

# Research on Talent Demand based on Combination Forecast Model

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**Abstract:** With the acceleration of urbanization in various countries, the demand for talents is on the rise. Large-scale "The war for talent" have been launched everywhere. This paper has nearly 50 occupations divided into six categories. The demand for talents in a city's job market is counted separately and the future demand is predicted by gray prediction and linear regression combined model. Through the above research, we put forward for some reasonable suggestions about talent introduction policies needed for city development.

**Keywords:** Talent demand; Grey prediction; Linear regression; Urban development

## 1. Introduction

Talent is the driving force of urban development. In recent years, with the urbanization process developed rapidly everywhere, especially for the second and third tier cities, the demand for all kinds of talents has greatly increased. Therefore, attracting the talents to settle down and obtain employment has become the main method of introducing talents between cities. Taking the data of a city's employment market as an example, this paper analyzes the demand for talents in the city and predicts the changes in demand for talents in the next few years.

## 2. Model Hypothesis

Assume that there has been no significant change in the talent education mode in the city.

Assume that the annual growth rate of graduates is basically unchanged.

Assume that the wage levels in various industries are basically unchanged.

Assume that all data are authentic.

## 3. Talent Demand Model

Talents are defined as those who have certain professional knowledge or skills, carry out creative work, and make contributions to the society. They are laborers with higher ability and quality in human resources. For the convenience of analysis, nearly 50 occupational categories are classified into six categories, skilled, management, research, transactional, artistic and social talents. The

specific classification results are shown in the following Figure 1-3.

By analyzing the data, we get the column chart of the job demand of graduates and the talent demand of enterprises. By comparison, we draw a conclusion: in this city, the job demand of graduates is far greater than the talent demand of enterprises. In addition, through calculation, we can know that the annual employment rate is about 86%.

In addition, by sorting out the data on the demand for talents of different professions from 2015 to 2018 and drawing the following bar chart, it can be clearly seen that the city has the largest demand for managerial talents, followed by skilled.

Through the analysis of the above basic situation, the correlation analysis is carried out on the data of the number of expected occupations, job demand and talent demand. The correlation test results show that there is correlation among the three, which is suitable for establishing regression models. Therefore, this paper uses the method of linear regression to model:

Let  $Y$  be the demand for talents,  $X_1$  be the number of people expected to work, and  $X_2$  be the demand for work:

$$Y = \beta_1 X_1 + \beta_2 X_2 + C$$

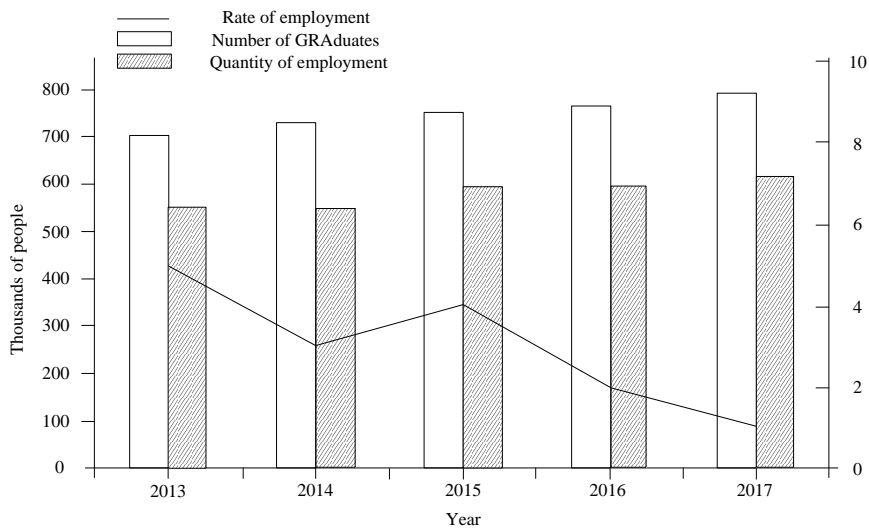
In which,  $\beta_1$ ,  $\beta_2$  are unknown and  $C$  is constant.

Then, SPSS is used to carry out regression analysis on the data. The results are as follows Table 1.

## 4. Combination Forecast Model of Talent Demand

- |  |  |  |
|--|--|--|
| <p><b>Skills</b></p> <input type="checkbox"/> Computer software<br><input type="checkbox"/> Computer hardware<br><input type="checkbox"/> IT-QM technical support and more<br><input type="checkbox"/> Transportation service<br><input type="checkbox"/> Construction<br><input type="checkbox"/> infrastructure gardening<br><input type="checkbox"/> Production operation<br><input type="checkbox"/> Customer service and technical support<br><input type="checkbox"/> Technical work<br><input type="checkbox"/> Restaurants & recreation<br><input type="checkbox"/> Beauty and personal care<br><input type="checkbox"/> Security housekeeping other | <p><b>Management</b></p> <input type="checkbox"/> Sales management<br><input type="checkbox"/> Market marketing<br><input type="checkbox"/> Sales<br><input type="checkbox"/> Finance/auditing/tax<br><input type="checkbox"/> Finance/auditing/tax<br><input type="checkbox"/> HR<br><input type="checkbox"/> Senior management<br><input type="checkbox"/> Legal profession/law<br><input type="checkbox"/> Banking<br><input type="checkbox"/> Securities/finance/investment<br><input type="checkbox"/> Insurance<br><input type="checkbox"/> Procurement<br><input type="checkbox"/> Trade<br><input type="checkbox"/> Property management<br><input type="checkbox"/> Hotels/tourism<br><input type="checkbox"/> General merchandise/chains/retail | <p><b>Study</b></p> <input type="checkbox"/> Internet development and application<br><input type="checkbox"/> Communications technology<br><input type="checkbox"/> Electronics/appliances/semiconductor /instrumentation<br><input type="checkbox"/> Engineering/machinery/energy<br><input type="checkbox"/> Science & technology<br><input type="checkbox"/> Hospital/medical/care<br><input type="checkbox"/> QMS/safety/environmental/protection<br><input type="checkbox"/> Biology/chemicals/pharmaceuticals/ medical equipment |
| <p><b>Transaction</b></p> <input type="checkbox"/> IT-Management<br><input type="checkbox"/> Logistics/warehousing<br><input type="checkbox"/> Translation<br><input type="checkbox"/> Office administration/logistics   | <p><b>Art</b></p> <input type="checkbox"/> Art/graphics/animation design<br><input type="checkbox"/> Fashion/textile/furs<br><input type="checkbox"/> Advertising<br><input type="checkbox"/> PRs and news media<br><input type="checkbox"/> Movies, TV and recreation<br><input type="checkbox"/> Literature/screenwriting/writing  | <p><b>Social</b></p> <input type="checkbox"/> Education<br><input type="checkbox"/> Counsel/consulting   |

**Figure 1. Post classification list**



**Figure 2. The employment about the city in 2013-2017**

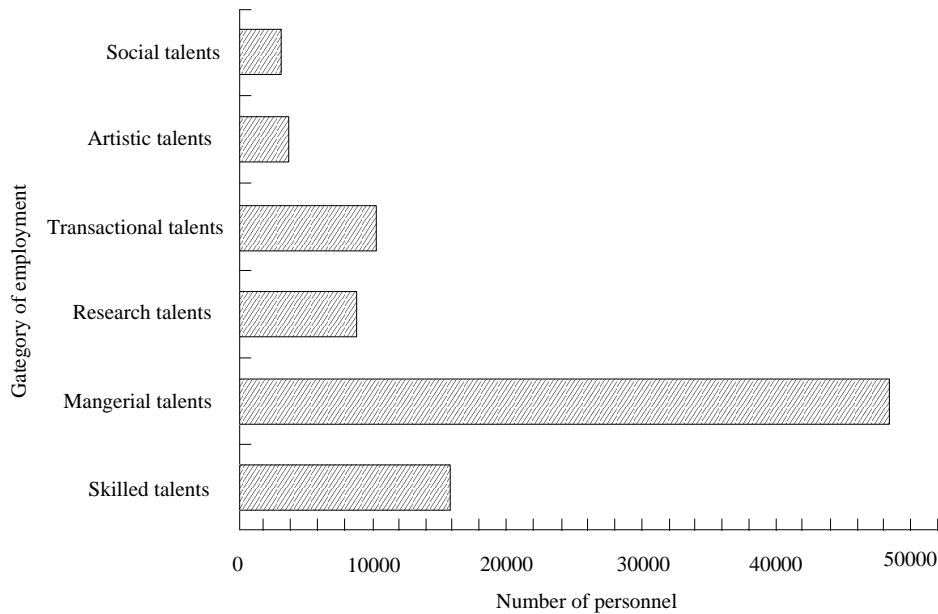


Figure 3. The number of personnel about category of employment

The prediction of talent demand refers to the prediction of the number of talent demand in a certain period of time in the future based on the analysis of historical data with the change trend of economic development. In order to facilitate analysis, this paper forecasts quarterly. Under the guidance of grey system theory, GM(1,1) grey prediction model is firstly adopted:  
Constructing an accumulation sequence  $X^{(1)}$

Table 1. Coefficient

Model	B	Standard error
Constant	-160.155	114.263
The desired profession	-.043	.023
Job demand	.985	.184

The model of talent demand in this city is as follows:  
 $Y = -0.43X_1 + 0.985X_2 - 160.155$

Let the total amount of sample data be  $m$  and the original data sequence be:

$$X^{(0)} = \{X^{(0)}(1), X^{(0)}(2), X^{(0)}(3), \dots, X^{(0)}(m)\}$$

On the basis of the original data sequence, the accumulation sequence is constructed and generated through accumulation:

$$X^{(1)} = \{X^{(1)}(1), X^{(1)}(2), X^{(1)}(3), \dots, X^{(1)}(m)\}$$

Table 2. Predict the potential talent demand of the city in the next three years

Occupational category	2018.09-2019.08	2019.09-2020.08	2020.09-2021.08
Skills	4209	3902	3621
Management	26409	5019	3420
Study	2499	2260	2146
Affair	1160	676	394

In which:

$$X^{(1)}(n) = \sum_{i=1}^n X^{(0)}(i), n = 1, 2, 3, \dots, m$$

Establish the following differential equation:

$$\frac{dX^{(1)}}{dt} + aX^{(1)} = \mu$$

Through the comparison of the accuracy of the results, it is found that if the prediction models are different, the errors of the prediction results are also different. Combining the grey prediction model with the regression prediction model, a prediction model with smaller relative errors can be obtained:

$$Y = \sum_{i=1}^N \rho_i Y_i, i = 1, 2, \dots, n$$

$$[a, \mu]^T = [B^T B]^{-1} B^T Y$$

Finally, the results of the talent demand combination forecasting model are as follows:

$$X^{(1)}_{(k+1)} = -153171.711 \times e^{(-0.0699 \times k)} + 159097.711$$

This model is a general model. In order to better predict the potential talent demand of a city in the next three years, we have also predicted the talent demand of different professions. The prediction results are as follows:

Art	1985	2370	2844
Social	522	360	248

## 5. Some Policy Suggestions on Talent Introduction

On the one hand, it is necessary to formulate a talent introduction policy according to the city's development situation and the actual demand for talents. It is essential for industries and fields that are vigorously developing to introduce high-quality talents. Only in this way can the city's development be effectively promoted by closely combining talents with industrial projects and focusing on the development of local advantageous industries and promising enterprises.

On the other hand, it is necessary to retain high-quality talents by improving the working environment, improving work welfare and establishing good facilities to create a good environment for attracting excellent talents to work in the field. The talents can really contribute to the

development of the city and promote the transformation and upgrading of the city.

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