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Research on the Collaborative Evaluation and Development of Digital Trade and Industrial Clusters: Taking Relevant Industries in Guangzhou as an Example

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Abstract

This paper constructs a synergy model between digital trade and industrial clusters from the perspective of system theory. Five major industrial clusters in Guangzhou, including textile and clothing, beauty and daily chemical, luggage and leather goods, jewelry, and food and beverage, are selected to analyze the evolution trend of the composite system between digital trade and industrial clusters. The study found that the luggage and leather goods industry is in the expansion stage of the synergy between digital trade and industrial clusters. The other four industries are still in the initial stage of digital trade and industrial cluster synergy, with low synergy level. The textile clothing industry has the least obvious growth momentum, showing the lowest level of synergy between digital trade and industrial clusters. By promoting the efficient evolution of the system, the upgrading and transformation of industrial clusters through digital trade can be achieved, and the deepening development of digital service trade based on industrial clusters can be effectively supported. This paper can provide recommendation for the collaborative development of Guangzhou's industrial digitization and digital industrialization.

Keywords: Digital Trade; Industry Cluster; Collaboration Development; Guangzhou

Several Measures for Guangzhou to Deepen the Industrial Internet Enabling Transformation and Upgrade Five Traditional Characteristic Industrial Clusters proposed that Guangzhou will focus on five industrial clusters, including textile and clothing, cosmetics and daily chemicals, luggage and leather goods, jewelry, food and beverage, to form digital transformation solutions. Currently, Guangzhou's digital trade is mainly focused on cross-border e-commerce, and there is a dilemma of low competitiveness in the field of digital services. In the same time, how to upgrade the traditional industry and enjoy the sustainable development is an urgent issue. It is necessary to collaborate with multiple factors in the digital trade and industrial cluster systems. This article constructs a synergy

model between digital trade and industrial clusters from the perspective of system theory, analyzes the evolution trend of the composite system of digital trade and industrial clusters, and clarifies the level of synergy between Guangzhou's digital trade and industrial clusters, thereby helping to solve conflicts and contradictions in the system and promoting efficient evolution of the system. Based on the synergistic mechanism between digital trade and industrial clusters, promoting digital trade to assist in the upgrading and transformation of industrial clusters, effectively supporting the deepening development of digital trade in industrial clusters, can provide reference ideas for the development of Guangzhou's industrial digitization and digital industrialization.

1.   Research Status at Home and Abroad

Domestic research on digital trade focuses on the concepts, connotations, measurements and strategies, development trends, value chain enhancement in the digital industry, and global value creation of digital trade (Li Jun et al., 2021; Xu Jinhai and Xia Jiechang, 2020; Fang Yuanxin, 2020; Jing Yanhui and Li Wei, 2020) [1-4]. Most existing literature studies the mechanism of e-commerce and export trade in enhancing the competitiveness of industrial clusters. E-commerce helps industrial clusters expand market capacity, enhance the level of collaboration and competition among cluster enterprises (Mao Yuanfang, 2010) [5]. The development of export trade has deepened international division of labor and promoted the optimization and upgrading of the internal structure of industrial clusters (Ding Yuan, 2013) [6]. In addition to relying on cross-border e-commerce platforms for goods trade, digital trade also covers digital product trade and digital service trade. It is evident that the development of digital trade has changed the global value creation model and formed a new value chain (Xu Jinhai and Xia Jiechang, 2020). Small and medium-sized enterprises share new market opportunities by forming virtual industrial clusters, and digital trade promotes cooperative links between upstream and downstream enterprises as well as cross industry enterprises (Lin, 2015) [7]. However, the research on the mechanism and path of high-quality development of industrial clusters driven by digital trade still needs to be in-depth. Industrial clusters have a positive effect on trade (Krugman, 1991) [8]. Industrial clusters can promote the expansion of market supply scope, which is directly manifested in the enhancement of export capacity (Liu Jun et al., 2010; Wu Longhui, 2013) [9-10]. The development of industry cluster has significantly increased the domestic added value of enterprises' exports, which is conducive to promoting the upgrading of the division of labor position of enterprises in the global value chain (Zhang Li and Liao Sainan, 2021) [11]. Li Hong (2015) [12] pointed out that although industrial clusters have a positive effect towards promoting regional e-commerce development, they cannot provide effective supervision and promotion in cross-border payments, international logistics, and market promotion. Therefore, it is crucial to build an efficient collaborative industrial cluster e-commerce model.

Li Fang et al. (2019) [13] pointed out that indicators related to the development level of cross-border e-commerce include: cross-border logistics and international market promotion system, cross-border payment and exchange settlement, institutional construction and port environment, and indicators related to the development level of industrial clusters

include: inter enterprise relations and government policies, capabilities of service institution, factor endowments, etc. These indicators interact each other. They established a structural equation model and collected subjective data from 272 cross-border e-commerce enterprises within the industrial cluster. The respondents all make choices based on their own experience, which leads to subjective selectivity bias. This method cannot obtain the heterogeneity of Panel data and does not involve digital service trade. Zhang Xiaheng (2021) [14] believes that cross-border e-commerce provides a possible path for building a full industry chain agglomeration. It is urgent to collaborate with traditional industries in China that have competitive advantages through cross-border e-commerce platforms, payment fields, logistics fields, and leading enterprises, fully leveraging their clustering effect in the entire industry chain agglomeration. There is not much research on the collaborative development of digital trade and manufacturing industry clusters in existing literature, and there is even less quantitative empirical research on the evaluation of their collaborative relationship. This article clarifies the connotation, influencing factors, and path arrangement of the collaborative relationship between digital trade and industrial clusters, analyzes the mechanism of their interaction and evolution, and measures and evaluates the level of collaboration between digital trade and industrial clusters in Guangzhou. It has certain theoretical importance and applied research value.

2. The Development Status of Import and Export Trade and Related Industry Clusters in Guangzhou

2.1 Current Situation of Import and Export Trade Development in Guangzhou

In 2022, the import and export volume of cross-border e-commerce in Guangzhou reached 137.59 billion yuan, breaking the 100 billion yuan for the first time, an increase of 93 times compared to 2014. Except for 2016, 2019, and 2020, Guangzhou's total import and export value has shown a steady growth trend from 2010 to 2022; In addition to the deficit in 2010 and 2011, there has been a continuous surplus in the past decade. In terms of specific product categories, the total import and export value of food and beverage, beauty and daily chemical, has been increasing year by year, while luggage, leather goods, and jewelry have also shown a stable growth trend in some years except for 2020; The fluctuation of textile and clothing in the past decade has been significant, with growth limited by factors such as weak internal competitiveness and external market pressure (see Table 1). Textile and clothing, luggage and leather goods have maintained a stable surplus, while beauty, daily chemical, and food and beverage have maintained a stable deficit. Jewelry continued to have a surplus before 2018, but turned into a deficit after 2019 (see Table 2).

2.2 Current Development Status of Related Industrial Clusters in Guangzhou

The Guangzhou fashion industry cluster is composed of six aspects, including clothing, leather goods, beauty and daily chemicals, jewelry, lighting and audio, and customized home furnishings. Especially, clothing, leather goods, beauty and daily chemicals, and jewelry can better reflect the fashion label. In 2021, the scale of the fashion industry cluster in the city exceeded 850 billion yuan. Among them, the manufacturing sector achieved a revenue of 414.5 billion yuan, an increase of 11.6%, with approximately 55000 enterprises and two

Table 1   Total Value of Import and Export of Goods in Guangzhou from 2010 to 2022

Unit: 10000 US dollars

Year	Total value of import and export			Textile and clothing	Beauty and daily chemical,	Luggage and leather	Jewelry	Food and beverage
	Sum	Im	Ex	Sum	Sum	Sum	Sum	Sum
2010	10376756	5538894	4837862	806616	79361	161664	433848	100294
2011	11616798	5969417	5647381	929473	95733	188684	537654	139944
2012	11716670	5825216	5891454	1006575	98222	208381	630929	141717
2013	11889571	5608901	6280670	1155229	102478	247707	806620	167373
2014	13058980	5787649	7271331	1329128	108619	293223	930124	195444
2015	13386768	5270041	8116727	1565437	110707	367302	810807	229089
2016	12930895	5113237	7817658	1417714	114517	353182	813849	238984
2017	14324969	5792992	8531977	1615939	144238	395778	711625	281652
2018	14850529	6365507	8485022	1365099	230348	369490	758185	359285
2019	14501947	6879666	7622281	1094928	285703	301188	824716	396149
2020	13761247	5939398	7821849	1181319	312043	224257	508139	409691
2021	16745149	6983278	9761871	1508488	325298	296589	947853	421936
2022	17945204	7967832	9953542					

Table 2 Import and export volume of textile and clothing, beauty and daily chemical, luggage and leather goods, jewelry, food and beverage in recent years

Unit: 10000 US dollars

Year	Textile and clothing		Beauty and daily chemical		Luggage and leather		Jewelry		Food and beverage	
	Im	Ex	Im	Ex	Im	Ex	Im	Ex	Im	Ex
2010	151221	655395	45877	33484	41914	119750	178449	255399	68473	31821
2011	160637	768836	51422	44311	45203	143481	210082	327572	101643	38301
2012	176660	829915	47924	50298	43005	165376	225488	405441	104888	36829
2013	200169	955060	47902	54576	50687	197020	296504	510116	130514	36859
2014	177795	1151333	49841	58778	63648	229575	369585	560539	151541	43903
2015	169362	1396075	53886	56821	58993	308309	304186	506621	191045	38044
2016	145386	1272328	59225	55292	44514	308668	324920	488929	199146	39838
2017	139308	1476631	82409	61829	36329	359449	271373	440252	237480	44172
2018	128004	1237095	151832	78516	38653	330837	316245	441940	303940	55345
2019	108118	986810	199396	86307	38922	262266	447390	377326	336761	59388
2020	98828	1082491	206547	105496	27216	197041	269936	238203	351145	58546
2021	121599	1386889	201254	124044	32976	263613	519911	427942	357513	64423

industries with a revenue of 100 billion yuan (customized home furnishings, beauty and cosmetics), two industries with a revenue of 50 billion yuan (clothing, leather goods), and two industries with a revenue of 10 billion yuan (lighting, audio, jewelry). As of the end of 2021, there were 542 high-tech enterprises in the manufacturing sector of Guangzhou Fashion Industry Cluster, accounting for 25% of the manufacturing high-tech enterprises; 51 enterprises with a revenue of over 1 billion yuan have cultivated a large number of leading enterprises and well-known brands, including Shein, UR, Vipshop, Perfect Diary, Ximuyuan, Oupai, Sofia, and Shangpin Home Accessories. Liuhua clothing, Xintang denim, Zhongda fabric, Shiling leather goods, Panyu jewelry, and Baiyun beauty have all developed into landmark characteristic business cards in the national and even global fashion industry. See Table 3.

The five major industrial clusters in Guangzhou, including textile and clothing, beauty and daily chemical, luggage and leather goods, jewelry, and food and beverage, have the following characteristics.

(1) Complete industrial chain

Panyu, a global jewelry industry cluster and a major base for jewelry production and export in China, has 11000 market entities, accounting for over 50% of the international jewelry market trade volume. Panyu Jewelry has formed a complete industrial chain that integrates raw material sales, production machines, technical training, design and research and development, semi-finished and finished product sales, e-commerce, inspection and testing, exhibition services, jewelry cultural appreciation, tourism, etc. The beauty industry in Baiyun District is gradually building a "Baiyun Meiwan" beauty and daily chemical industry ecosystem that integrates headquarters economy, research and development innovation, intelligent manufacturing, inspection and testing, marketing, and cultural dissemination. Baiyun District has reached cooperation intentions with more than 20 universities (research and development institutions), and has successively built three "strong foundation projects": Baiyun Meiwan International Cosmetics Research Institute Cluster, Zhongzhuang Lian Collection and Purchase Platform, and Beauty Industrial Internet. Currently, it is deeply connecting with multiple industrial internet suppliers such as Huawei, Kinoda, and Planck, striving to form a set of industrial internet "Baiyun Meiwan" standards. The first "one-stop" service platform for the quality infrastructure of cosmetics will be jointly constructed in the urban area. The "Meiwan Jiutiao" cosmetics special support policy will be introduced, and intellectual property protection efforts will be performed to continuously optimize the business environment. Technological innovation, the combination of industry, academia, and research, as well as government preferential policies and resource support, can quickly reach innovative achievement.

(2) Professional markets, exhibitions and business districts

The textile and clothing industry, jewelry industry, leather and bags industry, cosmetics and daily chemical industry in Guangzhou take advantage of the deep integration of "professional market+industrial cluster", and through the Internet platform, the business functions of production and marketing, brand communication, and information sharing can fully achieved. The professional market provides the market environment and industrial soil for the innovation and development of manufacturing and other related industries. However, traditional trading platforms often focus on providing services to trading nodes, failing to

Table 3   Size and Characteristics of Guangzhou Related Industrial Clusters

Industrial Clusters	Size	Characteristics
Textile and clothing	Liuhua Clothing, Xintang Denim, and Zhongda Cloth have incubated over 400 high-quality brands to go nationwide, such as Zhijing Technology, an internet enterprise in the textile and clothing industry	The unique model of "front store and back factory" and deep integration with internet platforms
Beauty and daily chemicals	In 2022, the output value and sales revenue exceeded 10 billion yuan. Baiyun District has a total of 1259 certified cosmetics production enterprises, accounting for approximately 42.07% of Guangdong Province and 23.83% of China. There are also over 4200 cosmetics commercial enterprises.	The production, sales, raw material, packaging, semi-finished product processing, exhibition and trade, design, research and development, testing, logistics, training and other industrial chains are complete, and many well-known brands and enterprises such as Guerlain, Adolf, and Kazilan have emerged
Luggage and leather	The largest leather production and sales center in China, as well as the distribution center for leather raw and auxiliary materials, with over 7200 production enterprises. Among them, luggage products account for 52% of the national market and 70% of the European mid to low end leather luggage market.	An industrial cluster trading center that integrates leather design, production, processing, sales, transportation, and information exchange
Jewelry	11000 market entities, accounting for over 50% of the international jewelry market trade volume.	Covering a complete industrial chain including design, processing and manufacturing, exhibitions, brand cultivation, supply chain integration, etc
food and beverage	21 enterprises with large size achieved a production value of 4.537 billion yuan in 2021, a year-on-year increase of 17.39%	An industrial chain that integrates research and development, production, sales, and logistics transportation, with brand enterprises such as Ligao and Dongpeng Special Beverage

reach all links of the entire supply chain. For example, the raw materials of jadeite, diamonds, and colored gemstones in China's jewelry industry mainly rely on imported supply, leading to information asymmetry between the consumer and supply sides of the jewelry and jade industry. This is manifested by unstable factor supply, and the lack of standardization in various transactions and transparency in prices. The trading platform must be transformed into a digital industrial ecotype enterprise, providing customized production and flexible manufacturing services, and deeply cooperating with various links in the whole industrial chain, such as material supply, manufacturing process, quality inspection, etc. Guangzhou

will integrate multi-dimensional elements such as exhibitions, expos, forums, and business districts to support Guangzhou's famous brands to use well-known exhibitions such as the Canton Fair to "group together and go abroad", and leverage the "joint live streaming" platform to continuously strengthen enterprise brands, industrial brands, and city brands.

(3) Less innovative brand, design, and insufficient raw materials

The common problems faced by the five major industrial clusters in Guangzhou, including textile and clothing, beauty and daily chemicals, luggage and leather goods, jewelry, food and beverage, are dependence on imports of raw materials, limited number of leading enterprises, overall small scale enterprises, insufficient brand building, high R&D costs for large enterprises, insufficient R&D for small and medium-sized enterprises, lack of innovative technology, and low market recognition. The entire industrial cluster tends to introduce or imitate, and the lack of funds, technology, and high-quality talents leads to a lack of innovation ability and enthusiasm. How to rely on the advantages from the huge industrial base, solve the market problems such as excessive dependence on imports and lack of bargaining power in the raw material industry chain, and move towards the two ends of the smiling curve, are what the government, enterprises and relevant departments need to seriously consider and urgently solve.

3. Empirical Analysis of Collaborative Evaluation between Digital Trade and Industrial Clusters

The collaborative development of digital trade and industrial clusters is the interaction between regions, chains, or subsystems such as different resource elements and economic environments, forming a stable, innovative, win-win, and mutually beneficial coordination system. Study of the two subsystems of digital trade and manufacturing industry cluster can be a good way to evaluate and understand the rationality of the collaborative model. The comparison of the development of the collaborative level of the two subsystems and the analysis of the synergy degree of the composite system can help to understand the influencing factors that need to be improved in the level of synergy.

3.1 Model construction

The degree of synergy comes from the integration of subsystem order, and the acquisition of order depends on the scientific selection of order parameter indicators. Therefore, selecting appropriate subsystem order parameter indicators is very important, as it can effectively describe the development level of subsystems and composite systems, and quantitatively analyze the collaborative status of the system. Therefore, based on the principles from Liu Yousheng et al., 2016 [13]; Li Fang et al., 2019 [13]; Zhang Xiaheng et al.,2021[14], the empirical research can be conducted to calculate the order degree of subsystems and the synergy degree of composite systems This article constructs a composite system synergy model, selects the indicators for the Guangzhou industrial cluster and digital trade subsystem (see Table 4), and calculates the degree of order and synergy.

(1) Clarify the order parameters of the subsystem.

The two subsystems are digital trade (A) and related industrial clusters (B), with their order parameters represented as $A=\{\alpha_1,\alpha_2,\alpha_3,\ldots,\alpha_n\}$, $B=\{\beta_1,\beta_2,\beta_3,\ldots,\beta_n\}$. Assuming

β_n, α_n as the upper and lower limits of the order parameter, the upper limit is generally determined by the product of the maximum value of the obtained time series data and $1+\alpha$, and the lower limit is determined by the product of the minimum value and $1-\alpha$. Taking the digital trading subsystem as an example, the following order parameter order degree formula is written:

$$\mu(\alpha_n) = \frac{\alpha_n - \beta_n}{\beta_n - \alpha_n} \tag{1}$$

The larger the value of $\mu(\alpha_n)$, the greater the contribution of the order parameter to the orderliness of digital trade.

(2) The degree of order of subsystems.

The contribution of the order parameters of each subsystem to its degree of order can be obtained through the integration of pairs. Generally, the weighted sum method or geometric average method is used for integrated calculation, and the calculation method is as follows:

$$\mu_j\left(e_{ji}\right) = \sqrt[n]{\prod_{i=1}^{n} \mu_j\left(e_{ji}\right)} \quad or \quad \mu_j\left(e_{ji}\right) = \sum_{i=1}^{n} \varphi_i \mu_j\left(e_{ji}\right) \tag{2}$$

Among them, φ_i is the weight of each order parameter index, and there is $\varphi_i \geq 0, \sum_{i=1}^{n} \varphi_i = 1$. In addition, $\mu(e_{ji}) \in [0,1]$, the larger the value, the higher the degree of order of the subsystem, and vice versa.

(3) Measurement of collaboration in composite systems

The changing state of collaboration in a composite system is the result of the interaction of various subsystems at different times, so the degree of collaboration in a composite system also depends on the evolution of the order of each subsystem. Assuming that at the specified initial moment t_0, there is a digital trade subsystem $\mu_1^0\left(e_1\right)$, and an industrial cluster subsystem with an order degree of $\mu_2^0\left(e_2\right)$. When the evolution arrives t_1, the corresponding gains of $\mu_1^1\left(e_1\right), \mu_1^2\left(e_2\right)$ are obtained. If the collaborative order degree of the composite system is U, then there are:

$$U = \omega \sqrt{\left|\mu_1^1\left(e_1\right) - \mu_1^0\left(e_1\right)\right| * \left|\mu_2^1\left(e_2\right) - \mu_2^0\left(e_2\right)\right|} \tag{3}$$

Among them, $U \in [-0,1]$ within the range of values, U>0 and closer to 1 indicate that the measured complex system is in a good state of collaborative evolution, U<0 indicates that its composite system is not collaborative. In addition, if and only if $t_1 \geq t_0$, then can be ensured and there is a positive synergistic effect between the two subsystems only at that time.

3.2   Data source and collaboration evaluation

The data is sourced from *t*he China Statistical Yearbook, China Logistics Yearbook, Guangdong Statistical Yearbook, Guangzhou Statistical Yearbook, and Guangdong Logistics Industry Development Report from 2011 to 2022. In the absence of data, a simple regression method is used to supplement. After the completion of data collection, the original data needs to be dimensionless, and the subsystem needs to be tested for gray correlation.

Table 4 Index System of Digital Trade and Industrial Cluster Enterprises

	dimension	Data indicators	variable
Development of digital trade	Market size	Total cross-border e-commerce exports	A1
		Number of employees in cross-border e-commerce and digital service trade enterprises	A2
		Number of cross-border e-commerce and digital service trade enterprises	A3
	Logistics infrastructure	Total railway mileage	A4
		Total highway mileage	A5
		Number of civilian routes	A6
		Number of berths at the dock	A7
		Port throughput	A8
		Number of A-level logistics enterprises	A9
	Cross border e-commerce logistics and customs clearance	Total revenue from international logistics business	A10
		Customs clearance efficiency (number of digital trade laws, regulations, and preferential and convenient measures introduced)	A11
Development of related industrial clusters	Cluster size	Total cluster output value	B1
		Total number of enterprises within the cluster	B2
		Total area of industrial park	B3
		Total profit of industrial park	B4
		Total fixed assets of industrial park	B5
		Number of employees of industrial park	B6
		R&D of industrial park	B7
	Cluster innovation	Number of invention patent authorizations	B8
		Number of R&D institutions	B8
		Proportion of R&D personnel	B9
		Number of intermediary institutions such as industry associations and financial institutions	B10
	Government	Government management level (number of preferential policies issued)	B11

After obtaining standardized data, the contribution of order parameters according to formula (1) is calculated. Afterwards, in order to calculate the order degree of the subsystem, it is necessary to calculate the weights of each order parameter. Then, the weights are brought into formula (2) to obtain the order degree of the subsystem, and the overall system degree is calculated according to formula (3). As a traditional advantageous industry, the digital trade and industrial cluster order of textile and clothing continue to rise, and the order of digital trade is higher than that of industrial cluster order. The synergy degree of the two subsystems is below 0.2, indicating weak growth momentum. Before 2017, the order of digital trade in the leather and luggage industry was lower than that of industrial clusters.

After 2017, the digital trade trend surpassed the industry trend, and the synergy between the two subsystems continued to rise, expected to reach as high as 0.6. The orderliness of digital trade in the beauty and daily chemical industry was higher than that of industrial clusters after 2017, and the orderliness of the two subsystems showed a fluctuating upward trend reaching 0.3. The orderliness of digital trade and industrial cluster in the jewelry industry shows a relatively consistent upward trend, and the synergy between the two subsystems has a relatively stable upward trend, reaching 0.2. The orderliness of digital trade in the food and beverage industry has been steadily increasing since 2018, as it has surpassed the orderliness of industrial clusters, and the synergy between the two subsystems reach 0.4.

Overall, the order of cross-border e-commerce subsystems surpassed the industry trend after 2017. The two subsystems of the leather and luggage industry have a high degree of orderliness, indicating that the industry has a high degree of matching in digital trade and industrial clusters. The innovation of the industrial chain, upstream raw material supply, downstream market development, and various indicators of digital trade all have mutual promotion benefits. In the future, continuous efforts will be made in brand design to promote the development of digital service trade. Guangzhou's various industrial clusters have been developing for a long time and have generated stable cluster benefits in terms of upstream and downstream enterprise cooperation, manufacturing and production. Cross border e-commerce is a trade model that has only rapidly developed in recent years. The operational capabilities of various elements of the cross-border e-commerce system and the development of industrial clusters need to be deeply and systematically matched in terms of models and resources.

4. Analysis of Countermeasures for the Collaborative Development of Digital Trade and Industrial Clusters

To sum up, Guangzhou's textile Clothing industry, beauty and daily chemical, jewelry industry, and food and beverage industry are at the starting and development stage of digital trade and industrial cluster synergy. The leather and luggage industry is in the expansion stage of digital trade and industrial cluster collaboration. In the initial and development stages, digital connections should be strengthened in the supply and demand relations, production supply chain, equipment operation and maintenance coordination, and labor and human resources coordination. In the expansion stage, it is necessary to strengthen the collaboration between internal resources such as research and development, manufacturing, circulation, sales, and branding, and digital trade. Encourage the matching of services such as industrial service platforms, and industrial internet platforms, and pay attention to the extension of service boundaries such as standardized services. Breaking the traditional industrial development model, integrating and optimizing resources of upstream and downstream enterprises in the industry chain, achieving good integration between manufacturers and market demand, fully utilizing digital advantages, and forming a modern manufacturing industry chain. In the mature stage, it is necessary to strengthen the deep integration of internal and external resources of the cluster with digital trade, and focus on improving the competitiveness of digital service trade. Finally, by improving data security measurements such as issuing and implementing laws and regulations, strategic policies, and standard

evaluation, or by combining blockchain, we aim to promote the exchange of trusted data within supply chain.

Fund Project

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