The Measurement and Spatial Analysis of Shaanxi Province's Technological Innovation

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Abstract: This paper establishes the measurement as well as spatial analysis system about science and technology innovation in Shaanxi Province by constructing three levels of science and technology innovation input, science and technology innovation transformation and science and technology innovation environment, collecting relevant data from 2012-2018, and using autocorrelation analysis for local spatial correlation analysis to get that the regions with more developed level of science and technology innovation development in Shaanxi Province are mainly concentrated in the central as well as northern regions, and The development of Xi'an city has influenced the development of neighboring cities to a certain extent, and the level of technological innovation develops more rapidly, but its neighboring cities develop slightly slowly, and this phenomenon has a certain negative impact on the development of scientific and technological innovation in Shaanxi province. Finally, the results of the comprehensive analysis are presented and relevant suggestions are made.

1. Introduction

The 18th Party Congress clearly pointed out that to improve the strategic support of social productivity and comprehensive national power, we must develop scientific and technological innovation. The scale of science and technology innovation in Shaanxi Province has been expanding, and the trend of science and technology innovation has been developing steadily. Although Shaanxi Province has sufficient science and technology education resources, its economic development is relatively backward and its science and technology innovation capability is relatively weak, and the entire province shows polarized development among cities. Based on this, this paper quantifies science and technology innovation from three dimensions: science and technology innovation input, science and technology innovation transformation, and science and technology innovation output, and then puts forward effective suggestions based on the results, which have far-reaching effects and important implications for driving Shaanxi's economic development.

2. Review of the literature

The theoretical system for the development of science and technology innovation has been maturing, and many scholars have published relevant literature on science and technology

innovation.Youzhi Zhang and Yuhe Qiao[1] argue that the economic development of Shaanxi Province is directly influenced by the innovation-driven capability. Focusing on the innovative economy, they comprehensively evaluate the innovation-driven capability among cities in Shaanxi Province in three aspects: innovation input, innovation output, and innovation environment, and put forward relevant suggestions about promoting economic development through a virtuous combination with science and technology innovation.Zhang Zizhen, Yu Jiawei, and Du Tian[2], on the other hand, believe that science and technology innovation capability will have an important impact on the regional economic quality development level, among which, realizing the allocation of science and technology innovation resources as one of the manifestations of regional science and technology innovation capability possesses a decisive driving role in the development of regional science and technology innovation level, and conclude that the efficiency of regional science and technology innovation resource allocation still needs to be improved. For different scholars on the influence factors between science and technology innovation and regional economic development, this paper will make an analysis based on the indirect influence relationship between economic development of Shaanxi Province and the level of science and technology innovation development between provinces and regions.

3. Science and Technology Innovation Measurements

(1) Construction of index system

In this paper, based on the above research, we measure the science and technology innovation capacity of ten cities in Shaanxi Province from 2012-2018 at three levels: science and technology innovation input, science and technology innovation transformation, and science and technology innovation environment

(2) Evolution of the Spatial Pattern of Science and Technology Innovation

● Trend of evolution of municipal-level differences

In order to better measure the degree of science and technology innovation development of each municipality in Shaanxi Province, this paper uses ArcGIS software to spatially visualize the level of science and technology innovation development of each municipality in Shaanxi Province from 2012 to 2018, and selects the legend of 2016, 2018 to analyze the development trend of the degree of science and technology innovation of each municipality in Shaanxi Province.
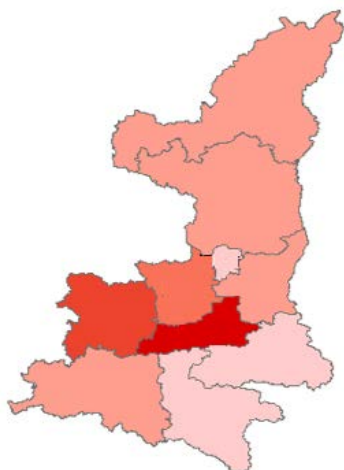

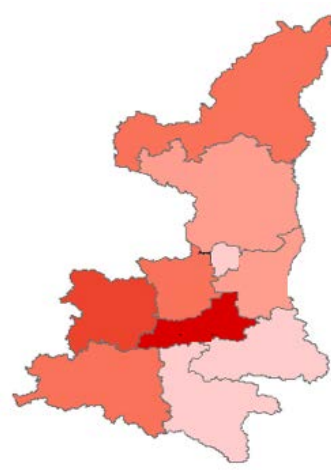*Figure 1: S&Technology innovation scores in Shaanxi Province in 2016*

Figure 2: S&Technology innovation scores of ten cities in Shaanxi Province in 2018

From the figure, it can be seen that Xi'an has the highest level of science and technology innovation

development, the fastest development speed, and has reached the medium and high level status; geographically, Xi'an is located in the central section of the city distribution in Shaanxi Province, which has become the gathering place of economic and technological development in Shaanxi Province, with a large number of talents gathered and high-tech industries created, which has become one of the important influencing factors to attract outside investment; during the period of 2012-2018, the The medium development level cities establish several high-tech industrial development zones, reasonably use the financial science and technology appropriation to establish high-quality urban high-tech development projects, and cultivate several innovative technology resources to incubate industrial bases. The government should first improve the level of science and technology education, use the state financial allocation funds to establish high-quality universities to cultivate a large number of high-quality science and technology innovation talents; establish a talent transmission and retention system, create science and technology innovation experimental bases, combine science and technology innovation talents with the vitality of science and technology innovation contribution, retain the basic labor output of the city, and vigorously cultivate innovative science and technology talents.

On the whole, Shaanxi Province's science and technology innovation development capability is in the middle level within the country, the state has invested a lot of funds for Shaanxi Province's science and technology innovation development, and under the good development background of combining science and technology with innovation, Shaanxi Province has been developing well in recent years.

● Local spatial autocorrelation analysis

The local spatial autocorrelation index can indicate the form of association and the degree of significance of spatial units, which can reflect the spatial state of the research object.
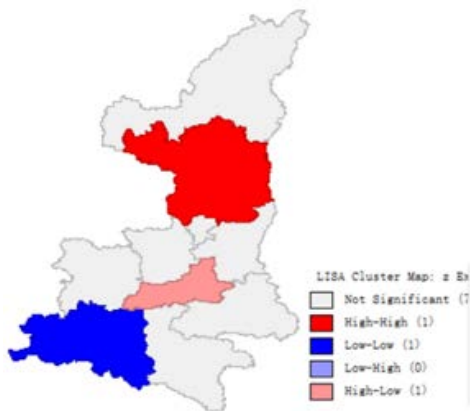

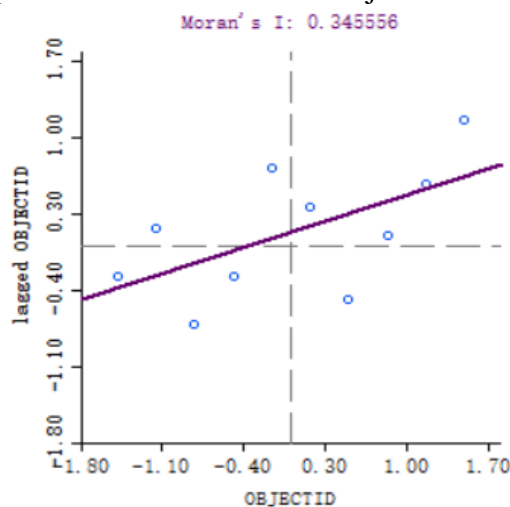*Figure 3: LISA agglomeration map of STI measures between 2012 - 2018*

Figure 4: Moran scatter plot of STI measures between 2012 - 2018

Through the above local autocorrelation analysis, we can see that Xi'an is at the forefront of science and technology innovation level, which negatively influences the level of science and technology innovation development of surrounding cities due to its high speed of science and technology innovation development and development efficiency. From the perspective of history, the long history of Xi'an has a positive influence on the development of culture and education in Xi'an, and the relatively high quality of education resources and high education level in Xi'an attract many scientific and technological talents to Xi'an. It has become the "cradle" for the breeding of talents for scientific and technological innovation development in Shaanxi Province.

4. Conclusions and insights

This paper uses the coefficient of variation method to measure the degree of science and technology innovation in Shaanxi Province from 2012-2018, and draws the following conclusions.

(1) The development level of science and technology innovation in Shaanxi Province from 2012 to 2018 is at a medium level, and the prospect of science and technology innovation development is relatively clear. The development trend of science and technology innovation in Shaanxi Province is good, and the vitality of science and technology innovation is high.

(2) The degree of science and technology innovation in each city from 2012-2018 has been increasing, indicating that each city follows the pace of science and technology innovation development and basically finds a suitable path for the development of science and technology innovation in the city by combining with the national and governmental policy guidance.

(3) The government should vigorously invest in talent cultivation programs in colleges and universities and open a number of incubation and cultivation programs for scientific and innovative talents to promote the better development of scientific and technological innovation water. At the same time, the government's policy guidance role should be strengthened to attract internal and external investment in science and technology funds and play the role of regional promotion ties for less developed areas.

References

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