

# Research on the Coupling Relationship between Talents and Industrial Development and Its Coordinated Development

Tiannan Yang<sup>1,a,\*</sup>, Xiaoyuan Li<sup>2,b</sup>, and Yunfeng Gao<sup>3,c</sup>

<sup>1,2,3</sup> Business School, Jiangxi Normal University, Nanchang, China

<sup>a</sup>yangtiannan123@163.com, <sup>b</sup>lihappy0791@163.com, <sup>c</sup>jxsdgyf@163.com

\*Corresponding author

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**Abstract.** By establishing a coupling coordination model between human resources and industrial economy, this paper analyzes and evaluates the coordination between industrial development and human resources interaction between Jiangxi Province and the whole country from 2003 to 2016. The results show that the degree of coupling and coupling coordination between the talents resources and the industrial economy are in a phased upward trend, and the interaction and correlation between the two are getting stronger in both Jiangxi Province and the whole country. However, from the comparative data analysis of Jiangxi Province and China, it can be seen that during the period of steady increase in the coupling of talent and industrial development in the whole country, the coupling degree in Jiangxi has generally stopped. The main reason is that the total number of industries in Jiangxi is not that large and the structure of it is not good enough, which brought the talent insufficient attraction problem.

## 1. Introduction

With the introduction of the innovation-driven strategy, innovation will gradually become the decisive force for the high-quality development of regional economy and the promotion of scientific and technological progress in China, so the talent factor is indispensable. The industrial economy is the pillar of the entire national economy. Under the general trend of accelerating the transformation of economic development mode and promoting the optimization and of industrial structure, talents play a very important role, and it also has realistic meaning in promoting the high quality, good efficiency and excellent structure of China's industrial development. In recent years, the government of Jiangxi Province has guided the new development concept, actively promoted the side structural reform and deeply implemented the strategy of strong industrial zone. While, we must be consciously aware that the pressure of the economy downward is still very obvious, and the foundation for economic stabilization is unstable now. The fundamental way out lies in innovation if we want to promote industrial stability, structure superiority, and increase efficiency rapidly, and the root of innovation is talent.

## 2. Literature review

With the continuous increase of China's industrialization index, there have been problems such as unbalanced industrial development in some regions. China has changed from a "agricultural power" to an "industrial power", however, our current basic national condition is still "big but not strong" [1]. What we are facing now will be how to solve the problem of "big but not strong", and turn China into a real "industrial power".

Talent plays a very important role in the process of industrial development. First of all, the development and progress of human resources will help promote economic development. Teixeira (2016) believes that human resources is a key factor in economic growth, and the interaction between human resources and structural changes in high-knowledge-intensive industries has a significant impact on economic growth [2]. Second, human resources is an important factor affecting the transformation of industrial structure and upgrading of efficiency optimization. Colin (2011) believes

that the transformation of industrial structure is the process of re-allocation of production factors such as material resources and work-force, and human capital is an important basis for the transformation of industrial structure [3]. Finally, human resources plays a positive role in industrial competition. The quality of laborers and the competitive advantage of industry are mutually influential [4], and industrial competitiveness comes down to human resources [5].

This paper introduces the coupling model which displays the relevance of talents and industrial development in a better way. The authors expect it can provide ideas for the development of Jiangxi Province.

### 3. Research methods and Data sources

#### 3.1 Indicator selection

The industrial GDP and the proportion of industrial output to China GDP is measured to measure the level of industrial development. The number of social employment, the number of industrial talents, and the proportion of industrial talents in the social employment of all employees are selected to measure the industrial talent team.

#### 3.2 Construction of coupling coordination degree model

The coupling degree between human resources and industrial economy reflects the strength of this role. Generally, the value ranges from 0 to 1. The larger the value, the stronger the interaction between human resources and industrial development, and vice versa. The coupling degree of human resources and industrial economy is used to express the connection of heterogeneous organization which is industrial talent construction and industrial economic development, trying to reveal the coupling mechanism between industrial talent team construction and industrial economic development. The horizontal measurement system analyzes the spatio-temporal differentiation state and evolution trend of the coupling coordination relationship between the two. On this basis, the optimal path of the coupling coordination degree between talent team construction and industrial economic development is discussed.

##### 3.2.1 Coupling degree model

Based on the capacity coupling coefficient model in physics, the coupling model of industrial development system and talent resource system is established. The formula is as follows:

$$C = \left\{ \frac{f(x) \times g(x)}{[f(x) + g(x)]^2} \right\}^{\frac{1}{2}} \quad C \in [0, 1] \quad (1)$$

##### 3.2.2 Coupling coordination model

The degree of coupling can represent the interaction between the industrial development system and the talent resource system, but the single indicator does not reflect the degree of mutual influence between the two. For example, when the two systems comprehensive evaluation index is low, a higher degree of coordination may occur. Therefore, this paper introduces the coupling coordination degree model [9], which can more accurately reflect the degree of coordination between the two.

$$T = \alpha f(x) + \beta g(y) \quad (2)$$

$$D = \sqrt{C \times T} \quad D \in [0, 1] \quad (3)$$

On the above formula, C is the degree of coupling, D is the degree of coupling coordination, and T is the comprehensive evaluation index of the industrial development system and the talent resource system.  $\alpha$  and  $\beta$  are the undetermined index of the two systems. Considering that the two are mutually influential research objects, the values of this paper are  $\alpha=0.5$  and  $\beta=0.5$ .

### 4. Coupling analysis

The coordination between the talent system and the industrial development system is conducive to promoting the development of a harmonious and virtuous circle. When talents and industrial development systems interact and reciprocate, the coupling is benign; on the contrary, the coupling is

bad. The degree of coupling can reflect the degree of interaction between systems (or between elements), and the degree of coordination can reflect the level of coordinated development.

#### 4.1 Comparative Analysis of the Coupling between Jiangxi and the Nation

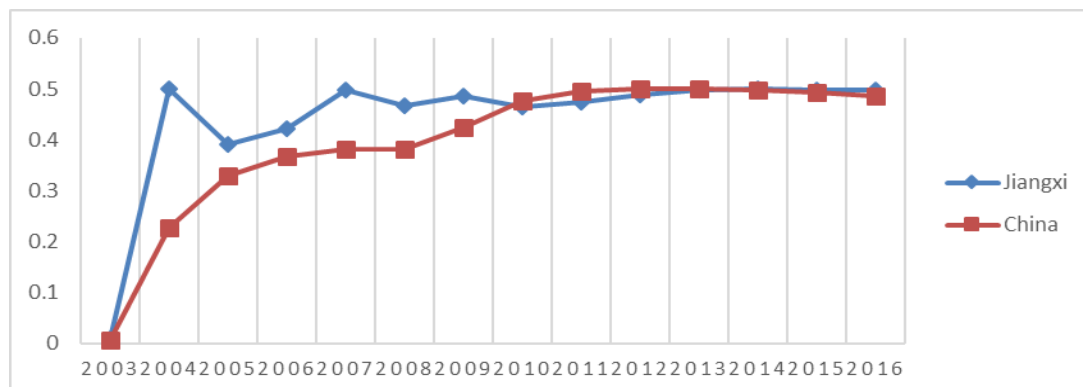


Figure 1 Coupling degree between China and Jiangxi in 2003-2016

According to the overall analysis from Figure (refer with: Fig. 1), due to the differences in regional development, the national coupling degree has been lower than that of Jiangxi in 2003-2009, but it has been increasing year by year. In contrast, Jiangxi is constantly fluctuating. After 2010, Jiangxi and the country are basically at the same level. From the perspective of the degree of coupling, in 2005-2016, Jiangxi and the whole country were in the embarrassing stage, but the number of both were close to 0.5. From the specific value, Jiangxi has a small gap from the benign stage. The above explanation shows that during the period of steady increase in the coupling of talent and industrial development across the country, Jiangxi has generally stopped, and then the national level catches up with Jiangxi. It reflects the slow industrial development and the poor industrial structure in Jiangxi, and the sufficient talent attraction caused by these problems. In the case of insufficient talents, we should attach great importance to these issues and promote the coupling of talent and industry in Jiangxi into a benign stage as soon as possible.

#### 4.2 Comparative Analysis of the Coordination Degree between Jiangxi Province and the Whole Country

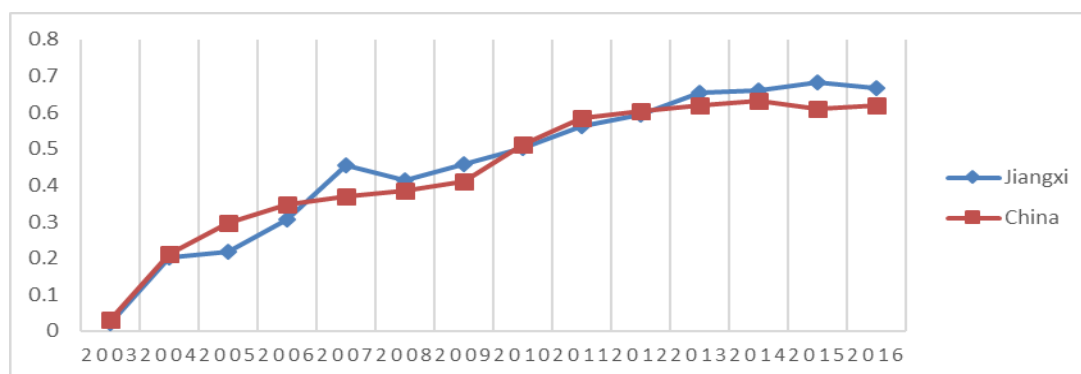


Figure 2 Coupling degree of national and Jiangxi industrial coupling in 2003-2016

Judging from the degree of coupling coordination(refer with: Fig. 2), the coordination degree between talents and industry in Jiangxi and the whole country has maintained an upward trend. However, in 2003-2006, Jiangxi was lower than the national level, 2007-2009 was higher than the national level, and slightly lower in 2010-2012. At the national level, 2013-2016 is significantly higher than the national level. From the perspective of coupling coordination level, Jiangxi is completely consistent with the whole country. 2003-2005 is the primary coordination stage, 2006-2009 is the intermediate coordination stage, and 2010-2016 is the advanced coordination stage. Judging from the specific values of the coupling coordination degree in 2016, Jiangxi is slightly higher than the national level. The above characteristics show that the coupling degree of talent and industrial development in Jiangxi has a historical stage which was higher than the national level, and

there was also a stage lower than the national level. However, in recent years, it is more obvious that the degree of coupling coordination is higher than the national situation, reflecting the growth rate of the industrial economy in Jiangxi in recent years has remained at the forefront of the country, and the industrial structure has been continuously optimized, and the introduction of talents has been intensified. In particular, the number of high-level talents and talented talents have been continuously break through the past, making the overall level of talent and industry synergy relatively good.

## 5. Research conclusions and enlightenment

### 5.1 Research conclusions

From the coupling analysis of the development of human resources and industrial economy in Jiangxi Province, we must clearly see that the overall increase in the coupling between talents and industrial development in the past 14 years has not been large enough, and it has been within a certain range for a long time, indicating that the degree of interaction between talents and industrial development needs to be further improved, and the top-level design and policy guidance needs to be further improved also for a better integration between talents and industrial development.

### 5.2 Talent supply must be coordinated with the province's industrial economy

The supply of talents must adapt to the needs of regional development for different levels and types of professional and technical personnel. It must be coordinated with the province's industrial economic development, industrial structure and talent employment structure. Therefore, it is necessary to strengthen the investigation and research of industrial talents in the province, and scientifically foster strategic planning for introducing and cultivating talents. And take effective measures to promote the coupling of talent supply and industrial development. "Focus on accelerating the construction of the real economy, science and technology innovation, modern finance, and the coordinated development of human resources", so that the role of human resources in supporting the development of the real economy is continuously optimized. We must fundamentally strengthen the attraction of talents, which help to increase the intensity of talent introduction. We need to coordinate the talents allocation with industrial development. Through the development of talents to promote the transformation and upgrading of regional economic development, and then make talents and industrial development grow together.

### 5.3 Combine traditional industries with high talents and new technologies

High talents and new technologies are necessary conditions for economic development and an important way to expand regional development. Jiangxi Province has many traditional industries. By implementing traditional industrial upgrading, and using advanced technologies, and actively transforming traditional industries to help make traditions industries revitalize. By promoting industrial transformation and upgrading to further increase the speed of economic development. At the same time, the successful transformation of traditional industries will help to grow the ordinary labor force into high-tech talents.

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