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Study on China's Top 100 Innovative Enterprises' Spatial Distribution and Its Influence Factors

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***Abstract*—Innovation is crucial for enterprises to achieve continuous growth in the new era. Innovative enterprises are the backbones of realizing Made in China. The spatial agglomeration of innovative enterprises gradually becomes an important index that measures the regional innovative and ecological development level. This paper analyzes the characteristics of the spatial distribution of China's top 100 innovative enterprises during 2016 and 2018. Based on exploring the influence factors of innovative enterprise agglomeration, it establishes the index system that evaluates the location conditions of innovative enterprises and carries out the empirical analysis on 34 sample cities. The result shows the city size, regional scientific and technological level, city's financial service capability, degree of globalization and city's transportation service ability and information service ability obviously promote the spatial agglomeration of top 100 innovative enterprises. According to the national conditions of China, it proposes policy suggestions on the government and enterprise levels, in order to provide reference for realizing the sustainable development of innovative enterprises and promoting the innovative environment of regional innovative ecological system.**

Keywords—top 100 innovative enterprises; spatial distribution; influence factors; empirical research

I. INTRODUCTION

Innovation drives the continuous growth of enterprises in the new era. As the pillar enterprises of China's economic growth and scientific and technological innovation, innovative enterprises gradually attract the attention from the educational circles and the industry. When driving the industrial development of scientific and technological innovation, the growth of innovative enterprises also becomes a crucial engine of urban and regional economic growth [1]. Its degree of agglomeration also becomes an important index that measures the regional innovation level. Innovative enterprise is first put forward by Lazonick who thinks innovative enterprise refers to the new form enterprise that ceaselessly produces high quality products through technological innovation and that strive to become the industrial leader [1]. At present, research institutes such as the Boston Consulting Group, Clarivate Analytics and Forbes annually publish the newest list of global innovative enterprises, which reveals that the global innovative enterprises have highly centralized spatial distribution. The list of Top 100 Global Innovative Institutions 2017 published by Clarivate Analytics shows these enterprises are distributed in twelve countries and regions in Asia, North America and Europe, including 45 Asian enterprises (such as Honda Motor), 36 enterprises in North America (such as Apple), only 1 enterprise in mainland China, 2 enterprises in Taiwan. Obviously, a large gap still exists between the global innovative enterprises and China's innovative enterprises. It is not difficult to see from the Top 100 Innovative Enterprises in Mainland China published by Clarivate Analytics in recent three years that the spatial distribution of China's innovative enterprises also has the characteristic of high agglomeration. The report shows there are 138 enterprises on the list distributed in 34 cities, and 73.2% of them are distributed in Beijing, Shanghai and Guangdong [2]. Therefore, basis would be provided to establish the regional innovative eco-system through researching the spatial distribution of China's innovative enterprises and its influence factors, discussing the characteristics of spatial distribution of innovative enterprises in different regions and the quantity variance as well as analyzing the influence factor of the location choice of innovative enterprises.

II. SPATIAL DISTRIBUTION CHARACTERISTICS OF INNOVATIVE ENTERPRISES

This paper analyzes the spatial distribution of China's top 100 innovative enterprises according to the data in the Report on Top 100 Innovative Enterprises in Mainland China published by the Clarivate Analytics from 2016 to 2018. This report bases on four variables, namely total enterprise invention, patent authorization rate, globalization and influence, and chooses 100 Chinese enterprises with the strongest innovation power. The report on the top 100 Chinese innovative enterprises divides in the echelon formation according to the degree of innovation. Among the 25 members of the first echelon that represent the core force of Chinese innovative enterprises, 23 enterprises stay on the list for three consecutive years. It can be seen from the data of top 100 enterprises in recent three years, 63 out of 138 enterprises listed in the top 100 innovative enterprises have been on the list of top 100 enterprises for three consecutive years. These data also unveil that when paying attention to the innovative development, Chinese enterprises are also promoted by innovative achievements. Good ecological balance has formed between innovation and enterprise development. Table I shows the spatial distribution of top 100 innovative enterprises in different regions and the representative enterprises. The overall spatial distribution is shown in "Fig. 1".

TABLE I. THE SPATIAL DISTRIBUTION OF THE TOP 100 INNOVATIVE ENTERPRISES IN 2016-2018

City	Number of Innovative Enterprises	Representative Enterprises	City	Number of Innovative Enterprises	Representative Enterprises
Beijing	60	China Guodian Corporation, MI, etc.	Jinan	2	Shandong Heavy Industry Group, Inspur Group
Shanghai	11	Baowu Group, Shanghai Electric, etc.	Qingdao	3	Haier, Hisense Group, etc.
Shenzhen	18	Huawei, BYD, etc.	Weifang	1	GoerTek
Guangzhou	5	Radio Group, Kingfa Science and Technology, etc.	Weihai	1	Beiyang Group
Zhongshan	1	Zhongshan Broad-Ocean Motor Company	Changsha	2	ZOOMLION, Sany Group
Dongguan	2	OPP, SYTECH	Chongqing	2	Chongqing Runze Pharmaceutical Co., Ltd, Lifan
Foshan	2	Midea, LESSO	Chengdu	1	Dongfang Electric
Zhuhai	1	Gree	Mianyang	2	Jiuzhou Electric, Sichuan Changhong Electric Co.
Huizhou	1	TCL	Hefei	2	SUNGROW, JAC
Hangzhou	4	Geely Automobile, Alibaba, etc.	Wuhu	1	CHERY Holding
Leqing	1	Chint Group	Baoding	1	Great Wall Automobile
Yuyao	1	Sunny Optical	Langfang	1	ENN
Suzhou	3	POSITEC, Corvo, etc.	Wuhan	2	FiberHome Technologies Group, Wuhan Iron and Steel Corp
Lianyungang	1	Hengrui Medicine, Nanjing Chia Tai Tianqing	Xiangyang	1	Dongfeng Automobile
Xuzhou	1	Xuzhou Construction Machinery Group	Zhengzhou	1	Yutong Bus
Kunshan	1	Goodbaby Group	Xi'an	1	XD Group
Changzhou	1	Trinasolar	Anshan	1	Anshan Iron and Steel Group Corporation

A. *Most Innovative Enterprises Gather in Beijing, Shanghai and Guangdong*

As shown in "Table I", after the distribution of the 138 top 100 innovative enterprises (see details in "Table I" and "Fig. 1") is collated in this paper, it is found that the top 100 innovative enterprises in recent three years are distributed in Beijing, Shanghai, Guangdong, Zhejiang, Jiangsu, Shandong, Hunan, Sichuan, Chongqing, Hebei, Hubei, Henan, Shaanxi and Liaoning, and most of them gather in Beijing, Shanghai and Guangdong, including 60 innovative enterprises in Beijing, accounting for 43.5%, 30 innovative enterprises in Guangdong for 21.7%, 11 innovative enterprises in Shanghai for 8% and 37 innovative enterprises in 25 cities such as Hangzhou. It is evident that the top 100 innovative enterprises distributed in Beijing, Shanghai, Shenzhen and Hangzhou account for a high proportion, reaching 89.58%.

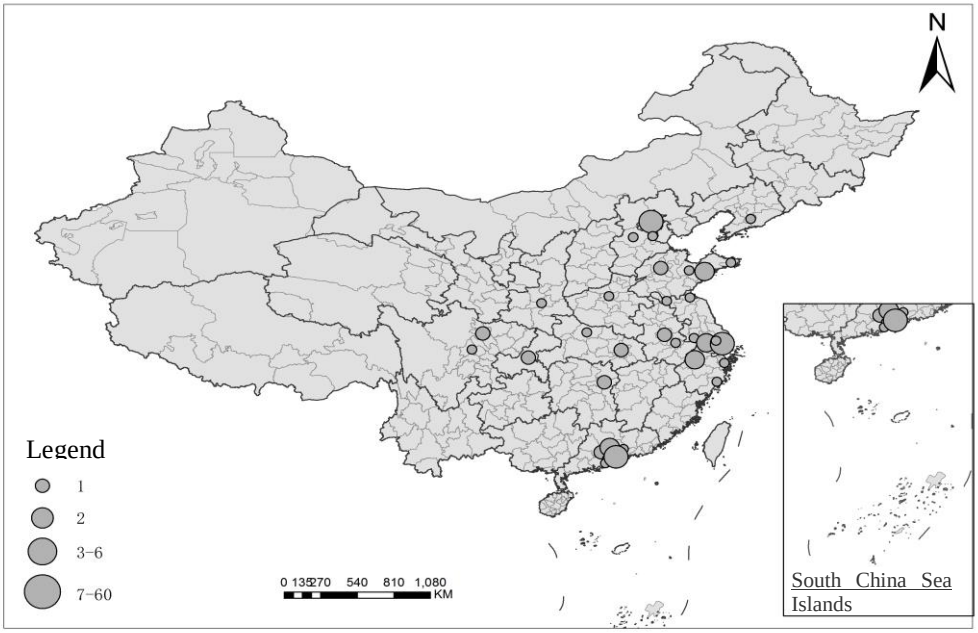

Fig. 1. The urban quantity distribution of innovative enterprises.

B. Most Innovative Enterprises That Stay on the List for Three Years Locate in Beijing and Guangdong

The data of the report on innovative enterprise in 2018 reveal that a total of 63 top 100 innovative enterprises such as Baidu gloriously stand on the list for three consecutive years, distributed in Beijing, Shanghai, Guangdong, Zhejiang, Jiangsu, Shandong and Hunan, including 38 top 100 innovative enterprises in Beijing accounting for 28.7%, followed by 17 enterprises in Guangdong Province accounting for 27%. More than half of the innovative enterprises with strong sustainable innovation ability gather in Beijing and Guangdong.

C. Innovative Enterprises Increasingly Tend to Gather Towards the Eastern Region

The data of report on innovative enterprise 2018 show the top 100 innovative enterprises in 2018 are distributed in 11 provinces and cities, slightly lower than 12 provinces and cities in 2017. The number of the top 100 innovative enterprises in Beijing, Shanghai and Guangdong with enormous advantage also ranks the top 3 among the listed enterprises. The number of top 100 innovative enterprises distributed in Zhejiang and Jiangsu shows a strong rising trend and ranks the 45th position after surpassing that of Shandong. A total of 14 out of 15 top 100 innovative enterprises on the list in 2018 locate in the eastern region. It shows that the trend that innovative enterprises move towards the eastern region is increasingly obvious.

III. INFLUENCE FACTOR OF THE SPATIAL DISTRIBUTION OF INNOVATIVE ENTERPRISES

As the core component that promotes the regional economic development, enterprises refer to the dynamic source for the continuous growth of regional economy. Enterprises realizing the sustainable growth in regions can effectively motivate the regional innovative vigor and then achieve the sustainable development of regional economy. Currently, scholars at home and abroad carry out the multi-directional research on enterprises' spatial location. Wevre E S. (1999) researches and finds that difference in location selection exists between the traditional industries and the new high-tech enterprises that highly rely on the knowledge and technological innovation [3]. It shows the position of regional innovation capability in regional economic development improves rapidly, becoming the key factor for new high-tech enterprises' location selection. Some scholar researches the factors that influence the location selection of new high-tech enterprises from the perspective of the factors related to the traditional location selection [4]. Besides, study explores the spatial distribution and its influence factors from the perspective of geographical clusters [5]. The core of studying enterprises' location selection is to explore the mutual relationship of spatial effect between enterprises and their locations [6]. At present, domestic studies mainly involve the influence factors of regional economic development for enterprises' location orientation. Wu Qianbo (2010) takes China's top 500 manufacturing enterprises as the research object and finds after research that the regional economic development level, infrastructure condition, technological development level and the regional financial service ability are the core factors that influence the agglomeration of enterprises [7]. Pan Fenghua et al (2013) hold the opinion that the agglomeration degree of China's listed enterprises is low through comparing the distributional difference between listed enterprises both at home and abroad, and summarize the main factors that influence the agglomeration of domestic and foreign enterprises [8]. It is not difficult to see from the above scholars' research that

factors such as infrastructure, market size, financial service, scientific and technological level, transportation and information and communication will affect enterprises' orientation in location selection. Most of these researches mainly analyze industrial and manufacturing enterprises. At present, few researches on the spatial distribution of innovative enterprises from the perspective of geography exist. Only Guo Xigen (2016) takes 676 innovative pilot enterprises as the research object and discusses the main factors influencing the spatial distribution via four aspects including city size, economic basis and market environment as well as innovation resources [9].

The current study on innovative enterprises mainly involves the qualitative research regarding the development of innovative enterprises. Empirical researches of regional factor are absent. This paper studies the factors that influence the spatial distribution of top 100 innovative enterprises, establishes the index system of regional evaluation as well as discusses the rule for innovative enterprises' spatial distribution, analyzes the main factors that influence the location selection of innovative enterprises, in order to provide reference for the establishment of regional innovation ecosystems required by the growth of innovative enterprises.

A. Research Hypothesis

The spatial distribution of China's innovative enterprises is affected by a variety of factors. According to the physical truth of China's economic development, this paper analyzes the influence factors relevant to spatial distribution of innovative enterprises from the aspects of 34 sample cities including city size, regional technological development level, city's financial service ability, degree of globalization, city's transportation service ability and information service ability, and puts forward the following hypotheses:

H1: City size can positively promote innovative enterprises' selection in spatial distribution. The bigger the city size, the stronger the agglomeration of innovative enterprises will be.

H2: Regional technological development level can positively promote innovative enterprises' development. The higher the regional technological innovation development level, the stronger the agglomeration of innovative enterprises will be.

H3: City's financial service ability will influence the number of innovative enterprises of a place. The stronger the financial service ability, the stronger the agglomeration of innovative enterprises will be.

H4: The degree of globalization can positively promote innovative enterprises' spatial distribution. The higher the degree of globalization, the stronger the ability of innovative enterprises' agglomeration will be.

H5: City's transportation service ability can positively promote innovative enterprises' spatial distribution. The more advanced the cities' transport, the more the agglomeration of innovative enterprises will be.

H6: Information service ability can positively promote innovative enterprises' spatial distribution. The stronger the cities' information service ability, the more the agglomeration of innovative enterprises will be.

To verify the above hypotheses, this study selects the cities where the top 100 innovative enterprises of mainland China within three years as the research sample and carries out the empirical analysis on 34 sample cities via establishing the index system evaluating innovative enterprises' location conditions, and scientifically evaluates the regional development and analyzes the distribution of top 100 innovative enterprises as well as summarizes the factors that influence the location selection of innovative enterprises.

B. Index Selection and Data Source

To verify the influence of the above-mentioned hypotheses on the spatial distribution of innovative enterprises, based on the representative indexes and available data, the author adopts the cross-section data of cities where the top 100 innovative enterprises locate in 2018 and establishes the index system that evaluates the innovative enterprises' location condition, including 6 level I indexes and 13 level II indexes as shown in "Table II". The data come from the database of State Statistics Bureau, and other data come from the statistical bulletin of sample cities.

TABLE II. THE LOCATION CONDITION EVALUATION INDEX SYSTEM OF INNOVATIVE ENTERPRISES

Level I Index	Level II Index
City Size X1	GDP (100 million) X11
	Year-end total population (10 thousand) X12
Scientific and technological development level X2	Expenditure on science and technology (10 thousand yuan) X21
	Number of students in universities (10 thousand) X22
	Number of patents (piece) X23
Financial service level X3	Number of employee in finance X31
	Year-end outstanding of deposits in RMB in financing institutions (10 thousand yuan) X32
Degree of globalization X4	Total export-import volume of goods (1 million USD) X41
Transport service level X5	City's passenger volume (10 thousand people) X51
	City's freight volume (10 thousand tons) X52
Information service level X6	User number of Internet broadband access (10 thousand households) X61
	Year-end number of mobile phones users (10 thousand households) X62
	Telecom revenue (10 thousand yuan) X63

This paper regards the number of China's top 100 innovative enterprises (NUM) as the explained variable, level II indexes as the explaining variables, investigating the influencing degree that the factors represented by indexes

influence the location selection of China's top 100 innovative enterprises through calculating the correlation coefficient between indexes and the number of top 100 innovative enterprises, and then the following model is established:

$$NUM= \alpha_1x_{11}+\alpha_2x_{12}+\alpha_3x_{21}+\alpha_4x_{22}+\alpha_5x_{23}+\alpha_6x_{31}+\alpha_7x_{32}+\alpha_8x_{41}+\alpha_9x_{51}+\alpha_{10}x_{52}+\alpha_{11}x_{61}+\alpha_{12}x_{62}+\alpha_{13}x_{63}+\varepsilon$$

In this model, α refers to the correlation coefficient between explaining variables and explained variables, ε refers the random interference error.

C. Empirical Analysis and Result

This paper adopts the regression analysis method to discuss the relationship between the agglomeration degree of the top 100 innovative enterprises in sample cities and the influence factors. Meanwhile, the correlation analysis is conducted for the number of the top 100 innovative enterprises in 34 sample cities according to the index system that evaluates the location condition of innovative enterprises. To avoid the multicollinearity between explaining variables that influences the accuracy of regression analysis results, this paper first adopts the principal component analysis (PCA) to extract several influence factors without multicollinearity from the explaining variables and uses the scores of influence factors and the regression analysis of explained variables to calculate the correlation between the factors influencing the location of sample city and the agglomeration degree of the top 100 innovative enterprises in this city, so the main factors that influence the spatial distribution of innovative enterprises will be obtained.

1) Standardized processing of data: Because the units of indexes are inconsistent, the Z-score is adopted to carry out the standardized processing of the original data, and the standardized formula is as follows:

$$z_{xj} = \frac{x_{xj} - \overline{x_j}}{s_j}, i = 1,2,\ldots,n$$

$$\overline{x_j} = \frac{1}{n}\sum_{i=1}^{n} x_{ij}$$

$$s_j = \sqrt{\frac{n}{n-1}\sum_{i=1}^{n}(x_{ij} - \overline{x_j})^2}, j = 1,2,...$$

2) KMO and Bartlett test: To check whether it is appropriate to use the factor analysis to deal with the explaining variables, the KMO measure of sampling adequacy and Bartlett's test of sphericity are conducted, as shown in "Table III":

TABLE III. KMO AND BARTLETT TEST

Index		Value
KMO measure of sampling adequacy		0.754
Bartlett's test of sphericity	Approximate chi-square	3158.436
	df	143
	Sig.	0.000

According to "Table III", the value of KMO is 0.754, the significance value is 0.000, indicating that the relatively strong correlation exists between variables, which is suitable for factor analysis.

3) Principal component analysis (PCA): SPSS software is applied to conduct the principal component screening for the standardized data of explaining variables and extract the characteristic value and rate of contribution of factors, and the result is shown in "Table IV".

TABLE IV. THE CHARACTERISTIC VALUE AND CONTRIBUTION RATE OF THE PRINCIPAL COMPONENTS

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	*% of variance*	*Cumulative %*	*Total*	*% of variance*	*Cumulative %*
1	5.734	42.565	42.565	5.734	42.565	42.565
2	3.815	22.763	65.328	3.815	22.763	65.328
3	1.936	16.464	81.792	1.936	16.464	81.792
4	0.836	7.832	89.624			
5	0.678	4.127	93.751			
6	0.414	2.664	96.415			
7	0.316	1.067	97.482			
8	0.227	0.980	98.462			
9	0.164	0.623	99.085			
10	0.027	0.504	99.581			
11	0.021	0.231	99.820			
12	0.016	0.159	99.979			
13	0.004	0.021	100			

As shown in "Table IV", the characteristic value and rate of contribution of the principal components show the characteristic values of the former three common factors are greater than 1, and the variance contribution rates of principal components are 42.565%, 22.763% and 16.464% respectively. The accumulated contribution rate of the three common factors reaches up to 81.792%, which indicates that the 13 variables that influence the spatial distribution of the

top 100 innovative enterprises can be loaded by the three common factors.

4) Component matrix: The factor loading components of the explaining variables calculated on the common factors show that no significant difference exists in the 3 loading coefficients of principal components of some variables. Therefore, varimax is adopted to conduct the factor rotation for the initial loading matrix, and the result is shown in "Table V".

TABLE V. SPAIN COMPONENT MATRIX

Index	Component		
	F1	*F2*	*F3*
X11	0.764	0.463	0.372
X12	0.302	0.679	-0.231
X21	0.587	0.576	0.841
X22	0.176	0.868	0.221
X23	0.896	0.174	0.195
X31	0.775	0.457	0.027
X32	0.862	0.473	0.167
X41	0.673	0.079	0.263
X51	0.726	0.443	0.274
X52	0.195	0.297	0.887
X61	0.486	0.615	0.286
X62	0.769	0.585	0.231
X63	0.430	0.796	0.272

[a.] Note: Positive rotation method with Kaiser standardization

According to "Table V", the first principal component has a relatively high load in GDP, the total volume of foreign trade of cargos, the number of employees in finance, the year-end outstanding of deposits in RMB in financing institutions, the number of patents, the city's passenger volume and the year-end number of mobile phone users; the second principal component has a relatively high load in the year-end total population, the number of students in universities and the telecom revenue; the third principal component is mainly determined by the expenditure on science and technology and the city's freight volume. The three factors can be expressed through the following formulas:

F1=0.764X11+0.302X12+0.587X21+0.176X22+0.896X23+0.775X31+0.862X32+0.673X41+0.726X51+0.195X52+0.486X61+0.769X62+0.430X63

F2=0.463X11+0.679X12+0.576X21+0.868X22+0.174X23+0.457X31+0.473X32+0.079X41+0.443X51+0.297X52+0.615X61+0.585X62+0.796X63

F3=0.372X11-0.231X12+0.841X21+0.221X22+0.195X23+0.027X31+0.167X32+0.263X41+0.274X51+0.887X52+0.286X61+0.231X62+0.272X63

To analyze the degree that variables influence the spatial distribution of China's top 100 innovative enterprises, this paper takes the three common factors extracted from the factor analysis as the explaining variables, along with the number of the top 100 innovative enterprises after standardized processing to conduct the multivariate regression analysis. The result is shown in "Table VI":

TABLE VI. THE MULTIVARIATE REGRESSION ANALYSIS AMONG THE EXPLAINED VARIABLE AND THREE COMMON FACTORS

	Regression Coefficient	Significance	Tolerance	Variance Inflation Factor
F1	0.768	0.000	1.000	1.000
F2	0.305	0.000	1.000	1.000
F3	0.284	0.000		
F value	75.569			
F accompanying probability P	0.000			
R2	0.567			
R2 after adjustment	0.524			

According to the regression result, the F value of the established regression model is 75.569, its accompanying probability P value is 0.000, indicating that the regression model passes through the test and has significant correlation. The R2 value before the adjustment of model is 0.567, and the R2 after adjustment is 0.524, indicating that the R-squared of the model is good, and the regression result is reasonable and effective. The regression model established by F1, F2, F3 and the number of top 100 innovative enterprises is:

NUM=0.768F1+0.305F2+0.284F3

The regression model between the explaining variables and the number of top 100 innovative enterprises is obtained through putting the factor expression of F1, F2 and F3 in the above-mentioned regression model:

NUM=0.834X11+0.373X12+0.875X21+0.463X22+0.796X23+0.793X31+0.853X32+0.833X41+0.771X51+0。484X52+0.642X61+0.837X62+0.65X63

D. Result Analysis

According to the empirical result, the factors that influence the spatial distribution of China's top 100 innovative enterprises mainly include:

The relatively strong correlation presents between the distribution of China's innovative enterprises and the size of cities where they locate. The analysis on regression result shows the correlation coefficient of the number of distribution of China's innovative enterprises with the GDP of cities where they locate reaches up to 0.834, the correlation coefficient with the year-end total population is 0.373. Through comparing the regression coefficients between the two variables, it is not difficult to find that the significance of the regression coefficient of local GDP is

relatively high, because the economic benefit produced by enterprises refers to an important part of regional economic development. Besides, the higher the local economic level, the more enterprises will be attracted effectively to settle in this region [10]. The agglomeration of enterprises has overflow effect in science and technology as well as management, and promotes the agglomeration and growth of top 100 innovative enterprises [11]. It shows city size to some extent will promote the agglomeration of the top 100 innovative enterprises.

Regional technological development level can positively promote the agglomeration of innovative enterprises. According to the regression result, the correlation coefficient of the number of distribution of innovative enterprises with the expenditure on science and technology is 0.875, and the correlation coefficient with the number of patents is 0.796, presenting the relatively strong correlation. Obviously, the favorable technological environment is significant to promote the scientific and technological innovation of regional enterprises. However, the correlation coefficient of the number of agglomeration of innovative enterprises with the number of students in universities is only 0.463. It indicates that the regional university scale to a large extent can promote the accumulation of human capital of enterprises and inject fresh intellectual resources into the regional innovation, but the growth of innovative enterprises is badly in need of highly-competent people in specific fields. Therefore, it has a relatively low correlation with the number of students in universities that represents the total number of talents in this region. It reveals that the regional technological development level is the basis that guaranteeing the development of innovative enterprises. The higher the city's technological development level, the more obvious the agglomeration of innovative enterprises will be.

The city's financial service ability affects the number of regional innovative enterprises. According to the data analysis, the correlation coefficients of the number of top 100 innovative enterprises with the number of employee in finance and with the RMB deposit of financing institutions are 0.793 and 0.853 respectively, having a strong correlation. It shows the financial service ability has a significant effect on the agglomeration of innovative enterprises. Since innovative enterprises need high investment, the regional financing institutions are required to provide the sound financial service to meet the financial demand of innovative enterprises' growth. Meanwhile, the agglomeration of innovative enterprises also enables financing institutions to absorb more deposit. Realizing the effective turnover of capital in a region is the basic condition for innovative enterprises to achieve sustainable development. It is evident that the city's financial service ability can support the agglomeration of innovative enterprises. The stronger the financial service ability, the stronger the agglomeration of innovative enterprises will be.

The degree of globalization can positively promote the agglomeration of innovative enterprises. According to the regression analysis, the correlation coefficient of the number of top 100 innovative enterprises with the import-export volume is 0.883, having high correlation. Enterprises realizing the expansion of market share through export can promote the agglomeration of innovative enterprises to some extent. It unveils that certain correlation exists between city's import-export volume and the agglomeration of top 100 innovative enterprises. The higher the degree of globalization, the stronger the ability of gathering innovative enterprises will be.

The city's transportation service ability can positively promote the spatial distribution of innovative enterprises. According to the data analysis, the correlation coefficients of the number of top 100 innovative enterprises with the passenger volume and with the freight volume in this region are 0.771 and 0.484 respectively, having a relatively strong correlation. The growth of innovative enterprises is realized through establishing highly intensive communication with global leading enterprises, which will inevitably need the convenient transportation. The research shows the traffic convenience is the main factor for enterprises' site selection [12]. The regional transportation service ability is the requirement for the development of innovative enterprises. Cities with more advanced transportation will have more agglomeration of innovative enterprises.

Information service ability can positively promote the spatial distribution of innovative enterprises. According to the analysis on regression result, the correlation coefficients of the number of top 100 innovative enterprises with the number of Internet users, the number of mobile phone users and the telecom revenue are 0.642, 0.837 and 0.650, having a relatively strong correlation. It indicates the information service ability can support the growth of innovative enterprises. The stronger the ability of city's information service ability, the more the agglomeration of innovative enterprises will be.

IV. CONCLUSION

On the basis of analyzing the characteristics of the spatial distribution of China's top 100 innovative enterprises between 2016 and 2018 and establishing the index system that evaluates the location condition of innovative enterprises, this paper conducts the empirical analysis on the 34 sample cities and the distribution of 138 top 100 enterprises. The result shows: As the popular region of economic development, Beijing, Shanghai and Guangdong have gathered more than half of the top 100 innovative enterprises and have become the core region of China's economic growth and innovative development. The regional distribution of the newest listed enterprise in 2018 reveals the tendency that innovative enterprises gather towards the eastern region increasingly highlights. Moreover, the city size, regional technological development level, city's financial service ability, degree of globalization, city's transportation service ability and information service ability has correlation with the spatial distribution of top 100 innovative enterprises. Specifically speaking, the correlation coefficients of city's GDP, expenditure on science and technology, number of patents, RMB deposits of financing institutions, total export-import volume of goods are relatively high, indicating these factors can significantly promote the agglomeration of top 100 innovative enterprises.

The following policy proposals are put forward on government level and enterprise level according to the above research result and the current situation of China's economic development:

The government should first further realize the optimal configuration of fund on science and technology and intensify the investment on it as well as highlight the key points of its investment and optimize the management level of fund on science and technology. Besides, the government should further strengthen the introduction of core technical talents. Second, the system of regional financing platform should be established. At present, China's innovative enterprises highly rely on the government-oriented financing pattern, and the financing channel is badly in need of expansion. The government should promote innovative enterprises' efficiency in fund use through encouraging financing institutions to launch financing products especially for innovative enterprises, establishing the financing service system for innovative enterprises and popularizing the mortgage financing pattern of intellectual property. Last, the government could provide the tax preference for innovative enterprises that meet the standard of export subsidy, which will bring benefits of innovation for innovative enterprises through preferential tax policy and promote the innovative enterprises to expand market shares through export.

On the enterprise level, firstly, innovative enterprises need to strengthen the innovation ability and enhance the construction level of scientific and technological innovation [14]. Secondly, enterprises should improve the consciousness of innovation and overall situation and have the keen insight in the significant achievements and development trend of frontier technology to steadily improve the sustainable innovation ability according to their status quo. Lastly, innovative enterprises should ceaselessly deepen the ability of communicating and coordinating with the government, financing institutions and other enterprise, perceive the related policies issued by the government, timely build multi-layered dialogue mechanism with financing institutions as well as establish the long-term cooperative relationship with other innovative enterprises, universities and scientific research institutions, in order to share the technological innovation from scientific research forces in a region.

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