land

MDPI

Article

The Rise of Specialized and Innovative Little Giant Enterprises under China's 'Dual Circulation' Development Pattern: An Analysis of Spatial Patterns and Determinants

Huasheng Zhu [1,2,*] , Ruobin Liu [2] and Bo Chen [2]

1 Beijing Key Laboratory of Environmental Remote Sensing and Digital Cities, Beijing Normal University, Beijing 100875, China
2 Faculty of Geographical Science, Beijing Normal University, Beijing 100875, China
* Correspondence: zhuhs@bnu.edu.cn

Abstract: As potential 'hidden champion' companies originating from Germany, specialized and innovative 'little giant' enterprises (LGEs) have become role models for small and medium-sized enterprises (SMEs) in China and have been considered important actors in the strategy of 'strengthening and supplementing national supply chains'. Based on the exogenous growth theory of the firm, this article takes the perspective of the 'dual circulation' new development pattern of China and analyses the spatial patterns and their determinants of LGEs using the data of national-level LGEs from 2019 to 2021 and the geographical weighted regression method. The following results were obtained: (1) the national-level LGEs show the spatial distribution pattern of 'east–central–west' decline and are highly concentrated in the high administrative levels of the cities, especially in the Beijing–Tianjin–Hebei, Yangtze River Delta, Cross–Strait urban agglomeration. (2) The domestic and international circulations jointly affect the spatial distribution of LGEs. Local institutional thickness has the largest and widest impact, followed by local industrial synergy. The impact of global linkage is relatively stable. (3) The impacts of the main determinants have spatial heterogeneity. The positive impact of local government support shows a decreasing differentiation law from east to west, and local industrial synergy is mainly significant in the east area of Northeast China, Bohai Rim, Shandong Peninsula, and Huang-Huai-hai Plain. The spatial heterogeneity of the effect of international circulation comes from the difference in marginal effects among regions and the influence of the Belt and Road Initiative. The positive impact of FDI is mainly concentrated in the northeast and southwest regions. This article highlights the importance of the domestic value chain in the strategy of Innovative China, and proves that varying global-local nexus of cities creates 'soils' with varying fertility in which LGEs thrives as well.

Keywords: specialized and innovative little giant enterprises (LGEs); dual circulation; global-local nexus; development pattern of small and medium-sized enterprises (SMEs)

1. Introduction

Hidden champions, originally coined by Hermann Simon, a famous management expert in Germany, are referred to as firms unknown to the public, focusing on some segmented markets, but rank highly in the European, or even global market, with annual sales revenues of less than USD 5 billion [1]. Experiences from developed countries have also demonstrated that hidden champions generally concentrate on the areas that large enterprises are not yet deeply involved in, which ultimately makes them have the potential to occupy a technological monopoly position in a certain segment market [2]. Despite their small scale, hidden champions adopt a global niche strategy to break through the limitations of the domestic market, pay timely attention to the needs of international customers, and meet their product requirements through innovation [3], which are interpreted as the secret of their maintaining the leading position in specific fields and resisting global economic

recessions [4]. As a consequence, hidden champions have become 'visible', and have been getting more and more attention.

The success of Germany's hidden champions provides a new way of regional innovation that relies on differentiation and specialization of small- and medium-sized enterprises (SMEs) instead of scale economies of large companies. Hidden champions have also been seen as important actors in countries' manufacturing sector to gain a global competitive advantage and secure national supply chains. Therefore, cultivating 'hidden champion' enterprises has become an important objective in the national development strategy of developing countries, such as China, especially for safeguarding their supply chain security [5]. Moreover, hidden champions provide a feasible solution for coordinating development within and between regions. Western literature has indicated that hidden champions generally operate away from urban built-up areas. Taking Germany as an example, two-thirds of hidden champions are located in rural areas [6]. Although rural areas are particularly constrained by economic factors and resources compared to urban areas, hidden champions can better protect their core technology secrets [7] and have more potential to take the leadership position in rural areas [8,9]. On the one hand, in order to keep their strong innovation capabilities and competitiveness in specific niche markets, hidden champions have initiated their regional supplier networks in rural areas, which strengthens local knowledge spillover effects and monetary externalities [7]. On the other hand, hidden champions have also kept extensive contacts with the suppliers of high-quality products and services in urban areas, which further promotes urban and rural integration development [10].

Similar to most countries, China's economy has been dominated by SMEs, which account for 99.8% of the country in terms of the number of micro-, small-, and medium-sized enterprises in 2021. A large number of SMEs, especially in the eastern coastal areas, have risen rapidly along with China's industrialization and rural urbanization. These enterprises have also become important actors in the development of export-oriented economy and of China's integration into the global production network. As China has implemented manufacturing innovation and upgrading strategy and the trade friction between China and developed countries has frequently happened, it is urgent to foster a group of companies with core competitive advantages such as Germany's hidden champions. Recently, the central government of China has put forward the development strategy of 'specialization, refinement, peculiarity and innovation' for small- and medium-sized enterprises (SMEs), namely, specialization (focusing on specific fields) [5], lean (lean production and management) [11], characteristic (characteristic of products and services) [12], and novelty (product and service innovation) [5]. Since 2019, a group of national specialized and new 'little giant' enterprises (referred to hereinafter as LGEs) were selected each year. Compared with the little literature available on hidden champions in developing countries, there is even less research on LGEs in China. Under such circumstances, it is worth more academic attention to exploring the influencing factors of LGEs' growth, which can provide policy suggestions for local governments to rationally allocate resources and create an environment suitable for LGEs' growth as potential hidden champions in developing world.

This article attempts to make a marginal contribution in the following aspects. First, it is incorporated into China's current dual-circulation new development pattern to explore the impact of global and local factors on the growth of SMEs into potential hidden champions, which contributes to a deep understanding of a new global–local connection or linkage within the Chinese context. Second, geographically weighted regression analysis was adopted to understand the regional differences in the influence of various factors on LGEs to provide theoretical support for differentiated local policy making.

The following sections are divided into four parts. The second part proposes the analytical framework under the background of the dual-circulation development pattern and main hypotheses based on the literature review. The third part introduces the study area, data sources and research methods, the fourth part analyses the research results, and the last part makes discussion and conclusions of this article.

2. 'Dual Circulation' Development Pattern and the Growth of LGEs: Literature Review and Main Hypotheses

The theory of firm growth originated from the research of mass production in the 1950s. It can be divided into endogenous growth theory of the firm and exogenous growth theory of the firm. The former theory emphasizes the function of internal capital and knowledge in enterprises' growth. The latter theory regards enterprises as an open system with self-sustaining ability, which is based on resources obtained from the environment [13]. Instead of focusing on the resources or capability inside LGEs [14], or strategic management of the little amount of academic literature available on hidden champions [15], this article takes the perspective of the new regionalism of economic geography and concerns about the environment where those firms operate their business, especially the global-local nexus and its impact on the growth of LGEs in a place [16] and their spatial distribution.

### 2.1. 'Dual Circulation' Development Pattern in China

Unlike hidden champions in developed countries, companies in developing countries, including China, SMEs in particular are generally faced with weak technological innovation ability and resources redundance. A large number of companies in those countries, have been directly or indirectly involved in global production network, mainly based on their low-cost labour force and flexible specialization [17]. Although globalization offers those enterprises the opportunity for growth or spatial expansion, they have also encountered the dilemma of being locked in the low end of value chains and facing technical barriers or blockages that are difficult to break through [18]. To maintain their bargaining power in the international market, focal firms of developed countries in global production networks consciously hinder the diffusion process of innovation, such as core or cutting-edge technologies, crucial know-how, and knowledge. Especially after the outbreak of COVID-19, developed countries have gradually moved their offshoring manufacturing back and implemented reindustrialization to strengthen their supply chain resilience or security [19]. Enterprises in developing countries that are heavily dependent on global production networks have been in urgent need of strategic adjustment. Some suggestions have been put forward in China that national production networks and regional cooperation should be strengthened to promote the innovation capability of the enterprise [20], taking advantage of increasing demands in the domestic market and new business opportunities based on regional coordination development.

Under such circumstances, the central government of China raised a dual-circulation development pattern, which means opening up international circulation to attract global resources and factors and expanding foreign trade, while further unclogging the domestic circulation to make use of China's super large market advantages and basic position and ultimately creating new international competitive advantages [21]. This is a deepening of China's supply-side structural reform against the background of a shrinking global market and rising protectionism, from passively participating in the global economic circulation to actively building a new development pattern in which both domestic and international circulations promote each other.

2.2. Analytical Framework and Main Hypotheses

The dual-circulations development pattern provides a new global-local context for China's SMEs to grow into LGEs. Participating in international circulation, measured as total import and export trade and total foreign direct investment (FDI) [22,23], can make it feasible for local enterprises to get access to the global market and effectively strengthen cooperation with foreign companies, thus promoting their growth [24] and obtaining knowledge spillovers and opportunities for technological transfer to promote their innovation capability [24] and competitiveness. Domestic circulation of China owns the advantage in the increasing potential of large and various demand, together with a complete industrial system and perfect supporting conditions. Among them, the cooperation among industry, universities and research institutes [25], the coordination of the

upstream and downstream parts of industrial chains [26], and the combination of scientific and technological innovation, modern finance, and human capital [27] are the key factors of the local environment, which SMEs need to rely on to actively participate in international and domestic circulation. In addition, they have to rely upon a conducive institutional, financial and industrial environment, a strong economic foundation, and appropriate traffic and information technology conditions [28]. The specific framework is shown in Figure 1 as below.
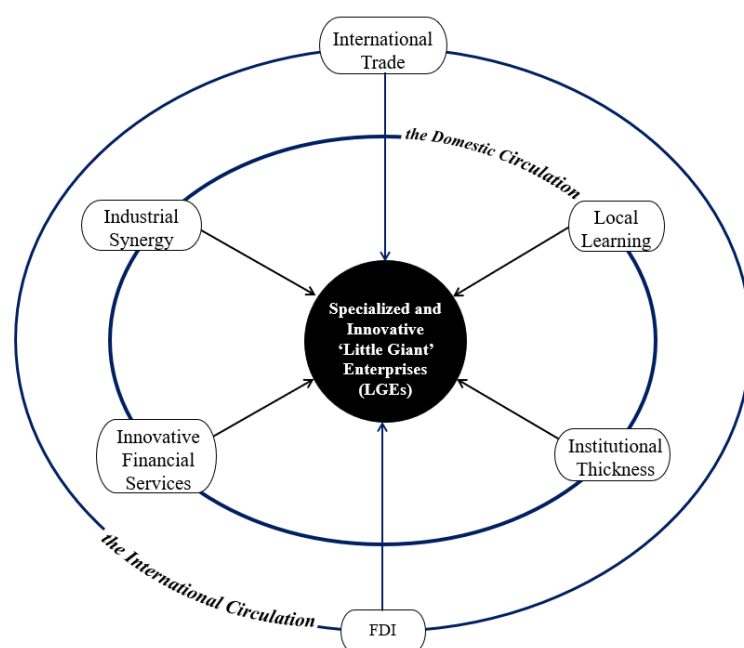
Figure 1. Development path of specialized and innovative "little giants" under the framework of domestic and international double circulation.

2.2.1. International Trade, FDI, and the Growth of LGEs

Simon pointed out that one of the secrets of hidden champions' success lay in their expansion to the international market through overseas investment and trade [27]. As mentioned above, integrating into the global production network and entering the global circulation with the cost advantages of labour, raw materials, and land rent have the lock-in effect of path dependency and the difficulties in industrial upgrading for developing countries, which especially inhibits the improvement of innovation ability of local SMEs [29]. However, there are still some positive aspects. First of all, due to the increasing competition between developing countries and even between different enterprises within a specific developing country, it is necessary for SMEs to import and apply new technology and advanced equipment so as to improve their productivity and provide products with lower price and higher quality [30]. This means that international trade may stimulate the growth of local SMEs in developing countries through increasing their business opportunities and driving them to promote competitiveness.

Furthermore, inward FDI may bring about knowledge spillovers through skilled labour mobility or establish the economic collaborations with local SMEs in developing countries through joint ventures and outsourcing networks, which would increase the opportunities for local SMEs to expand their business, acquire new knowledge and technology transfer, and promote their competitiveness in a specific market [31]. It is believed that this positive impact of knowledge and technological innovation depends on the technology gap between foreign companies and local firms, and the absorptive capacity of the latter firms for advanced technologies [32]. Moreover, foreign greenfield investment can directly support high-input and long-cycle innovation activities of enterprises, avoiding capital flow drying up [33]. Overall, global circulation would facilitate SMEs in developing countries'

access to technical knowledge, human resources, and other strategic resources to promote their status in global production networks. Therefore, the two hypotheses are made as follows.

Hypothesis 1a (H1a). *FDI promotes the growth of local LGEs.*

Hypothesis 1b (H1b). *International trade promotes the growth of local LGEs.*

2.2.2. Local Industrial Synergy and the Growth of LGEs

Industrial synergy refers to the organic connection between the upstream and downstream enterprises of an industrial chain, technological collaboration between horizontally related industries, and mutual support between leading and supporting industries to enhance technological innovation and the continuous optimization and upgrading of modern industrial systems [34]. It includes the collaboration between industries, enterprises, and economic actors in a specific place or across neighboring places [35]. Local industrial synergy brings about collective efficiency, which is considered as one source of the competitiveness of industrial clusters [36,37].

A high level of coordination and collaboration within value chains is beneficial to the interaction between SMEs and thus ensures the supply of high-quality products or services, and this effect is believed to be easily kept in a certain area [38]. Taking Germany as an example, industrial synergy is reflected not only in the close cooperation network between hidden champions and their surrounding suppliers, but also in the cross-regional intensive production and knowledge network connecting rural and urban areas, which guarantees the high-quality and high-tech specialized production [39]. As a result, the geographical agglomeration or constructed connection channels of upstream and downstream enterprises are conducive to creating a favorable environment for the growth of SMEs. Specifically, the growth and upgrading of manufacturing SMEs and the deepening of specialization in turn leads to an increase in their demand for producer services. Producer services promote the deepening of the division of labour and reducing the cost of intermediate inputs of SMEs by providing high-quality intermediate services for the manufacturing industry [40]. This mutual promotion is constantly strengthened, thus continuously promoting the growth of local manufacturing and producer service enterprises [41]. From this perspective, SMEs cannot easily grow into LGEs without the support of other related enterprises and sectors in a place. Therefore, this article proposes the following hypothesis.

Hypothesis 2 (H2). *Local industrial synergy promotes the growth of LGEs.*

This article uses the industrial synergy agglomeration index [42] to measure local industrial synergy, and the specific formula is as follows:

$$\text{coagg}_i = 1 - \frac{|\text{manu}_i - \text{serv}_i|}{\text{manu}_i + \text{serv}_i} + (\text{manu}_i + \text{serv}_i) \tag{1}$$

thereinto

$$\text{manu}_i = \frac{x_{mi}}{x_m} \Big/ \frac{x_i}{x} \tag{2}$$

$$\text{serv}_i = \frac{x_{si}}{x_s} \Big/ \frac{x_i}{x} \tag{3}$$

Type of x_{mi} for manufacturing employment in city i, x_m for national manufacturing employment, x_{si} for employment of producer services in city i, x_s for national employment of producer services.

2.2.3. Local Learning and Growth of LGEs

LGEs are the SMEs that operate with a higher level of innovation capability to sustain and improve their core competitiveness. The industrial cluster literature empha-

sizes the knowledge spillover effects and knowledge transfer generated by geographical proximity and cooperative networks among local actors, which are the knowledge sources of local learning and affect local actors' innovation activities and performance [43]. Knowledge spillover can make SMEs obtain access to new knowledge and information for their innovation at a lower cost [44], which ultimately in turn increases local knowledge spillover [45]. As a purposeful and planned channel of interorganizational cooperation, industry–university–research cooperation is different from knowledge spillover as an unintentional action and has an important impact on the innovation of local enterprises involved in this cooperation [46,47]. For example, the dual apprenticeship system in Germany, based on the joint training of enterprises and vocational colleges, is often regarded as a major advantage of local learning, for it combines theoretical learning in colleges with practical skill training in enterprises to satisfy the talent demand for high-quality manufacturing [48]. In addition to internalizing the spillover effect, the R&D cooperation between LGEs and local universities, research institutions, and other technologically advanced firms can obtain talent and new knowledge and technology [31] and, thus, promote their innovation and growth. Therefore, this article proposes the following hypothesis.

Hypothesis 3 (H3). *Local learning promotes the growth of LGEs.*

Following Leeuwen [49], this article uses the number of college students to measure the innovation vitality of local universities and research institutions, the R&D input intensity to measure of local research and the development of enterprise vitality, and patent applications to measure innovation performance. It synthesizes the above three indicators as local learning.

2.2.4. Local Institutional Thickness and the Growth of LGEs

The concept of institutional thickness was proposed by the new regionalism and is used to describe the existence of a large number of institutions and organizations that can have a positive impact on local development [50]. Informal and formal institutions—the former including routines, customer, and values, the latter including policies and laws—can have an impact on regional development. This article emphasizes the influence of formal institutional governance of local governments on the growth of LGEs.

National-level LGEs can be seen as the institutional arrangement of the central government, and only provincial small giant enterprises are eligible to participate in the selection. It also means that local governments at and below the provincial level are necessarily responding to national-level LGEs selection, which even can be traced back to their longstanding policies to foster SMEs by providing institutional guarantees. Limited by their small size and scarce resources, SMEs are vulnerable to economic fluctuations, public health events, and other external factors. Local governments can enact policies to invest in constructing various platforms for trade cooperation and infrastructures and instruments for public scientific research, and provide public services, which is helpful for SMEs to expand their production and business at a lower cost [51] and reduce the cost of innovation [52]. In addition, local governments can encourage enterprises through special fund subsidies and corporate tax relief to make expansion or become innovative [53]. Although a branch of the extant literature questioned the effectiveness of the government's institutional governance and pointed out information asymmetry between enterprises and government, demonstrating differences in the effect of governmental support on enterprise growth [54], enterprises are generally supposed to conglomerate into regions with perfect institutional environment to reduce production and innovation costs and get access to scarce factors, such as financial capital and talents [55]. Moreover, the Chinese government's supporting policies for LGEs aim to maintain the security of national supply chain and develop key technologies independently, which could promote the growth of LGEs. Therefore, this article makes the following assumption.

Hypothesis 4 (H4). *Local institutional thickness/supporting policies promote the growth of LGEs.*

According to Zhang et al. [56], both the Chinese government's platform building, and capital subsidies come from local expenditures, so this article adopts the general public budget expenditure of local governments as the measurement index of government public platform building and funding.

2.2.5. Local Innovative Financial Services and the Growth of LGEs

Due to their small size, SMEs have long been faced with financial difficulties and high financing costs. These enterprises can hardly get financial support from the traditional financial system represented by banks, securities, and insurance companies, to make expansion or carry out innovative activities [57], as well as hidden champions [14]. It is not a special case for SMEs to encounter the risk of bankruptcy and even have to be closed for lacking in working capital.

With the rapid development of information technology, digital finance has gradually become a supplement to the traditional financial system in China. Innovative financial services, especially booming technological financial services, provide a new opportunity for the growth of SMEs [58], and a full range for each enterprise's innovation activities to provide financial services is one of the purposes of financial innovation [59]. Theoretically, SMEs can use P2P lending platforms, such as Jingdong Finance and Ant Financial (two well-known technology and financial service companies in China), to effectively reduce the service cost of loans, thus eliminating the restrictions of traditional financial institutions. LGEs need financing to support high-intensity internal innovation activities to gather in areas with easy access to digital finance services. Therefore, this article proposes the following hypothesis.

Hypothesis 5 (H5). *Local innovative financial services promote the growth of LGEs.*

This article uses the Chinese digital Pratt & Whitney financial index to measure the development level of local innovative financial services [60]. The index data are provided by the digital financial research centre of Peking University, and the ant gold group calculation is open to the public and used in the recent literature [61].

In addition, this article uses economic development, traditional finance services, informatization level, transportation, and market conditions as control variables. The variables are shown in Table 1 below.

Table 1. Variable selection and description.

Variable Types	Level-One Variable	Level-Two Variable	Measurement Index	Unit
Independent Variable	Global	Foreign Direct Investment	Foreign Direct Investment (FDI)	10,000 USD
		International Trade	Import and Export Trade Volume (trade)	10,000 CNY
	Local	Industrial Synergy	Industrial coagglomeration index (coagg)	-
		Local Learning	Number of College Students (lab)	Person
			R&D Intensity (R&D): R&D expenditure/GDP	-
			Number of Patent Application (pat)	Piece
		Institutional Thickness	Local Public Budget Expenditure (gov)	10,000 CNY
		Innovative Financial Services	Digital Inclusive Financial Index (digfin)	-

Table 1. *Cont.*

Variable Types	Level-One Variable	Level-Two Variable	Measurement Index	Unit
Control Variable		Economic Development	Per Capita GDP (GDP)	CNY
		Traditional Financial Services	Deposit Balances of Financial Institution s (fin)	10,000 CNY
		Informatization	Number of Mobile Phones Per 100 People (tel)	Piece per 100 Persons
			Number of Broadband Interfaces Per 100 People (int)	Set per 100 Persons
		Market	Total Wages of on-the-job Workers (wage)	10,000 CNY
			Population Density (peo)	Person per km^2
		Transportation	Railway Density (rail)	km/km^2
			Highway Density (free)	km/km^2

3. Study Area and Methodology

3.1. Study Area

This article mainly discusses the spatial distribution and determinants of LGEs in China on the scale of prefecture-level cities. There are 333 prefecture-level divisions in 34 provincial-level regions of China, including 293 prefecture-level cities, 7 regions, 30 autonomous prefectures, and 3 leagues (hereafter called prefecture-level cities) (Figure 2). Due to the data availability, a total of 4 municipalities directly under the central government and 286 prefecture-level cities in 31 provincial-level regions are included.
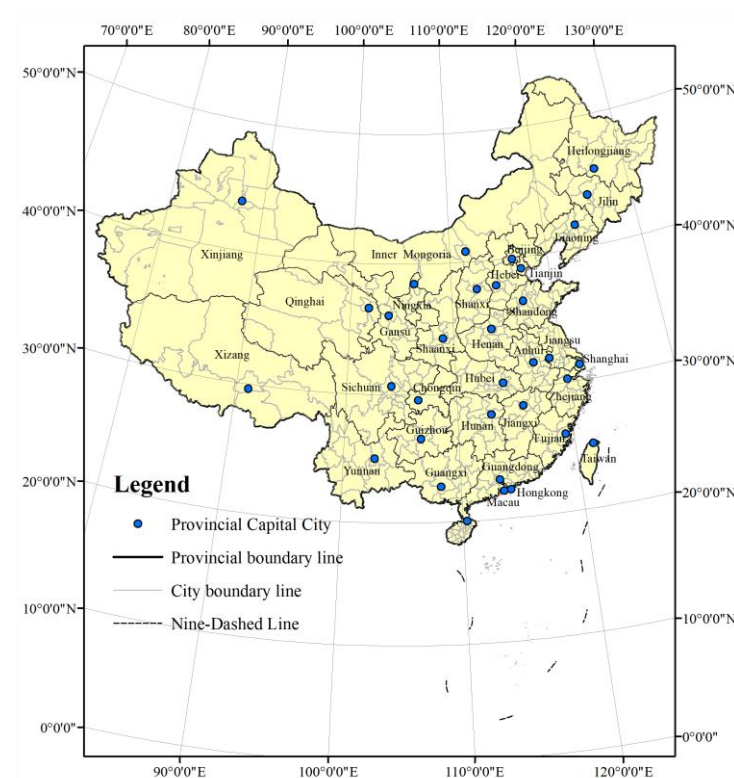

**Figure 2.** The map of prefecture-level cities in China.

3.2. Data Sources and Statistics Profile

The list of LGEs is from the Ministry of Industry and Information Technology (MIIT) of China. Since 2019, MIIT has started selecting LGEs based on factors such as niche market focus, high innovation efficiency, strong market share, and belonging to the advanced

manufacturing industry. As of 2021, 4762 LGEs have been selected in three batches. There have been 4919 LGEs considered because 160 enterprises were disqualified during the second batch of publicity periods, and three of them passed in the third batch. Then, the "Qichacha" website was used to search the enterprise name, company address, business scope, and other enterprise information. Qichacha is the largest enterprise credit inquiring website in China. It can provide information consistent with the State Administration for Market Regulation, such as enterprise address, registration time, and business scope. It can also show the history information of the enterprises after cancellation, name change and relocation. The socioeconomic data are from the China City Statistical Yearbook (2019) and City Statistical Yearbook and bulletins of cities in 2018.

According to the Industrial Classification for National Economic Activities in China (GB/T 4754-2017), the quantity statistics of LGEs in each industry are shown in Figure 3.
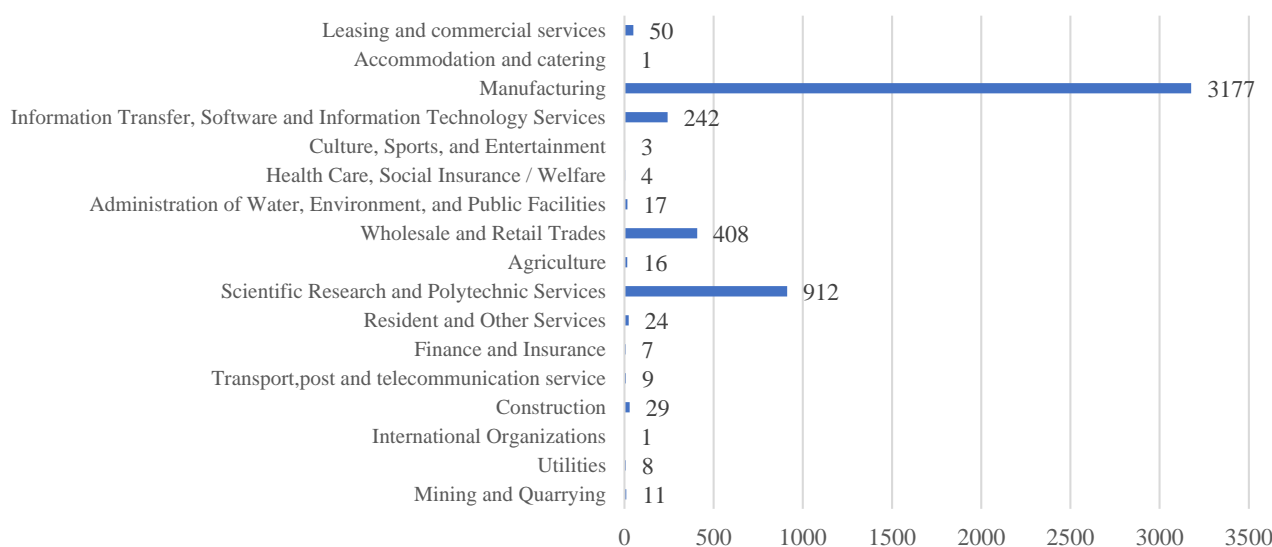
Figure 3. Number of LGEs by industry in China, 2019–2021.

The largest proportion of LGEs is in the manufacturing industry, accounting for 64.59%. Subdividing the manufacturing industry based on "Four Bases of Industry Development Catalogue in China" according to LEG selection criteria (Figure 4), the numerical control tools and robotics industry, new materials industry and new information technology industry account for the largest number of 721, 646, 437, respectively.

The productive service industry is an enterprise aggregation that provides intermediate services for the manufacturing industry. It supports the production efficiency, technology innovation, and upgrading of the manufacturing industry [62]. According to Howells, the productive service industry includes business services and scientific services, such as insurance, banking, finance, accounting, and legal services [63]. Due to the corresponding statistical caliber of the yearbook, the transportation industry, postal service industry, information technology service industry, wholesale and retail industry, finance industry and leasing, and business services industry were considered. The result shows the number of LGEs in the productive service industry is 1629, which is second only to the manufacturing industry. The proportion of LGEs in these two industries accounts for 97.71%. LGEs can import foreign advanced knowledge through FDI and international trade, which have a certain lag effect on innovation. To reduce the endogeneity of the model [64], the article took the first batch of LGEs in 2019 as the basis point, lagged behind all independent variables by one year, and selected data from 290 cities after removing incomplete information.
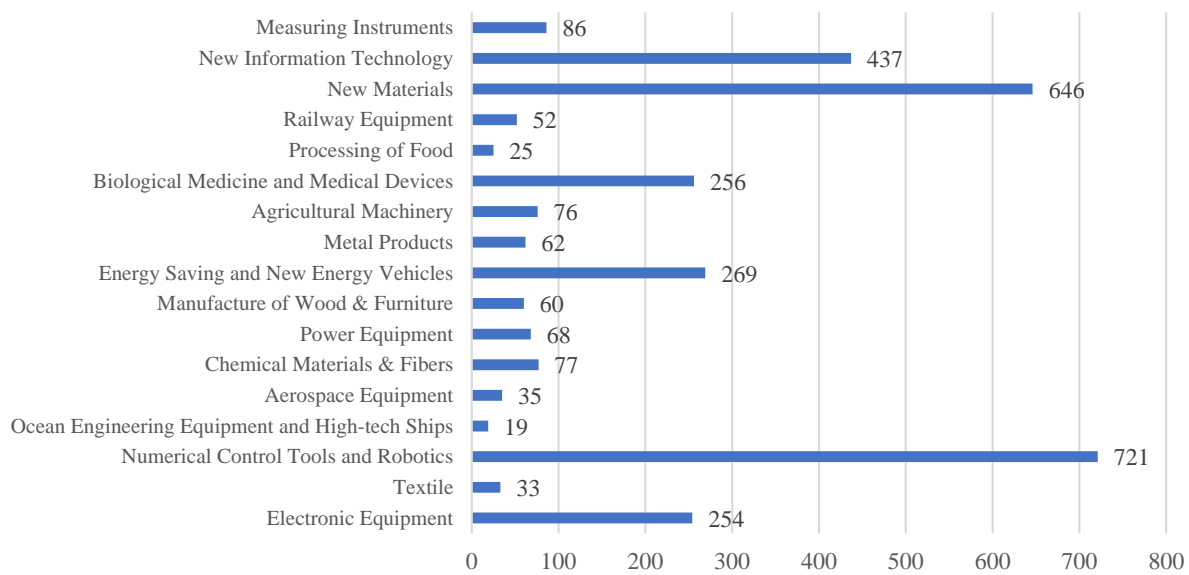
Figure 4. Number of LGEs by manufacturing industry in China, 2019–2021.

3.3. Research Method

3.3.1. Global Moran's I

Moran's I is the most commonly used measure of spatial autocorrelation, suggesting whether the distribution of elements is clustered, dispersed, or random [65]. Therefore, the global Moran's I was used to represent the overall spatial patterns of LGEs. The calculation formula is as follows:

$$\text{I} = \frac{\sum_i^n \sum_{j \neq i}^n W_{ij} (X_i - \overline{X})(X_j - \overline{X})}{\frac{1}{n} \sum_i^n (X_i - \overline{X})^2 \sum_i^n \sum_{j \neq i}^n W_{ij}} \tag{4}$$

where X_i is the number of LGEs for the ith city; X_j is the number of LGEs for the jth city; and W_i is a weight parameter between cities i and j that represents proximity.

3.3.2. Anselin Local Moran's I

Compared to global Moran's I, the Anselin local Moran's I can identify the location and degree of spatial element agglomeration, and distinguish further four types of spatial agglomeration, including (1) high-high cluster (HH), (2) high-low outlier (HL), (3) low-high outlier (LH), and (4) low-low outlier (LL). [66]. The calculation formula is as follows:

$$I_i = \frac{(x_i - \overline{x})}{s^2} \sum_j w_{ij} (x_j - \overline{x}) \tag{5}$$

where x_i is the number of LGEs for the ith city; $\overline{x}$ is the mean number of LGEs for the ith city; and w_{ij} is a weight parameter for the pair of cities i and j that represents proximity.

3.3.3. Geographically Weighted Regression

Linear regression is one of the most common methods used to explore the relationship between two or more variables. The basic principle is to assume the relationship between the dependent variable and independent variables in advance; then, ordinary least squares (OLS) regression is adopted to obtain the estimated value of the equation parameters. The calculation is shown in Formula (6):

$$Y_i = \beta_o + \sum_i \beta_i X_i + \varepsilon_i \tag{6}$$

where β_i is the regression coefficient of the ith variable; ε_i is the residual error.

The traditional OLS method assumes all independent variables are global and spatially stationary [67]. However, due to the spatial differences in the effect of location factors on the distribution of LGEs, geographically weighted regression (GWR) was able to reduce the error caused by spatial non-stationary. In the GWR model, the spatial heterogeneity was investigated by using a local liner regression for each local scale. The calculation is shown in Formula (7):

$$Y_i = \beta_o(u_i, v_i) + \sum_k \beta_k(u_i, v_i)X_{ik} + \varepsilon_i \qquad (7)$$

where Y_i is the number of LGEs for the ith city; (u_i, v_i) is the latitude and longitude of LGEs for the ith city; $\beta_0(u_i, v_i)$ is the intercept term; $\beta_k(u_i, v_i)$ is the regression coefficient of the kth independent variable in the ith city; X_{ik} is the kth independent variable in the ith city; and ε_i is the residual error.

Each local liner regression was calibrated by the spatial weight function of GWR, which expresses the spatial relationships between data. A Gaussian function was chosen to represent the spatial weight function, as shown in Formula (8):

$$e^{-\left(\frac{d_{ij}}{b}\right)^2} \qquad (8)$$

where d_{ij} is the Euclidean distance between city i and city j and b is the bandwidth determined by AIC.

4. Result

4.1. Spatial Distribution of LGEs

4.1.1. Spatial Distribution of LGEs

This article visualizes the number of LGEs at the provincial and municipal levels (Figures 5 and 6). At the provincial level, a basic distribution pattern of LGEs is shown, which is greater in the southeast coastal areas and less in the northwest inland areas. LGEs are mainly located in Beijing, Shandong, Jiangsu, Zhejiang, Shanghai, and Guangdong, while they are less distributed in Qinghai, Inner Mongolia, and Xinjiang. At city level, there are generally more LGEs in the southeast region than in the northwest region of China, and there are more LGEs located in the high administrative levels of the cities, especially in the Beijing–Tianjin–Hebei, Yangtze River Delta, Cross–Strait urban agglomeration.
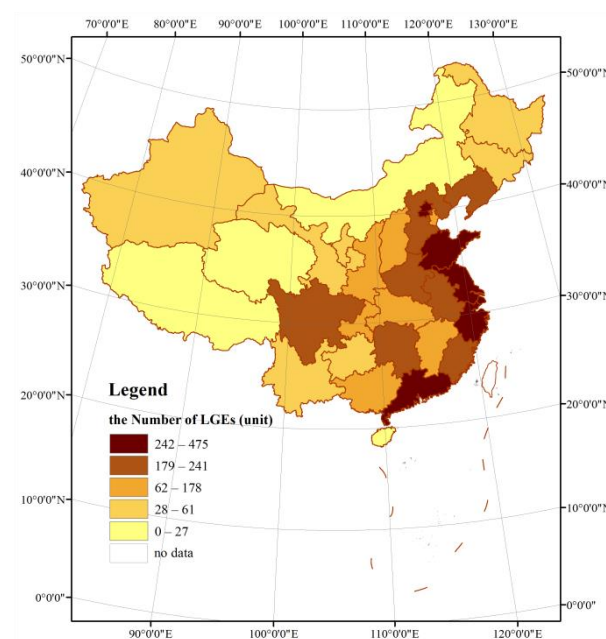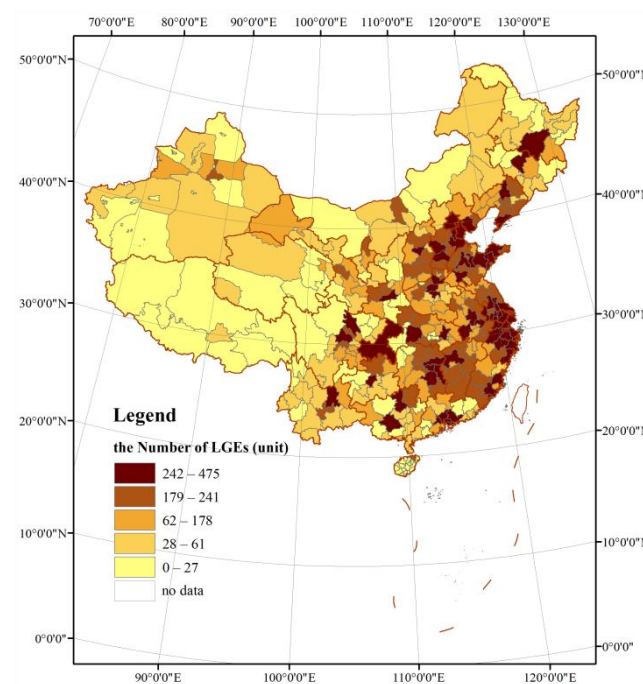

Figure 5. LGEs distribution in China at the provincial level.

Figure 6. LGEs distribution in China at the city level.

4.1.2. Geographical Agglomeration of LGEs

The global Moran's I index of LGEs was 0.147, the Z score was 2.211 < 1.96, and the *p* value was 0.027 < 0.05, which means that LGEs in manufacturing industry and producer services tend to conglomerate geographically at the city level, which is the precondition of the GWR model.

The LISA maps identify the local spatial clusters of LGEs in different industries. For all industries (shown in Figure 7), the HH cluster areas are concentrated in Yangtze River Delta, Tianjin, Huizhou, Dongguan, and Weihai, where the Yangtze River Delta is the most widespread. The HL outlier areas are mostly distributed in the capital cities of inland underdeveloped provinces, like Harbin, Changchun, Urumqi, Xi'an, Chongqing, Guiyang, Kunming, Nanning, and Liuzhou. The LH outlier areas exist in the periphery of the national urban agglomerations such as Beijing-Tianjin-Hebei region and Yangtze River Delta, so these regions receive external radiation from central cities such as Beijing, Tianjin, Shanghai, and Hangzhou. The LL cluster areas are concentrated in northern Heilongjiang, southern Gansu, and southern Guangxi. Due to relatively low economic levels, it is difficult for these cities to form the LGEs agglomeration.

For the manufacturing industry (shown in Figure 8), the HH cluster areas are concentrated in Guangzhou, Shenzhen, Huizhou, and Dongguan in the Pearl River Delta, north of Shandong, and Yangtze River Delta. Among these areas, the Yangtze River Delta is the most extensive high-value agglomeration. The LH outlier areas are mainly located in the periphery of the Yangtze River Delta, such as Zhenjiang, Quzhou and Huangshan, which are driven by the external radiation of the central cities like Shanghai and Hangzhou. The HL outlier and LL cluster areas are similar to all industries of LGEs.
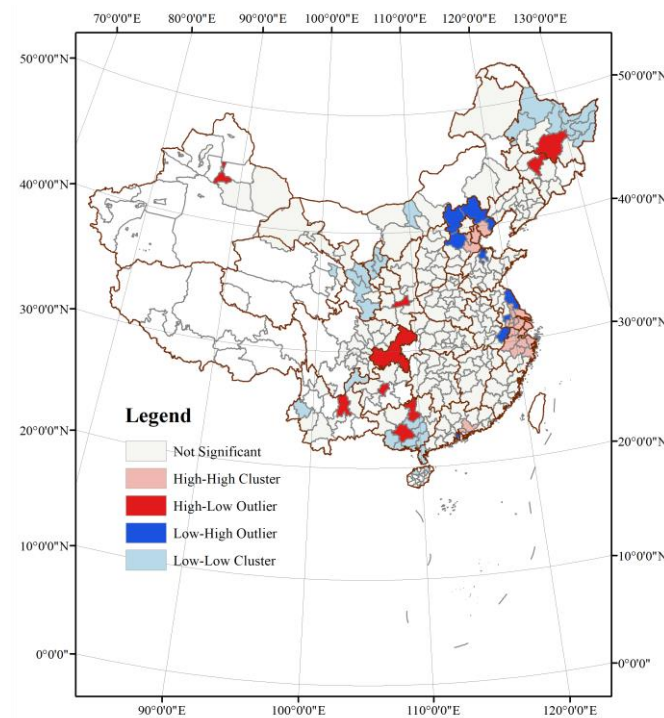
Figure 7. The LISA map of LGEs in all industries.
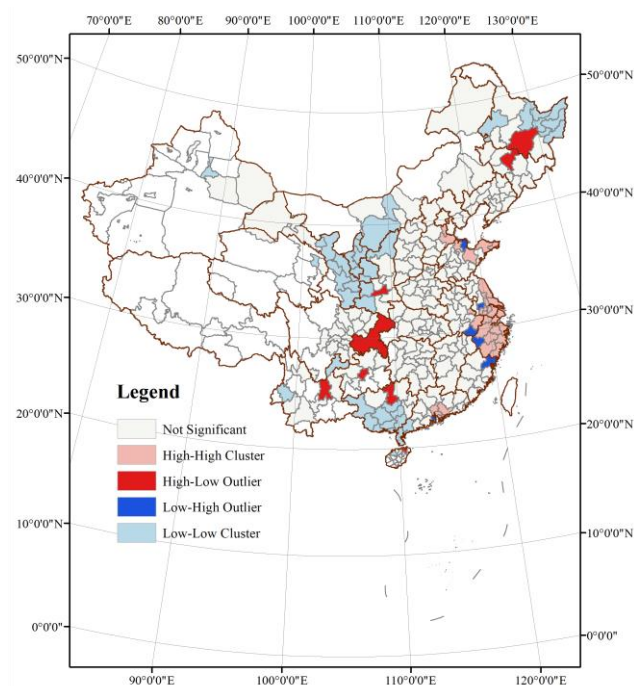
Figure 8. The LISA map of LGEs in the manufacturing industry.

For the producer services (shown in Figure 9), the HH cluster areas are concentrated in Tianjin, Suzhou, Jiaxing, Huzhou, and Taizhou of the Yangtze River Delta, and Guangzhou, Zhuhai and Dongguan of the Pearl River Delta. The LH outlier areas are mainly distributed in Zhangjiakou, Qinhuangdao, Baoding, Langfang of Beijing-Tianjin-Hebei region, Nantong, Shaoxing of Yangtze River Delta, and Shanwei, Heyuan, Huizhou, Zhongshan of the Pearl River Delta, which are driven by the external radiation of Beijing, Tianjin, Shanghai, Hangzhou, Guangzhou and Shenzhen. Otherwise, the HL outlier and LL cluster areas are similar to all industries of LGEs.
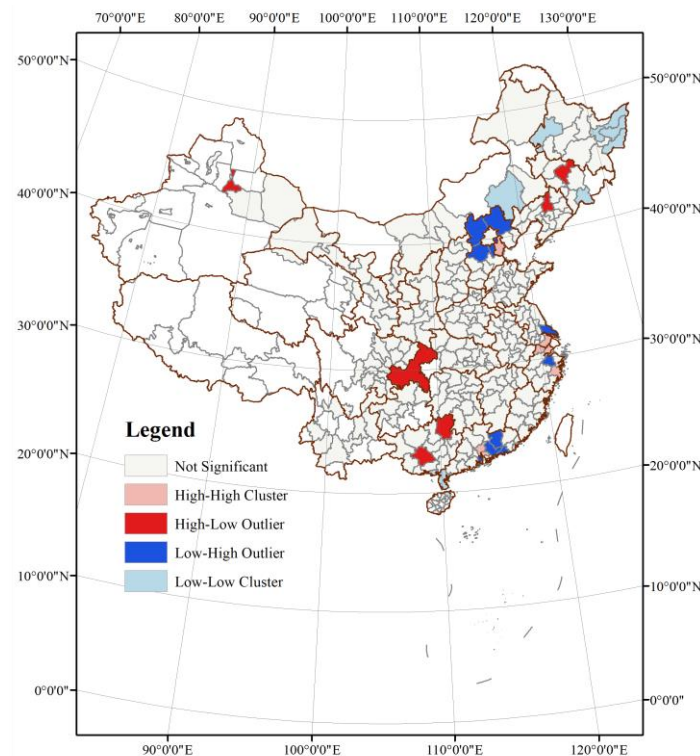
Figure 9. The LISA map of LGEs in the producer services.

4.2. Influencing Factors of the Spatial Distribution of LGEs

4.2.1. Key Variables Adaptability Analysis and Model Selection

First, key variables adaptability analysis was conducted to test whether the choosing of international trade indicators was stable and appropriate for the model. Many indicators were applied to measure international trade, such as total import and export trade, foreign trade dependence, export dependence, and import dependence. Foreign trade dependence measures the degree of economic dependence on foreign trade, as the ratio of a total import and export trade to GDP. It can be divided into import dependence and export dependence, respectively, and measured as the ratio of a total import or export trade to GDP. Therefore, this article conducted total import and export trade (OLS Model (1)), foreign trade dependence (OLS Model (2)), export dependence, and import dependence (OLS Model (3)) as international trade indicators for linear regression (Table 2). It also tried to use both the import trade volume and the export trade volume in the linear model, but the results show high multicollinearity, which means the regression coefficients cannot truly reflect the effect of predictor variables on dependent variables.

The significance of the regression coefficients was consistent in the three models, reflecting the stability of the indicator selection of international trade. FDI, local general public budget revenue and industrial chain synergy index were all significantly positive. The indicators of international trade in OLS models (1) and (2) were significant. In OLS model (3), only export dependence was significantly positive, while import dependence was not significant, which implies export trade is a key factor to promote the growth of LGEs. The reason is probably that LGEs develop international markets by specialization advantages, which is similar to the preference of exporting of hidden champion [4].

Table 2. The test for international trade indicators and models selection.

Dep. Var.	The Measurement of International Trade		
Models	(1)	(2)	(3)
FDI	0.182 ***	0.170 ***	0.169 ***
	(3.462)	(3.25)	(3.229)
Import and Export Trade Volume	0.122 *		
	(1.663)		
Foreign Trade Dependence		0.091 ***	
		(2.735)	
Import Dependence			0.037
			(1.109)
Export Dependence			0.063 *
			(1.736)
Industrial coagglomeration index	0.069 **	0.064 **	0.064 **
	(2.297)	(2.137)	(2.113)
Number of College Students	0.017	0.004	0.004
	(0.438)	(0.106)	(0.114)
R&D Intensity	0.026	0.025	0.025
	(1.034)	(1.004)	(1.01)
Number of Patent Application	0.060	0.086	0.081
	(0.886)	(1.363)	(1.236)
Local Public Budget Expenditure	0.568 ***	0.618 ***	0.617 ***
	(6.401)	(7.926)	(7.894)
Digital Inclusive Financial Index	0.045	0.027	0.026
	(1.298)	(0.782)	(0.753)
R2	0.867	0.870	0.870
Adjusted R2	0.860	0.862	0.861
F Staristic	111.919 ***	114.118 ***	107.051 ***
Moran's I test of the standardized residuals	0.0198	0.0427 ***	0.0406 **
(GWR)	(1.18)	(2.36)	(2.263)
Whether to accept GWR model	Yes	No	No

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Then this study introduced the volume of import and export trade (GWR model 1), foreign trade dependence (GWR model 2), export dependence, and import dependence (GWR model 3) into GWR regression as preliminary tests. It used Moran'I to verify whether the standardized residuals of the GWR models were randomly distributed. The result showed that only the Moran'I of the GWR model (1) was not significant, which means the standardized residuals of the dependent variable were completely randomly distributed in space, so the regression coefficient of the GWR model (1) was statistically significant. The Moran'I index of the GWR model (2) and the GWR model (3) was significant, indicating that the indicator selection was not suitable for GWR. Therefore, the volume of import and export trade were used in the GWR model as the measurement index of international trade in the following analysis.

Second, this study compared the OLS model and the GWR model to prove the reliability of the results. The most immediate evidence is that pronounced congruence between the number of units passed the significance test in GWR and significance in OLS was found (Tables 3 and 4). Moreover, the GWR model has a better fitting result. Tables 2 and 3 show that the fitting effect of the GWR model was better than that of the OLS model. The R2 adjusted of GWR (0.909) was larger than that of OLS (0.867), and the AICc parameter of GWR (245.996) was less than that of OLS (272.095).

Table 3. Comparison of the fitting effects of the OLS and GWR models.

VARNAME	OLS Model	GWR Model
Residual Squares	38.485	26.396
Sigma	0.3750	0.3385
AICc	272.095	245.996
R2	0.867	0.909
R2 Adjusted	0.860	0.886

Table 4. Regression coefficients of the GWR model (the total number of cities = 290).

Model Parameter	Minimum	Upper Quartile	Median	Lower Quartile	Maximum	Mean Value	Number of Cities that Pass Significance Test
Local R2	0.813	0.853	0.895	0.919	0.956	0.886	-
C1_FDI	0.122	0.162	0.185	0.220	0.272	0.189	197
C2_trade	−0.229	0.083	0.294	0.403	0.902	0.244	88
C3_coagg	0.081	0.099	0.114	0.127	0.163	0.115	107
C4_lab	-	-	-	-	-	-	0
C5_R&D	0.069	0.090	0.109	0.123	0.149	0.106	34
C6_pat	-	-	-	-	-	-	0
C7_gov	0.256	0.382	0.669	0.886	1.351	0.670	287
C8_digfin	0.087	0.102	0.123	0.147	0.164	0.125	9

4.2.2. Global Analysis of Influencing Factors

It was found that 98.56% of the simulated standardized residuals for the dependent variable range from −2.58 to 2.58, and the standardized residuals of the dependent variable predicted by GWR were completely randomly distributed through the spatial autocorrelation test (Moran's I index = 0.0198, Z score = 1.18, p value = 0.235). These reflect the reliability of the GWR model. To analyse the GWR model overall, the statistical results of the determination coefficients and regression coefficients were refined, such as the minimum, upper quartile, median, lower quartile, maximum, mean value, and units that passed the significance test ($p < 0.05$, $t > 1.96$ or $t < −1.96$).

Global and local factors jointly influence the spatial distribution of LGEs. Compared with global factors, local factors are more crucial to the geographical distribution of LGEs, especially local institutional thickness. According to the mean values of model parameters that passed the significance test in Table 4, the factors in descending order of their influencing intensity are local public budget expenditure, import and export trade volume, FDI, the digital inclusive financial index, the industrial coagglomeration index, and R&D intensity in turn. Meanwhile, according to the number of cities passing the significance test of coefficient, the factors in descending order of their influencing geographical extent are local public budget expenditure, FDI, industrial coagglomeration index, import and export trade volume, R&D intensity, and digital inclusive financial index in turn. The specific analysis is as follows.

First, among all the local factors, local institutional thickness, represented as local public budget expenditure, exerts the most significant influence on the spatial distribution, both in terms of intensity and geographical extent of its impact. Local industrial synergy follows behind. LGEs are cultivated and supported by different levels of governments in China as a response to the "Made in China 2025" strategy about leading world manufacturing power since 2019, and get official supports, including more land for scale expansion or technological upgrading, special funds, tax incentives, property rights protection, and financing and credit enhancement, to reduce innovation risk and production costs, which further promotes the growth and agglomeration of LGEs [68]. In addition, upstream and downstream enterprises in local industrial chains and related enterprises in supporting sectors facilitate LGEs to reduce production cost and improve innovation efficiency and strengthen competitive advantage. Therefore, H4 and H2 are confirmed.

Second, global factors can help LGEs gain crucial resources, such as capital, markets and technology. It is necessary for LGEs to develop the international market, because they focus on niche markets, which may lead LGEs to fall into the narrow domestic market [27]. In addition, FDI can bring international advanced technology into China and attract the agglomeration of LGEs due to the gap between Chinese technology and international standards [29]. Therefore, H1a and H1b are confirmed.

Third, the impact of local learning and innovative financial services on the geographical distribution of LGEs is relatively weak. Only a few cities passed the significance test of R&D intensity ($p < 0.05$), and no city passed the significance test of the number of patent application. This probably suggests that local R&D activities are not motivated by the needs of SMEs, and the majority of local R&D investment from large companies and even local public R&D institutes is barely related to the growth of LGEs [69]. It also reflects LGEs pay little attention to innovative activities and have limited capacity to absorb local knowledge on the other hand. The extant literature demonstrates that the growth of China's SMEs (including many LGEs) still depends on cost-related factors, following the innovation of foreign and domestic peer enterprises, and paying little attention to the investment in original innovation [70,71]. From this perspective, there is still a long way to go for China's LGEs to grow into global hidden champions.

In spite of being the main form of innovative financial services in China [72], the Chinese digital finance system has been not perfect. Compared with the case that most of the financial laws in China focus on traditional financial services [73], supervision of digital finance services encounters great challenges, especially for information leakage risk and imperfect information of the credit reference system. The Fintech Security Analysis Report in 2018–2019 indicated that 44% of financial institutions had experienced data breaches [74]. According to the survey conducted by Digital Finance Institution of Peking University and Finance Department of Chinese International Business and Economics University in 2021, nearly a third of entrepreneurs were concerned about the loan security of digital finance and the legality of collecting loans. Moreover, the gap in China's digital financial development is increasing between cities, and LGEs still have difficulty in obtaining loans from digital financial system in most cities [75]. Therefore, H3 and H5 are rejected.

4.2.3. Local Analysis of Influencing Factors

The article further analysed the spatial differences in the impact of the major factors across cities, including FDI, international trade, institutional thickness, and local industrial synergy, because local learning and innovative financial services are only significant in very few cities. To visualize the influence of each factor on LGEs in different cities, the quantile method in ArcGIS 10.6 was used to classify the regression coefficients of the independent variables into five levels.

The spatial heterogeneity of the influence of global factors is mainly manifested in the difference in marginal effects among cities and the promotion of 'Belt and Road Initiative', while it is consistent with developing South–South cooperation in new development patterns of "dual circulation". Figure 10 shows that the regression coefficients of FDI are significantly positive in the Southwest, Northeast, and North China, and these coefficients in the Southwest and Northeast China are slightly higher than those in the North China. This means that LGEs in the Southwest, Northeast, and North China probably benefit from FDI through formal and informal cooperation with foreign companies and can obtain access to the opportunity of business expansion, technological transfer, or knowledge spillover [76]. However, in the southeastern coastal area, the frontier of reform and opening up in China, local LGEs did not show a significant correlation with FDI. This is probably because LGEs in this area focus on the niche markets where they own the traditional advantages in production and technology [77], while FDI is not involved into, or depend on local R&D investment in these cities with this indicator passing significance test.
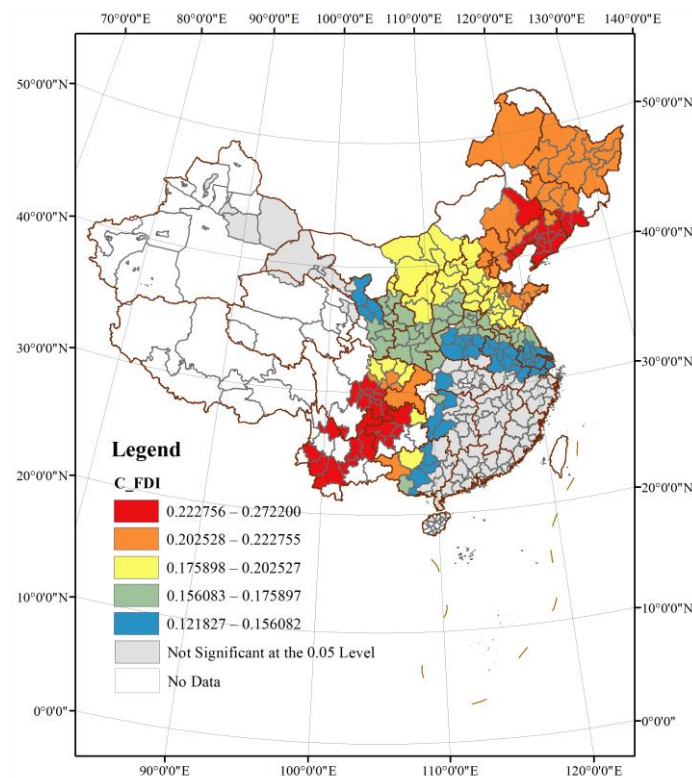
Figure 10. Local estimated coefficient of FDI.

Figure 11 shows that the regression coefficients of import and export trade were mainly significantly positive in the cities of Shaanxi and Guangxi (maximum = 0.9) and had weak negative effects in the eastern coastal cities of Shandong and Jiangsu. These two opposite results may be related to the structure of trade products and target countries. With the implementation of the 'Belt and Road Initiative', Guangxi has accelerated the development of the Beibu Gulf Economic Zone and the Pearl River-Xijiang Economic Belt with the location advantages of being adjacent to ASEAN countries by land and sea, and has expanded the international market with lower price and higher quality of its preponderant products, such as medicines, electronics, building materials, and textile products. According to the official website of Guangxi Provincial Government, the import and export volume between Guangxi and countries along the Belt and Road reached 253,714 billion Chinese Yuan in 2019, accounting for 54% of the total international trade volume and being up 134% from 2016. Specifically, exports of machinery and electrical appliances accounted for more than 50%, while exports of labour-intensive products, such as textile and footwear products, were reduced. Shaanxi also has paid attention to the development international trade with countries along the Belt and Road recently, and the volume of its import and export to the latter countries reached 45.99 billion Chinese Yuan in the first half of 2021, increasing by 26.9% compared to the same period of 2020 according to the official website of the Shaanxi provincial government. LGEs in Shaanxi made upgrading from modern agriculture to energy, nonferrous metallurgy and equipment manufacturing, and built a cooperation channel for Central Asian countries. One of the most direct pieces of evidence is that LGEs in equipment manufacturing account for 57%, including electronic equipment, aerospace equipment, shipping equipment, and rail trafiic equipment.
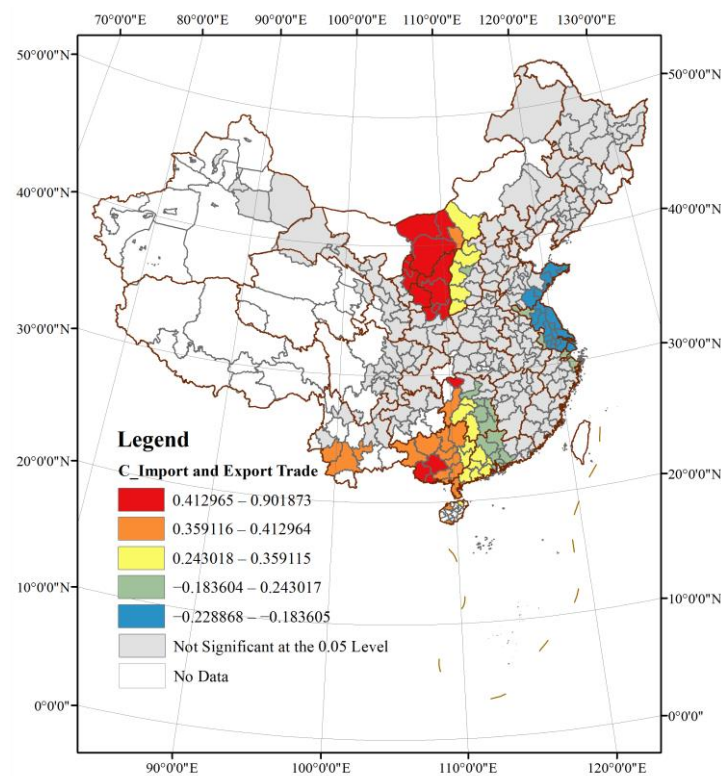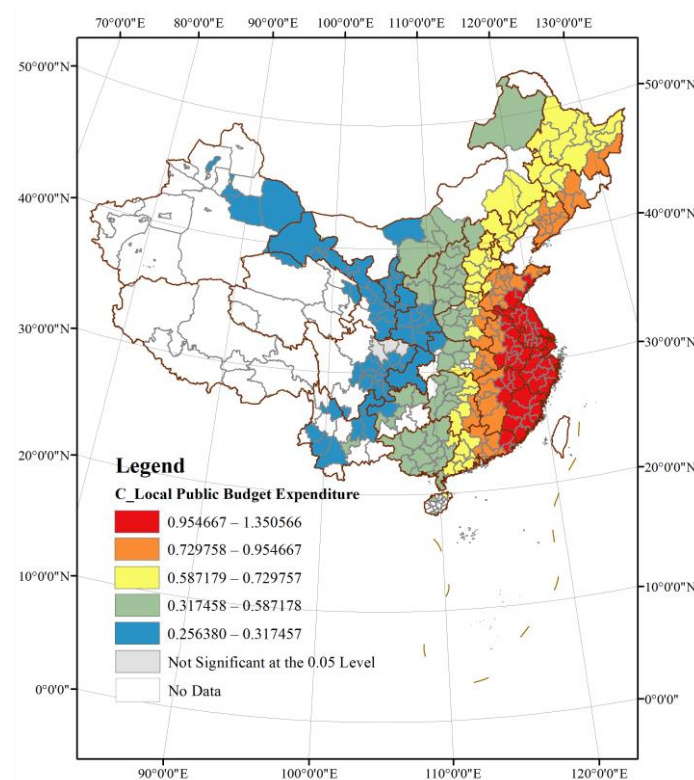
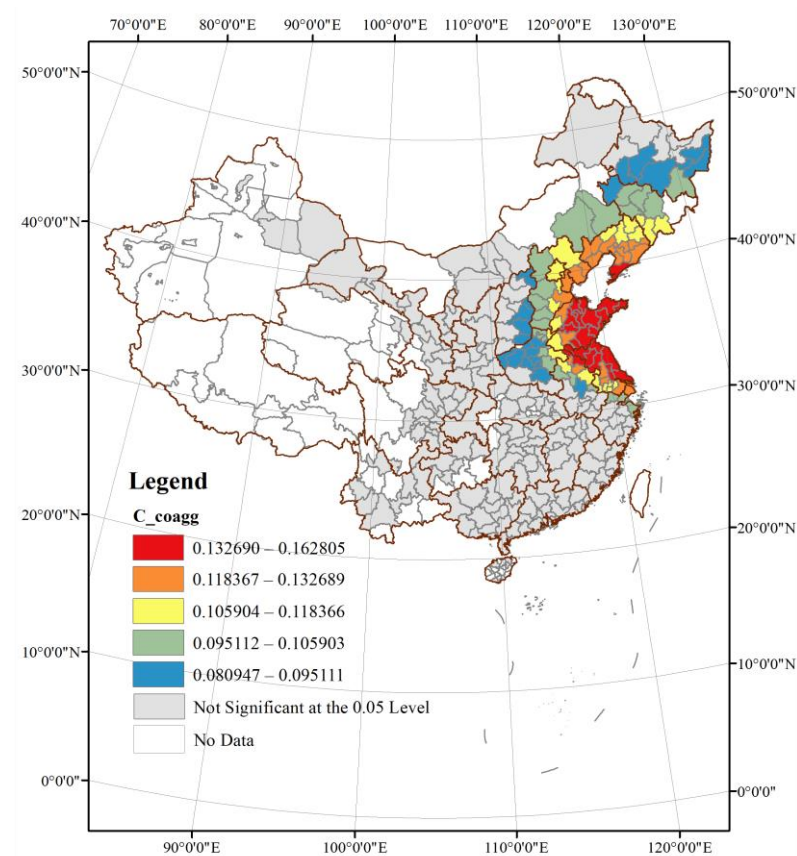**Figure 11.** Local estimated coefficient of total import and export volume.

However, in terms of the eastern coastal cities in Shandong and Jiangsu, local enterprises have conducted international trades with developed countries in East Asia, Europe, and the United States [78], which could support their speedy growth into LGEs at the initial stage but tends to be locked into the development path depending on lower cost and lower value end. Ultimately, it is not beneficial to improve their innovation capability and sustain their long-term growth. Moreover, for most cities, LGEs are likely to depend on the domestic market, so there is no significant correlation between international trade and the spatial distribution of LGEs.

There are significant spatial differences in the impact of local factors. Figure 12 shows that local institutional thickness, represented as local general public budget expenditures, had a positive impact on the spatial distribution of LGEs for all the cities passing significance test, with the regression coefficients decreasing from the east, the middle, to the west. This proves that formal institutions of local governments indeed make a contribution to the growth of LGEs. Interestingly, the spatial pattern of these coefficients resembles that of China's economic development. This is probably because local governments in eastern cities have more financial capacity and motivation to support the development of LGEs. Meanwhile, it also reflects that local governments in this area are more effective in encouragement policy formulation and institutional governance. For example, Shanghai Municipal Government has issued more than 1200 supporting policies and notification for LGEs, covering building Shanghai Enterprise Service Cloud, opening the platforms for entrepreneurship training and industry-university-research partnership, and policy matching and consulting services for LGEs. However, for the local governments in Western cities, the need to promote the development of leading enterprises to drive local economic take-off is more urgent.

Figure 12. Local estimated coefficient of local general public budget expenditures.

As far as local industrial synergy goes, Figure 13 shows its positive effect was significant in the cities of the east area of Northeast China, Bohai Rim, Shandong Peninsula, and Huang-Huai-hai Plain (from north to south), with the regression coefficients decreasing from the coastal to the inland area. Surely this means that industrial collaboration and coordination within these cities provides a perfect business environment for small giant enterprises. The geographical proximity of upstream and downstream partners of supply chains can reduce transportation costs, improve logistics efficiency, facilitate to adopt just-in-time production to make a quick response to the changing market, so as to promote the competitiveness and growth of LGEs. However, it also implies that the industrial synergy between different neighboring cities in this area is not high, and there is a lack of effective division of labor and the mechanism of cooperation and resource sharing between different cities. LGEs in these areas cannot get sufficient supports from their neighboring cities. It is likely that LGEs in the cities of the Yangtze River Delta and Pearl River Delta can expand their production networks across neighboring cities instead of heavily depending on the local partners in the same city, which is why the indicator in these two areas did not show a significant coefficient.

Figure 13. Local estimated coefficient of industrial coagglomeration index.

5. Discussion and Conclusions

5.1. Discussion

According to the result analyzed above, there are some issues in need of further consideration. Firstly, this article used the GWR model to discuss the differences of the main determinants in the influence intensity, the size of the regression coefficient, and the influence area, the number of cities passing significance test. Future research which would identify the crucial determinants and provide proofs to implement differentiated policies for cities on the underlying the differences and mechanism of these determinants, is needed. For example, the impact of global and local factors on LGEs varies in different cities, this can be used as the basis for cities to establish their own dual-circulation development paths for sustaining the growth of LGEs. To explain further, the eastern coastal cities should focus on cultivating and utilizing the vitality and potential of the domestic market, and enhancing the growth of LGEs; while, inland cities in the Southwest, Northwest, and Northeast can take advantage of the opening opportunities of the Belt and Road to facilitate international trade and investment channels and encourage the growth of LGEs.

Secondly, this article focused on the cooperation and coordination between local actors in terms of local industrial synergy and local learning, but the effect of synergy efficiency between neighboring cities is also worth discussing. According to the experience of hidden champions in Germany, local government should also pay attention to the high-quality industrial cooperation with its surrounding cities besides the coordination between local related economic actors and activities, to ensure the improvement of LGEs' competitive advantages. In terms of local learning, using the number of local college students to measure the industry–university–research cooperation may ignore the transregional university–enterprise cooperation, because colleges and universities in China are mainly located in a few large cities and provincial capitals [79]. It is suggested to build cooperation platforms for LGEs to enhance their cooperation with universities and research institutes in the locale and other cities to improve their innovation ability. As a consequence, local government

should make an effort to improve collective efficiency of local production system through industrial clustering policies, support facilities provision and spatial planning, and make coordination of production and innovation chains with its neighboring cities through the integration of infrastructure and the elimination of institutional barriers.

Thirdly, digital finance services showed a significant correlation with the growth of LGEs in only nine cities in Fujian and Jiangxi (Figure 14). Further investigating the 'secret' why this indicator had a positive impact on the growth of LGEs in these cities would be helpful for other cities to provide effective financial supports for LGEs. In order to relieve financing difficulties for SMEs, especially for LGEs, innovative financial services, various financing channels, and financing cost reduction should be highlighted in the encouragement policies of cities to promote the growth of LGEs in the future.
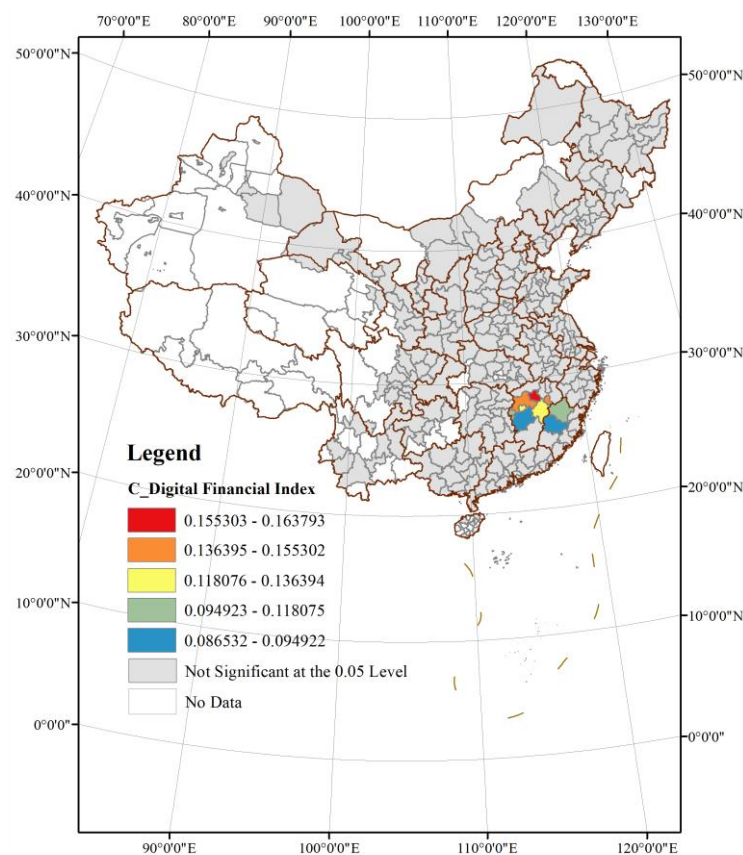
Figure 14. Local estimated coefficient of digital financial Inclusive index.

Moreover, due to the availability of data, this article only used the general public budget expenditure of local governments to measure local formal institutions, but it did not consider local government supports related to R&D infrastructure and talent training for LGEs and local other organizations' roles. These deserve further exploration and would provide suggestions for the improvement of the institutional thickness.

Besides, in terms of industry heterogeneity and enterprise heterogeneity, there may be significant differences in determinants of spatial distribution of LGEs among the agriculture, manufacturing industry, and producer services as well as within these industries. With the increase of the number of approved national-level LGEs, it will be possible to solve this issue so as to make differentiated policy recommendations for cities to promote the growth of different types of LGEs. In particular, it is urgent for agriculture and the rural area to cultivate LGEs through urban-rural coordination.

5.2. Conclusions

This article took the perspective of the exogenous growth theory of the firm and discussed the role of external factors in the spatial patterns and their determinants of LGEs. Under the 'dual circulation' new development pattern of China, it used the data of national-level LGEs from 2019 to 2021 and the geographical weighted regression method, and obtained the main conclusions as follows.

First, the spatial distribution pattern of LGEs in China is basically consistent with that of regional economies, with their number gradually decreasing from the east, central to the west; the higher administrative level the cities are, the more LGEs they own. This shows the inertia of the spatial pattern of regional development, as well as the importance of regional natural and socioeconomic foundation in the growth of LGEs.

Second, the global and local factors jointly influence the spatial distribution of LGEs. Compared with the determinants at the global scale, the local factors are more crucial to the growth of SMEs into LGEs. This indicates that for developing countries, the growth of innovative SMEs depends more on their local environments than their global linkages. It also implies the domestic value chain plays a key role in the industrial upgrading of developing countries and building a new global-local nexus under 'dual circulation' pattern of China is a practical path to push forward the strategy of Innovative China.

Third, in terms of local factors, institutional thickness and industrial synergy have a significant influence on the spatial distribution of LGEs in general. Local governments' policies, such as special financial subsidies, tax exemptions, and building public platforms, are beneficial for SMEs to reduce production and innovation costs and improve the resilience to adverse external factors so as to grow into LGEs. Local industrial synergy, representing collective efficiency of local production system, also sustains the growth of SMEs into LGEs.

Last but not least, the determinants influencing the growth and spatial distribution of LGE vary from one city to another in terms of both the influence intensity and the influence area. This further proves that varying global-local nexus of cities creates 'soils' with varying fertility in which LGEs thrives.

References

1. Simon, H. *Hidden Champions: Aufbruch Nach Globalia Die Erfolgsstrategien Unbekannter Weltmarktfuhrer*, 2nd ed.; Campus Verlag GmbH: Frankfurt, Germany, 2013; pp. 55–84.
2. Scherer, F.M. Invention and Innovation In the Watt-Boulton Steam-Enging Venture. *Technol. Cult.* **1965**, *6*, 165–187. [CrossRef]

3. Yoon, B. How do hidden champions differ from normal small and medium enterprises (SMEs) in innovation activities? *J. Appl. Sci. Res.* **2013**, *9*, 6257–6263.

4. Simon, H.; Lorenz, J.U. *Die heimlichen Gewinner: Die Erfolgsstrategien unbekannter Weltmarktführer*; Campus-Verlag: Frankfurt, Germany, 1996; pp. 78–95.

5. Garcia-Vega, M. Does Technology Diversification Promote Innovation? An Empirical Analysis for European Firms. *Res. Policy* **2006**, *35*, 230–246. [CrossRef]

6. Schenkenhofer, J. Hidden Champions: A Review of The Literature & Future Research Avenues. *Manag. Rev. Q.* **2022**, *72*, 417–482.

7. Eder, J.; Trippl, M. Innovation in the periphery: Compensation and exploitation strategies. *Growth Change* **2019**, *4*, 1511–1531. [CrossRef]

8. Albers, H.H.; Suwala, L. Place leadership and corporate spatial responsibilities. In *Handbook on City and Regional Leadership*; Edward Elgar Publishing: Cheltenham, UK, 2021; pp. 108–130.

9. Rietmann, C. Hidden Champions and their integration in rural regional innovation systems: Insights from Germany. *ZFW-Adv. Econ. Geogr.* **2022**. [CrossRef]

10. Venohr, B.; Meyer, K. The German Miracle Keeps Running: How Germany's Hidden Champions Stay Ahead in the Global Economy. *Berl. Sch. Econ. Work. Pap.* **2007**, *30*, 1–33. [CrossRef]

11. Ellison, G.; Glaeser, E.L.; Kerr, W. What Causes Industry Agglomeration? Evidence from Coagglomeration Patterns. *J. Oper. Manag.* **2007**, *25*, 785–805.

12. Söderbom, M.; Weng, Q. Multi-Product Firms, Product Mix Changes and Upgrading: Evidence from China's State-Owned Forest Areas. *China Econ. Rev.* **2012**, *23*, 801–818. [CrossRef]

13. Zajac, E.J.; Kraatz, M.S.; Bresser, R.K. Modeling the Dynamics of Strategic Fit: A Normative Approach to Strategic Change Strategy. *Manag. J.* **2000**, *21*, 429–453. [CrossRef]

14. Johann, M.S.; Block, J.H.; Benz, L. Financial performance of hidden champions: Evidence from German manufacturing firms. *Multinatl. Bus. Rev.* **2018**, *26*, 2–24. [CrossRef]

15. Rant, M.B.; Cernr, S.K. Becoming A Hidden Champion: From Selective Use of Customer Intimacy and Product Leadership to Business Attractiveness. *South East Eur. J. Econ. Bus.* **2017**, *12*, 89–103. [CrossRef]

16. Shi, J. Global and Local Factors of City Growth in China Based on the Change in the Manufacturing Sector. *Prog. Geogr.* **2019**, *38*, 1571–1582. [CrossRef]

17. Dedrick, J.; Kraemer, K.; Linden, G. Who Profits from Innovation in Global Value Chains? A Study of the iPod and Notebook PCs. *Ind. Corp. Change* **2010**, *19*, 81–116. [CrossRef]

18. Zhang, J.; Zheng, W.P. The Innovative Effect of Chinese Domestic Firms under the Global Value Chain. *Econ. Res. J.* **2020**, *52*, 4–19.

19. Yang, W.L.; You, X.J.; Du, D.B. The Evolutionary Properties and Functions of the Geo-economic System from the Perspective of Global Commodity Trade Network. *Geogr. Res.* **2021**, *37*, 1–19.

20. Hayakawa, K.; Tomohiro, M.; Fukunari, K. Globalization and Productivity: A Survey of Firm-Level Analysis. *J. Econ. Surv.* **2012**, *26*, 332–350. [CrossRef]

21. He, C.F.; Ren, Z.R.; Wang, W.Y. "Dual circulation" and Beijing-Tianjin-Hebei High-Quality Coordinated Development: From the Division in the Value Chain And Factor Mobility Perspective. *Acta Geogr. Sin.* **2022**, *77*, 1339–1358.

22. Kamakura, W.A.; Ramón-jerónimo, M.A.; Gravel, J.D.V. A Dynamic Perspective to the Internationalization of Small-Medium Enterprises. *J. Acad. Mark. Sci.* **2011**, *40*, 236–251. [CrossRef]

23. Wang, Y.; Ning, L.; Li, J.; Prevezer, M. Foreign Direct Investment Spillovers and the Geography of Innovation in Chinese Regions: The Role of Regional Industrial Specialization and Diversity. *Reg. Stud.* **2016**, *50*, 805–822. [CrossRef]

24. Landau, C.; Karna, A.; Richter, A.; Uhlenbruck, K. Institutional Leverage Capability: Creating and Using Institutional Advantages for Internationalization. *Glob. Strategy J.* **2016**, *6*, 50–68. [CrossRef]

25. Lee, J.H.; HWAN, K.K. Scale-up Factors of Public Spin-offs to Grow up Middle Market Enterprise of Korea—A Case study on Kolmar BNH Co., Ltd.—Korean Corporation. *Manag. Rev.* **2019**, *26*, 43–63.

26. Jones, S.L.; Fawcett, S.; Wallin, C.; Fawcett, A.M.; Brewer, B.L. Can Small Firms Gain Relational Advantage? Exploring Strategic Choice and Trustworthiness Signals in Supply Chain Relationships. *Int. J. Prod. Res.* **2014**, *52*, 5451–5466. [CrossRef]

27. Simon, H. Innovation Activities of Mid-Sized World Market Leaders: The Case of the Hidden Champions. *J. Creat. Innov.* **2009**, *2*, 9–32.

28. Song, Z.Y.; Liu, W.D. The Challenge of Wide Application of Information and Communication Technologies to Traditional Location Theory. *Geogr. Sci.* **2013**, *23*, 315–330. [CrossRef]

29. Buckley, P.J.; Clegg, J.; Wang, C. Is the Relationship Between Inward FDI and Spillover Effects Linear? An Empirical Examination of the Case of China. *Int. Bus. Stud.* **2007**, *38*, 447–459. [CrossRef]

30. Audretsch, D.B.; Lehmann, E.E.; Schenkenhofer, J. Internationalization strategies of hidden champions: Lessons from Germany. *Multinatl. Bus. Rev.* **2018**, *26*, 2–24. [CrossRef]

31. Mear, F.; Werner, R.A. Subsidiarity as secret of success: "Hidden Champion" SMEs and subsidiarity as winning HRM configuration in interdisciplinary case studies. *Empl. Relat.* **2020**, *43*, 524–554. [CrossRef]

32. Del, G.M.; Scuotto, V.; Garcia-Perez, A.; Petruzzelli, A.M. Shifting Wealth II in Chinese Economy. The Effect of the Horizontal Technology Spillover for SMEs for International Growth. *Technol. Forecast. Soc. Change* **2019**, *145*, 307–316.

33. Tan, J.; Zhang, Y.Q.; Cao, H. The Fdi-Spawned Technological Spillover Effects On Innovation Quality of Local Enterprises: Evidence From Industrial Firms And The Patents In China. *Appl. Econ.* **2022**, *20*, 1–6. [CrossRef]

34. Taddeo, R.; Simboli, A.; Ioppolo, G.; Morgante, A. Industrial symbiosis, networking and innovation: The potential role of innovation poles. *Sustainability* **2017**, *9*, 169. [CrossRef]

35. Siskos, I.; Van Wassenhove, L.N. Synergy Management Services Companies A New Business Model for Industrial Park Operators. *J. Ind. Ecol.* **2017**, *21*, 802–814. [CrossRef]

36. F-Jardon, C.M.; Pagani, R.N. Is Collective Efficiency in Subsistence Clusters a Growth Strategy? The Case of the Wood Industry in Obera, Argentina. *Int. J. Emerg. Mark.* **2009**, *11*, 232–255. [CrossRef]

37. Fraccascia, L. The Impact of Technical And Economic Disruptions In Industrial Symbiosis Relationships: An Enterprise Input-Output Approach. *Int. J. Prod. Econ.* **2019**, *213*, 161–174. [CrossRef]

38. Duschl, M.; Scholl, T.; Brenner, T.; Luxen, D.; Raschke, F. Industry-Specific Firm Growth and Agglomeration. *Reg. Stud.* **2015**, *49*, 1822–1839. [CrossRef]

39. Noy, E. Niche Strategy: Merging Economic and Marketing Theories with Population Ecology Arguments. *J. Strateg. Mark.* **2010**, *18*, 77–86. [CrossRef]

40. Eswaran, M.; Ashok, K. The Role of the Service Sector in the Process of Industrialization. *J. Dev. Econ.* **2002**, *68*, 401–420. [CrossRef]

41. Andersson, M. *Co-Location of Manufacturing and Producer Services—A Simultaneous Equation Approach*, 1st ed.; Routledge: London, UK, 2004; pp. 18–25.

42. Ellison, G.; Glaeser, E.L.; Kerr, W.R. What Causes Industry Agglomeration? Evidence from Coagglomeration Patterns. *Am. Econ. Rev.* **2010**, *100*, 1195–1213. [CrossRef]

43. Petruzzelli, A.M.; Albino, V.; Carbonara, N. External Knowledge Sources and Proximity. *J. Knowl. Manag.* **2009**, *13*, 301–318. [CrossRef]

44. Caniels, M.C.; Donald, B. Knowledge Spillovers and Economic Growth: Regional Growth Differentials across Europe. *Reg. Sci.* **2002**, *42*, 437–439.

45. Seung, K.A. A Study on the Business Ecosystem of German SMEs and its Implications for Korean SMEs: Focusing on the Hidden Champion Enterprises in Germany. *Korean J. Econ. Manag.* **2014**, *32*, 69–95.

46. Sarkar, S. Uncorking Knowledge-Purposeful Spillovers as a Strategic Tool for Capability Enhancement in the Cork Industry. *Int. Entrep. Manag. J.* **2017**, *13*, 251–275. [CrossRef]

47. Alexy, O.; George, G.; Salter, A.J. Cui Bono? The Selective Revealing of Knowledge And Its Implications For Innovative Activity. *Acad. Manag. Rev.* **2013**, *38*, 270–291. [CrossRef]

48. Mulder, R.H.; Messmann, G.; Konig, C. Vocational Education and Training: Researching the Relationship between School and Work. *Eur. J. Educ.* **2016**, *50*, 497–512. [CrossRef]

49. Leeuwen, V.G. *Innovation and Performance: A Collection of Microdata Studies*; Proefschrift Technische Universiteit Delft: Delft, The Netherland, 2009.

50. Giordano, B. 'Institutional thickness', Political Sub-Culture and the Resurgence of (the 'New') Regionalism in Italy—A Case Study of the Northern League in the Province of Varese. *Trans. Inst. Br. Geogr.* **2001**, *26*, 25–41. [CrossRef]

51. Kim, S.W. An Analysis of Critical Factors in The Success of Global "Hidden Champion" Enterprises. *J. Entrep. Ventur. Stud.* **2010**, *13*, 87–114.

52. Kwon, K.S.; Kim, B.J.; Ha, K.S. An Exploratory Study of Key Success Factors in Public R&D Institutions' Business Supporting Service-Focused on Ceramic Hidden Champion Project. *Asia-Pac. J. Bus. Ventur. Entrep.* **2012**, *7*, 225–232.

53. Wang, S.; Ahmad, F.; Li, Y.; Abid, N.; Chandio, A.A.; Rehman, A. The Impact of Industrial Subsidies and Enterprise Innovation on Enterprise Performance: Evidence from Listed Chinese Manufacturing Companies. *Sustainability* **2022**, *14*, 4520. [CrossRef]

54. Armstrong, H.W.; Kehrer, B.; Wells, P. Initial Impacts of Community Economic Development Initiatives in the Yorkshire and Humber Structural Funds Programme. *Reg. Stud.* **2001**, *35*, 673–688. [CrossRef]

55. Zhao, K.; Wu, W.S. Innovation of Family-Owned Enterprises and Government Subsidies: From A Policy-Oriented Perspective. *Sustainability* **2022**, *14*, 13331. [CrossRef]

56. Zhang, X.; Yu, F.Z.; Xu, L.J. Spatial Structure of Urban Networks in China Based on the Perspective of Cultural Industry Enterprise Networks. *Prog. Geogr.* **2020**, *39*, 78–90. [CrossRef]

57. Chen, B.K.; Lin, Y.F. Financial Repression, Insutrial Structure and Income Distribution. *J. World Econ. Res. J.* **2012**, *35*, 3–23.

58. Khoe, K.I. The Activation Plan of Government Supporting Loan for Development of Digital Contents Industry and Case Study. *J. CEO Manag. Stud.* **2015**, *18*, 151–167.

59. Rietmann, C. Corporate responsibility and place leadership in rural digitalization: The case of Hidden Champions. *Eur. Plan. Stud.* **2022**, *2*, 1–21. [CrossRef]

60. Guo, F.; Wang, J.Y.; Wang, F. Measuring the Development of Digital Financial Inclusion in China: Index Compilation and Spatial Characteristics. *China Econ. Q.* **2020**, *19*, 1401–1418.

61. Fu, Q.Z.; Huang, Y.P. Digital Finance's Heterogeneous Effects on Rural Financial Demand: Evidence from China Household Finance Survey and Inclusive Digital Finance Index. *J. Financ. Res.* **2018**, *11*, 68–85.

62. Kakaomerlioglu, D.C.; Carlsson, B. Manufacturing In Decline? A Matter Of Definition. *Econ. Innov. New Technol.* **1999**, *8*, 175–196. [CrossRef]

63. Howells, J.; Green, A.E. Location, Technology and Industrial Organisation in U.K. Services. *Prog. Plan.* **1986**, *26*, 83–183. [CrossRef]

64. FU, X. Foreign Direct Investment, Absorptive Capacity and Regional Innovation Capabilities: Evidence From China. *Oxf. Dev. Stud.* **2008**, *36*, 89–110. [CrossRef]

65. Zhang, L.; Zhang, H.; Yang, H. Spatial Distribution Pattern of the Headquarters of Listed Firms in China. *Sustainability* **2018**, *10*, 2564. [CrossRef]

66. Cheruiyot, K. Detecting Spatial Economic Clusters Using Kernel Density and Global and Local Moran's I Analysis in Ekurhuleni Metropolitan Municipality, South Africa. *Reg. Sci. Policy Pract.* **2022**, *14*, 307–327. [CrossRef]

67. Brunsdon, C.; Fotheringham, A.S.; Charlton, M.E. Geographically Weighted Regression: A Method for Exploring Spatial Nonstationarity. *Geogr. Anal.* **1996**, *28*, 281–298. [CrossRef]

68. Hottenrott, H.; Richstein, R. Start-up Subsidies: Does the Policy Instrument Matter? *Res. Policy* **2020**, *49*, 103888. [CrossRef]

69. Huang, J.Y.; Chou, T.C.; Lee, G.G. Imitative innovation strategies Understanding resource management of competent followers. *Manag. Decis.* **2010**, *48*, 952–975. [CrossRef]

70. Song, F.F.; Zhao, C.H. Why do Chinese enterprises make imitative innovation?—An empirical explanation based on government subsidies. *Front. Psychol.* **2022**, *13*, 802703. [CrossRef]

71. Xiao, F.; Zhou, Y.; Deng, W.; Gu, H. Did High-Speed Rail Affect the Entry of Automobile Industry Start-Ups? Empirical Evidence From Guangdong Province, China. *Travel Behav. Soc.* **2020**, *19*, 45–53. [CrossRef]

72. Sternberg, R.; Arndt, O. The Firm or the Region: What Determines the Innovation Behavior of European Firms? *Econ. Geogr.* **2001**, *77*, 364–382. [CrossRef]

73. Dong, Y.; Li, X. Internet Finance: A Literature Survey. *J. Financ. Rev.* **2014**, *6*, 16–40+123.

74. Capgemini Group; EFMA. *World FinTech Report 2019*; Capgemin: Paris, France, 2019; Available online: https://ncfacanada.org/global-fintech-report-2019 (accessed on 19 November 2022).

75. Liao, G.K.; Li, Z.H.; Wang, M.; Albitar, K. Measuring China's urban digital finance. *Quant. Financ. Econ.* **2022**, *6*, 385–404. [CrossRef]

76. Hoang, D.T.; Do, A.D.; Trinh, M.V. Spillover Effects of FDI on Technology Innovation of Vietnamese Enterprises. *J. Asian Financ. Econ. Bus.* **2022**, *8*, 655–663.

77. Sun, W.; Wang, J.Y.; Cheng, L.W. Technological resources and innovation efficiency of high-tech industry—Empirical research of Chinese data based on canonical correlation analysis. *Stud. Sci. Sci.* **2010**, *28*, 1088–1093.

78. Hu, X.L.; Ma, Y. International Intra-Industry Trade of China. *Weltwirtschaftliches Arch.-Rev. World Econ.* **1999**, *135*, 82–101. [CrossRef]

79. Liu, Y.; Shen, J.; Xu, W.; Wang, G. From school to university to work: Migration of highly educated youths in China. *Ann. Reg. Sci.* **2017**, *59*, 651–676. [CrossRef]