of digital level of economic development of circulation industry development, build bidirectional fixed effects model as follows:

$$doc1_{it} = m_0 + m_1 dige_{it} + m_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \qquad (2)$$

The transfer items of digital economy and circulation industry development are added to the model (1) to verify the regulatory role of the development of circulation industry in the influence of digital economy on industrial agglomeration.

$$aggl_{it} = \beta_0 + \beta_1 dige_{it} + \beta_2 doc_{it} + \beta_3 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \qquad (3)$$
$$aggl_{it} = \gamma_0 + \gamma_1 dige_{it} + \gamma_2 doc_{it} + \gamma_3 dige_{it} * doc_{it} + \gamma_4 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \qquad (4)$$

Among these, the $doc1_{it}$ represents provinces i t years of the development level of circulation industry; doc_{it} show will $doc1_{it}$ The median is the standard, taking 1 greater than the median, and taking 0 otherwise, $dige_{it}*doc_{it}$ is the digital economy and the circulation the interaction term of industry development.

Variable design and data

Explained variables: industrial agglomeration ($aggl_{it}$). The methods for measuring industrial agglomeration include location entropy method, Hufendal index method, cluster analysis method, location gini coefficient method and industry cluster index method. This paper using the location entropy method [37] to measure manufacturing industrial agglomeration, the formula is provided as formula (5):

$$aggl = \frac{q_{ij} / q_i}{q_j / Q} \qquad (5)$$

Where, i indicates the province, j indicates the manufacturing industry, and q_{ij} represents the number of employment in manufacturing industries in i province, and Q indicates the total number of employment nationwide.

Interpretive variables: digital economy ($dige_{it}$). Most scholars for the provincial level of the digital economy measure using entropy weight, entropy method and principal component analysis, this study draws on ZhaoTao [38, 39], measuring the digital economy by using the entropy method.

Level 1 indicators	Secondary indicators	unit	Indicator attributes
Digital economy development scale	Total postal business	kilometres	+
	Express business revenue	Wan Yuan	+
	Total telecom business	100 million	+
Digital economy infrastructure	Mobile phone penetration rate	Department / 100 people	+
	Internet broadband access to the users	Ten thousand households	+
	Talent support (the number of ordinary colleges and universities)	individual	+

Table 1: Indicator System.

Adjustment variables: the development of the circulation industry (doc_{it}). Measured by the specialization level of circulation industry, according to the definition of industrial specialization in Glaeser and Dekle [40], in the regulation effect model, the median is the standard, the province with the circulation development level higher than the median is 1, otherwise, 0.

$$doc1_{it} = \frac{n_{it}}{N_{it}}$$

$$(6)$$

Among these, the $doc1_{it}$ refers to the professional level of the circulation industry, used to measure the growth level of the circulation industry, n_{it} is i province t year circulation industry urban unit employment number, N_{it} it is the final number of urban units in t.

Control variables: financial level (Fin): this paper refers to the study of Zhao Tao [38], measured by the ratio of the sum of the balance of regional institutional deposits and loans to gross regional product; degree of government intervention (gov): the percentage of fiscal expenditure to GDP measures the degree of intervention by governments; urbanization level (urban): to measure the level of urbanization by using the proportion of the urban population, at the same time, it is log-treated; level of transportation infrastructure (tra): transportation infrastructure is the basic condition of the industry, in this paper, we refer to the methods of Gong Xinshu [41], etc., using the following formula:

$$Trade = \frac{\text{total mileage of regional highways}}{\text{area}} * 100\% \qquad (7)$$

For study and analysis in this work, the panel data of 31 Chinese provinces from 2011 to 2020 were chosen. The China City Statistical Yearbook and EPS database provided the first data. The interpolation method was used for the individual data with missing values. Table 2 displays the descriptive statistical findings for the research variables.

Variables	Mean	Std.Dev	Min	Max
Industrial agglomeration (aggl)	0.810	0.353	0.0830	1.782
Development level of digital economy (dige)	0.230	0.133	0.0190	0.892
Circulation industry development level (doc)	0.050	0.501	0.000	1.000
Financial Level (Fin)	0.284	0.210	0.110	1.379
Degree of government intervention (gov)	2.664	1.094	0.882	6.761
Urbanization level (urban)	4.035	0.234	3.127	4.495
Transport infrastructure level (tra)	0.432	0.391	0.0130	2.087

Table 2: Descriptive statistics (sample size =310).

Empirical Analysis

Benchmark regression

The regression is performed on formula (1) to examine the influence of digital economic growth on industrial agglomeration, and the findings are displayed in Table 3. Table 3 (1) shows results without controlling variables. The results of the digital economy on industrial agglomeration is shown in Table 3 columns (2) through columns (5) when the four control variables are introduced one at a time. The digital economy coefficient is determined to be significantly positive, proving that hypothesis 1 is correct. Using the regression of formula (2), the digital economy component is found to be substantially positive in Table 3 column 6, indicating that the digital economy can significantly contribute in its growth of the circulation industry. Hypothesis 2 is correct.

variables			aggl			doc1
	(1)	(2)	(3)	(4)	(5)	（6）
dige	0.551**	0.549**	0.554**	0.564**	0.599**	0.075*
	(0.253)	(0.260)	(0.256)	(0.258)	(0.282)	(0.044)
gov		-0.029	-0.055	-0.075	0.119	0.248***
		(0.258)	(0.248)	(0.255)	(0.276)	(0.088)
tra			0.086	0.087*	0.116*	-0.010
			(0.051)	(0.048)	(0.060)	(0.010)
fin				0.003	-0.005	-0.021**
				(0.024)	(0.020)	(0.010)
urban					0.505*	0.003
					(0.276)	(0.024)
_cons	0.765***	0.773***	0.743***	0.740***	-1.291	0.016
	(0.048)	(0.089)	(0.092)	(0.093)	(1.094)	(0.013)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R²	0.105	0.105	0.113	0.113	0.145	0.208
N	310	310	310	310	310	310

Table 3: Benchmark regression.

The regulating effect of the development of the circulation industry

The findings are displayed in Table 4. Table 4 (2), the regression coefficient of interaction between digital economy and circulation industry development is 0.266, and R² changes is 0.015, indicating that the regulation effect is significant. The growth of the circulation industry is crucial for advancing the progress of the digital economy promotes agglomeration and hypothesis 3 is verified. May be due to the circulation industry developed areas, driving the construction of infrastructure, the urbanization level is higher, attracts a lot of capital and labor, and the production materials of transportation cost is lower, produce greater consumption and production capacity, provide more jobs, promote the local industrial agglomeration.

variables	aggl	
	（1）	（2）
dige	0.582*	0.385*
	(0.288)	(0.216)
doc	0.051	-0.007
	(0.033)	(0.037)
dige*doc		0.266*
		(0.138)
gov	0.123	0.275
	(0.252)	(0.256)
tra	0.121**	0.123*
	(0.057)	(0.061)
fin	0.002	-0.004
	(0.020)	(0.017)
urban	0.572**	0.610**
	(0.271)	(0.278)
_cons	-1.591	-1.730
	(1.088)	(1.127)
Fixed effects	Yes	Yes
R^2	0.170	0.185
N	310	310

Table 4: Results of moderating effect.

Heterogeneity analysis

Group the samples by region and perform benchmark regression was conducted in each to examine the heterogeneity of the influence of the digital economy on industrial agglomeration in the area. The outcomes are displayed in Table 5. The digital economy strongly promotes industrial agglomeration in the eastern region. The cause of this difference may be that the eastern economy and circulation industry development level overall higher, is advantageous to the production of raw materials to reduce production costs and information transmission. Beneficial to forming industrial agglomeration. And digital economy infrastructure of the cental and west region is relatively backward, relatively poor industry development environment, circulation industry is underdeveloped, all kinds of costs and information congestion, cause the role of the digital economy is limited.

variables	In the area		
	east	central	west
	(1)	(2)	(3)
dige	0.997**	0.852	-0.324
	(0.415)	(0.842)	(0.315)
gov	0.565	0.308	-0.050
	(0.986)	(0.741)	(0.220)
tra	-0.208	-0.423	0.064
	(0.999)	(0.305)	(0.043)
fin	0.007	-0.117	-0.010
	(0.031)	(0.081)	(0.015)
urban	0.463	-0.457	0.117
	(0.645)	(1.372)	(0.457)
_cons	-1.080	2.705	0.252
	(2.500)	(5.355)	(1.726)
Fixed effects	Yes	Yes	Yes
R^2	0.418	0.295	0.413
N	100	100	110

Table 5: Heterogeneity analysis based on location.

A group regression was then performed according to different degrees of various indicators in different regions, as shown in Table 6. First, this article uses the marketization index constructed by Fan Gang [42] to measure the level of marketization, in the provinces of the median, the median sample for high marketization level group, below the median sample for marketization level group [43], and regression analysis, can be found that in the low marketization level of digital economy of industrial agglomeration is not significant and negative, this shows that the regional market foundation is not perfect, hindered the development of digital economy and industry, is not conducive to the formation of industrial agglomeration. Second, this paper to the median of the standard, the whole sample is divided into low density, high density and regression analysis respectively, the results can be found in the population density is high, the digital economy in promoting industrial agglomeration, the higher the population density, provides the resources of industrial development must labor, promote the formation of industrial agglomeration. Third, this research project measures the level of technical innovation using the number of patent applications [44]. It can be seen that in cities with low level of technological innovation, the impact of digital economy on industrial agglomeration is not significant and negative, which shows that regions with low level of technological innovation lack independent introduction, and the industry is underdeveloped.

variables	Marketization level		density of population		Technology innovation level	
	High marketization level (1)	Low marketization level (2)	high density (3)	low density (4)	High innovation group (5)	Low innovation group (6)
dige	0.794*	-0.205	1.037***	-0.087	0.792*	-0.411
	(0.449)	(0.471)	(0.232)	(0.115)	(0.458)	(0.568)
gov	0.330	-0.015	0.929***	-0.058	0.177	-0.045
	(0.908)	(0.259)	(0.289)	(0.250)	(1.231)	(0.258)
tra	0.352	0.106**	0.083	0.065**	0.719	0.108**
	(0.673)	(0.042)	(0.159)	(0.031)	(0.476)	(0.048)
fin	0.004	0.003	-0.070***	-0.016	0.014	-0.004
	(0.059)	(0.014)	(0.025)	(0.012)	(0.082)	(0.013)
urban	0.746	-0.098	0.886*	0.384*	1.065**	-0.089
	(0.513)	(0.324)	(0.431)	(0.192)	(0.481)	(0.297)
_cons	-2.225	0.954	-2.872	-0.650	-3.643*	0.982
	(2.162)	(1.253)	(1.766)	(0.757)	(1.957)	(1.168)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.207	0.306	0.360	0.123	0.190	0.270
N	155	155	155	155	155	155

Table 6: Analysis of the heterogeneity.

Robustness test

The explanatory variable lags for one period. This article will re estimate industrial agglomeration with explanatory variables lagging for one period to test the robustness of the model. As demonstrated in column (1) of Table 7, the coefficient of the digital economy's development level with a one-period lag is still favorably significant.

Replace the explained variable. For the purpose of trying to get more reliable regression results, the calculation formula in this paper is as Equation (5), which is based on the research of Sun Zhichao [45], using the industrial agglomeration of GDP and population proportion to replace the measure of employment to conduct the robustness test. The calculation formula is as Equation (5). The results are displayed in Table 7 (2), and it can be seen that even when the explained factors are replaced, the coefficient of digital economy development level remains substantial and positive, demonstrating that the prior results are resilient.

$$Aggl = \frac{(GDP\ of\ the\ secondary\ industry / resident\ population)}{(national\ secondary\ industry\ GDP / national\ resident\ population)} \tag{8}$$

variables	The explanatory variables lag behind the one phase (1)	Replacement by the explanatory variable (2)
L.dige	0.691**	
	(0.280)	
dige		36.421**
		(16.001)
gov	0.046	-15.732
	(0.239)	(15.924)
tra	0.184**	1.854
	(0.087)	(2.520)
fin	0.004	0.743
	(0.018)	(1.423)
urban	0.653*	16.357
	(0.323)	(10.333)
_cons	-1.938	-38.016
	(1.304)	(40.601)
Fixed effects	Yes	Yes
R^2	0.145	0.420
N	279	310

Table 7: Robustness test.

Conclusion

This paper employs the models to examine how the expansion of the digital economy has affected industrial agglomeration and the regulatory impact of the development of the circulation industry. According to research, the growth of the digital economy significantly promotes the formation of industrial agglomeration, and the growth of the circulation industry significantly promotes the formation of industrial agglomeration in the digital economy. Moreover, with a more actively improving effect in the eastern region. In addition, in the high level of marketization areas with dense populations and high levels of technological innovation also have more significant promoting effects.

The following enlightenments are drawn by this article from the earlier analysis: Develop the digital economy first, then upgrade the infrastructure. This study comes to the conclusion that the growth of the digital economy can aid in the creation of industrial agglomerations. The foundation for developing a digital economy is to build an infrastructure that is flawless, vigorously push for the development of digital infrastructure, particularly by fully utilizing the permeability, efficiency, lowering trade costs, advancing the level of growth of the circulation industry. Simultaneously, emphasis should be placed on encouraging the digital transformation of old industrial infrastructure, fully utilizing the information dividend that the digital economy has brought to the sector and developing the regional economy. Secondly, the combination of online and offline industrial clusters. Online agglomeration can help promote industrial integration and development, and improve competitiveness. With the digital economy, industrial agglomeration can no longer rely closely on offline agglomeration. The degree of industrial integration will rapidly decline. As a result of the digital economy's impact, online agglomeration can enable enterprises to have no distance and use digital technology to quickly connect and exchange products and services online, enhancing the quality of goods and services provided by upstream and downstream businesses. And online clustering can provide more information and job opportunities. Thirdly, develop the circulation industry and enhance the level of urbanization. Regions with developed circulation laws have lower trade costs, easier access for enterprises to low-cost raw materials, and densely populated areas with more employment opportunities and higher levels of urbanization. These are all factors conducive to the formation of industrial clusters.

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