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Talent demand and urban development in City A

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ARTICLE INFO

Article history

Received: 14 January 2020

Accepted: 17 January 2020

Published Online: 31 May 2020

Keywords:

BP neural network

Factor analysis

Analytic hierarchy process

ABSTRACT

The introduction of talent programs is one of the key programs in many cities in recent years. In order to “encourage and enrich the people and innovate the city”, cities such as Beijing, Shanghai, Wuhan, Chengdu, Xi’an and Shenzhen are using various attractive policies to compete for talents. Based on this, this paper uses BP neural network and analytic hierarchy process to model and analyze the talent demand of A-City and the development of the city.

1. Introduction

The introduction of talent programs is one of the key programs in many cities in recent years. In order to “encourage and enrich the people and innovate the city”, cities such as Beijing, Shanghai, Wuhan, Chengdu, Xi’an and Shenzhen are using various attractive policies to compete for talents. Talents are the driving force for urban innovation and development. They can learn better skills, make better products and master better management methods in a short time. At the same time, talent is also the main driving force for urban innovation diffusion, and innovation diffusion is achieved through the development of new technologies and technologies through high-quality talents. Today, companies typically recruit talent through the Internet, campus job fairs, open recruitment events, and local talent markets.

2. Analyze the Talent Needs of City A From Three Aspects

According to the data given in the annex, when analyzing the talent demand of “A-City Employment Market”, this paper stands on the perspective of expectant occupation, and analyses the employment demand and expectant education background of “A-City Employment Market” in all fields of “A-City” embodied in the annex.

In the annex, the background of talent demand in A city during the 36 months from 2015 to 2018 is given. From the perspective of employment demand, we analyze the total demand in various fields in the annex data and draw charts using MATLAB. Observe their trends.

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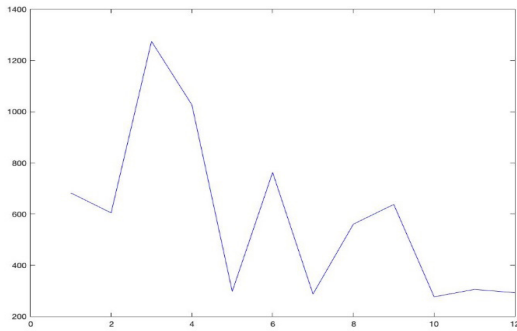


Figure 1. Quarterly Breakdown of Talents Demand in Computer Software

Take computer software as an example. As shown in Figure 1, the abscissa is given by the attachment for 36 months and 12 quarters, and the ordinate is the talent demand of computer software. Figure 1 shows that the demand for talents in the field of computer software tends to be stable. In the annex, the trend of change in the remaining 47 areas of A-City is basically the same as that in the field of computer software, which shows that the employment demand of A city tends to be stable and the development of A-City’s talent employment market tends to be mature.

In terms of the expected educational background, we assign 1, 2, 3, 4, 5, 6, 7, 8 and 9 points to the unrestricted degree, secondary school, technical secondary school, junior college, bachelor’s degree, master’s degree, doctor’s degree and MBA under the educational background. Using (1) formula, the scores of each field are calculated separately.

$$w = \frac{\sum x_i y_i}{\sum y_i} \tag{1}$$

After calculating the corresponding values of each sector each month, the work of calculating the average values of all the months given in the annex is carried out. By observing the calculated scores, the closer the scores are to “9”, the more highly educated talents are needed in this field. On the contrary, the smaller the score calculated, it shows that the field is absorbing talents with lower educational background.

Form 1. Expectations for each sector

Sector	Educational expectations corresponding to this sector
Science and technology	5.17
Education	5.06
Translation	5.24

...	...
Literature/screenwriting/writing	2.47
QMS/safety/environmental protection	2.07
Transportation service	1.86
Real property	1.75
Beauty and personal care	1.68

As shown in Form 1, science and technology, education and translation have the highest expectations, indicating that A-City needs highly educated personnel in the fields of science and technology, education and translation, while for the transportation industry, the service sector and other aspects, the requirements for academic qualifications are not high.

In fact, the higher the educational background, the better the talent needed in all fields. But for A-City, it may be that the city is not a key city, which makes the number of master’s degree, doctorate degree and master’s degree in the talent employment market of A city too small.

3. Establishment of A-City’s Practical Talent Demand Model

Assuming that the data in the “A-City Employment Market” is an ideal model, this paper establishes the actual talent demand model of A-City by looking for the influence rate of the employment situation of Chinese students on the talent demand of “A-City Employment Market”.

Based on the ideal talent demand model of A city, this paper studies the employment situation of Chinese students, taking the total recruitment enterprises, recruitment posts and recruited new people in each month in the appendix data as the basis.

By investigating the basic employment situation of the schools around the graduates by Liaoning Human Resources and Social Security Bureau in 2017, this paper conducts chi-square test to analyze the influencing factors of the employment situation of the graduates. According to the three dimensions of feasibility motivation, value evaluation motivation and self-expectation motivation, the standardized data of 11 indicators were selected in this questionnaire for factor analysis^[1].

It is found that the government’s attitude toward college graduates, whether they are in urban economic conditions, whether their families support going out to work, their physical condition, and whether they have professional skills have a greater impact on the feasibility motivation. Local employment policies for college graduates, perceptions of the urban contribution rate of college graduates and the ability of employment to demonstrate their skills have a greater impact on the motivation of value assessment. How-

ever, the expectation of annual employment income, the expectation of living standard after employment, and the expectation of enjoying employment urban social insurance have less influence on self-expectation motivation.

Based on this impact, the average employment rate of Chinese students is 91.6% by collecting relevant data. In other words, the actual talent demand model of A-City is 91.6% of the ideal model of talent demand in the A-City employment market.

4. Predicting and Analyzing Potential Talent Demand of A-City in the Next Three Years

Using the data given in the annex, statistical analysis was carried out by extracting recruiting companies, recruitment positions, and recruited new employees in each month of the total demand for talents in the city.

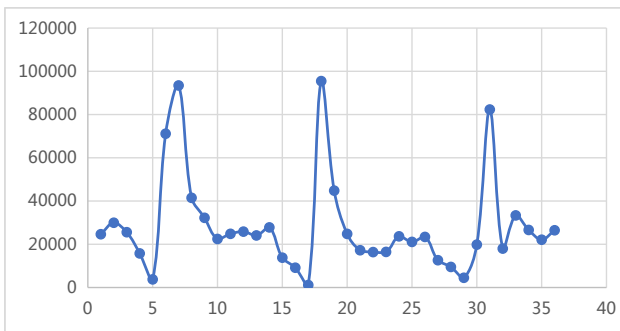


Figure 2. A-City's Talent Demand in Months

As shown in Figure 2, a monthly statistical chart of the number of employees recruited in A-City shows that the demand for talents in this city changes periodically.

According to the cyclical change of talent demand from 2015 to 2018 and the talent demand in the employment market of A-City from 2011 to 2012, this paper uses the method of BP neural network to forecast the talent demand of A-City in the next three years by using MATLAB.

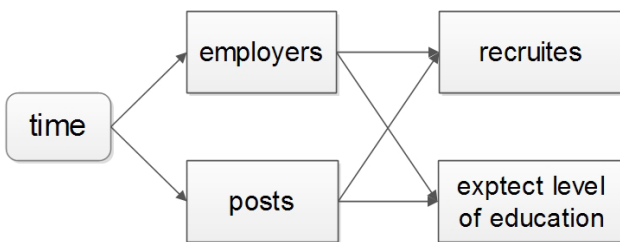


Figure 3. Three-layer BP Neural Network

In this paper, from 2011 to 2018 as the input layer of the BP neural network, recruitment enterprises and recruitment posts as the hidden layer, and recruitment volume and expected education level as the output layer of the BP neural network.

Form 2. Potential Talent Demand of A-City in the Next Three Years

Years	Talent Demand of A-City (Ten Thousands)
2019	30.56
2020	34.42
2021	41.71

The talent demand of A-City in the next three years is shown in Form 2. The potential demand for talent in the next three years is almost the same as that in the period from 2015 to 2018. However, the demand for talent is also affected by the city's GDP, the relevant government policies and the 13th Five-Year Plan's 100 major projects.

5. Infer the Possible Location of A City and the Development of Industry

Based on the above-mentioned statistical analysis of relevant data, it is found that the talent market in A-City is between 300,000 and 400,000. The employment figures of the cities in the first, second, third and fourth tier cities are collected using the employment data of the cities published by the Ministry of Human Resources and Social Security of the People's Republic of China, as shown in form 3. Combined with the number of talents in A city, it is found that the demand for talents in A-City is similar to that in China's fourth-tier cities.

Form 3. Employment in each city

First-tier city			Second-tier cities		
Beijing	Shanghai	Guangzhou	Xiamen	Hal Ice	Kunming
742.3	619	324	130.3	137.4	137.3
Third-tier city			Fourth-tier city		
Yangzhou	Tangshan	Baoding	Liaoyang	Xiangtan	Leshan
101.1	96.7	99.9	30	35.4	29.3

China's economic development has achieved remarkable achievements and has formed a certain scale of economic circles. China's current four economic circles are: the Pan-Pearl River Delta regional economy centered on the Pearl River Delta, Guangdong and the radiated Fujian; the Shanghai-Nanjing-Hangsu economic region dominated by the Yangtze River Delta, the Yangtze River estuary Shanghai as the center and then Jiangsu, Zhejiang; the Bohai Economic Circle, with Beijing and Tianjin as the center to radiate Hebei, Henan, Shandong; Northeast old industrial base, Heilongjiang, Jilin, Liaoning.

There are also China's emerging economic circles: the economic circle centered on Xinjiang Urumqi, the typical mineral resource regional economy; the economic circle centered on Hohhot, Inner Mongolia, typical mineral

resources and natural pasture-based post-regional economy; The economic circle centered on Xining in Qinghai, Lanzhou in Gansu, and Yinchuan in Ningxia, typical resource-driven economy; the economic circle centered on Shanxi Taiyuan, typical coal-type economy; the economic circle centered on Xi'an in Shaanxi, typical cultural tourism Type economy; economic circle centered on Zhengzhou, Henan Province, typical labor-type and transportation-type economy; the cultural economy centered on Sichuan and Chongqing, typical inland-type cultural economy; centered on Wuhan, Changsha, Nanchang and Hefei Economic circle, typical transportation convenience economy; economic circle centered on Kunming, Yunnan, border trade and tourism economy; North Bay Economic Circle with Guangxi as the center, typical marine resource-based economic circle; Haikou-centered economy Circle, tropical tourism and marine resource-based economic circle; economic circle centered on Lhasa, Tibet, climate tourism culture and economic circle.

Through statistical analysis of market demand in A-City, it is found that A-City has no industry demand in the fields of ocean, port, agriculture, mineral resources, etc. Therefore, it can be judged that A-City is a ship underdeveloped, low level of agricultural development, and no large amount of mineral resources. Inland city. Compared with the characteristics of China's economic circle, this paper believes that A-City is most likely to be located in central China, and it is most likely that A-City is located in the economic circle centered on Xi'an, Shaanxi Province, China.

In addition to the traditional industries, the talent demand of the A-City is mainly reflected in the fields of computer technology and manufacturing. So there is reason to believe that A-City is a emerging city. In the future, high-tech industries in the fields of computer and hardware manufacturing will flourish.

6. Provide Strategies for City Development and Talent Introduction in City A

The use of analytic hierarchy process to model and quantify the emerging employment trends of college students, participate in village officials exams, take civil service exams, start their own businesses, engage in resignation, and study abroad, leading to the diversification of the types of employment of college graduates. Through consulting the data, it is found that the five factors of social environment, natural environment, salary, personal interest and family pressure have greatly affected the employment tendency of college students.

Select five factors: social environment, natural environment,

salary, personal interest, family pressure as the criterion level; participate in village official examinations, take civil service examinations, start their own businesses, engage in resignation, study abroad as a program level; employment orientation as Target layer building model

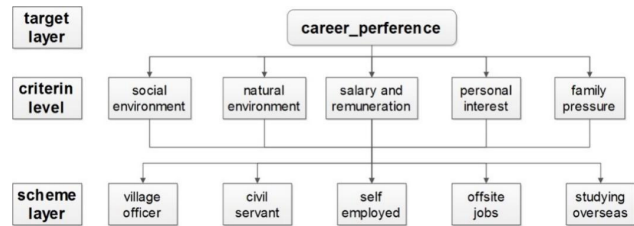


Figure 4. The hierarchical structure of college students' employment tendency

The paired matrix of the five factors of the criterion layer to the target layer is:

$$C = \begin{bmatrix} 1 & \frac{1}{2} & 4 & 3 & 3 \\ 2 & 1 & 7 & 5 & 5 \\ \frac{1}{4} & \frac{1}{7} & 1 & \frac{1}{2} & \frac{1}{3} \\ \frac{1}{3} & \frac{1}{5} & 2 & 1 & 1 \\ \frac{1}{3} & \frac{1}{5} & 3 & 1 & 1 \end{bmatrix} \quad (2)$$

Pairwise comparison matrix Maximum eigenvalue $\lambda=5.073$, the normalized eigenvector corresponding to the eigenvalue

$$\omega = \{0.263, 0.475, 0.055, 0.099, 0.110\} \quad (3)$$

then

$$CI = \frac{5.073 - 5}{5 - 1} = 0.018 \quad (4)$$

$$RI = 1.12 \quad (5)$$

Therefore

$$CR = \frac{0.018}{1.12} = 0.016 < 0.1 \quad (6)$$

Show C passed the consistency test.

Through calculation, the weights of participating in the village official examination, taking the civil service examination, starting their own business, engaging in leaving work, and studying abroad are respectively 0.346, 0.329, 0.401, 0.372, 0.456.

According to the results obtained by the analytic hierarchy process, A-City should support students to start their own businesses, leave their jobs, study abroad, and encourage them to participate in the examinations of village officials and civil servants in accordance with the principle of fully respecting graduates' career choices. This paper takes the development and talent introduction strategies of dozens of advanced cities in Shanghai, Nanjing, Hangzhou, Wuhan, etc. as examples, and proposes the following three suggestions for A-City:

(1) Students who stay in the local area can enjoy housing rent subsidies. For example, college graduates in Nanjing will enjoy subsidies for renting, with a doctoral degree of 1,000 yuan per person per month, a master's degree of 800 yuan per person per month, and a bachelor's degree (including senior workers and above) of 600 yuan per person per month. If the actual rent is lower than the subsidy standard, the actual rent subsidy will not exceed 36 months.

(2) Encourage college students to start their own business. For example, Hangzhou provides 50 square meters of work space for entrepreneurs in the Pioneer Park and rents are exempted for the first three years.

(3) Settled to give housing subsidies. For example, Changsha has given 60,000 yuan and 30,000 yuan to purchase housing subsidies for the first-time home purchases of full-time college graduates (excluding government and institutional personnel) who have settled in the city and work in this city.

7. Suggestions and opinions about IT professional training program

With the rapid development of the "Internet +" era, the demand for IT talents in enterprises and countries has also increased. The development of IT technology has profoundly affected the political, economic, military, and cultural aspects of various countries. The competition of IT technology has become an important part of national competition. The fundamental of IT technology competition lies in the cultivation of talents. The cultivation of high-quality IT talents has become the primary task of IT education in Chinese universities. Through the exploration and research on the talent training model of North China University of Technology and the national IT industry, the following suggestions are put forward to improve the quality of IT talent training in our school, meet the needs of IT talents at home and abroad, and improve the employment level of students.

In terms of curriculum construction, students should be the center. Teachers should assist and guide students

to motivate students to actively learn and create more opportunities for independent thinking and practice. Open and exploratory experiments should be conducted in the classroom so that students can integrate into the classroom and gain knowledge from practice. Moreover, some foreign countries have created a practical teaching model that combines industry and education jointly created by the IT industry, relevant government departments, and the education sector. If conditions permit, we can also adopt this method. In the planning of professional courses, it is necessary to focus on the characteristics of IT professional application-oriented personnel training, based on the principle of "thick foundation, strong application, and characteristics" and strong application ability, highlighting IT practice teaching and design in talents. The role of training to plan theoretical and practical teaching and graduation design curriculum systems to meet the needs of IT talent development.

For the cultivation of applied talents, the combination of schools and enterprises should be further strengthened. School-enterprise cooperation can't just stop sending senior students who have passed the enterprise audit to the company for training and internship. In order to make the enterprise requirements and the school teaching content closely integrated, so that more fresh students meet the enterprise standards, quickly integrate into the enterprise work, and save the enterprise training funds. The school-enterprise cooperation model should be innovated from the following aspects:

(1) The enterprise sets relevant courses in cooperative universities according to the production process.

(2) Establish scholarships for these courses.

(3) Enterprises can also regularly carry out project competitions synchronized with operations in colleges and universities, so that students can keep abreast of the latest technology trends.

(4) Regularly select students who have performed well in the course assessment and competition to enter the company's real production practice during the university's winter and summer vacations. In this way, we can promote the development of school-enterprise cooperation and deliver a steady stream of high-quality talents for enterprises^[5].

We should speed up the integration with internationalization, break through traditional concepts, and run international schools. As a government, we should give certain economic support and formulate corresponding policies to optimize the structure of educational resources and truly realize the internationalization of running schools. As a school, we should introduce advanced foreign teaching methods and professional training materials from interna-

tionally renowned IT vendors, provide students with the latest development platform, open IT professional English courses, require students to easily understand IT English materials, and use the English-language development software. The training of core teachers regularly arranges opportunities for teachers to learn new technologies and encourages teachers to lead students to participate in related business projects, schools should provide opportunities to increase the number of exchange students^[3].

For the individualized training of college students, we should teach students in accordance with their aptitude and orientation. We should adopt a hierarchical positioning teaching mechanism, set up multi-directional courses, improve the flexibility and practicability of the curriculum, and train special high-level IT talents to achieve "teaching in accordance with their aptitude and directional training". First, let students know every position in every section of the IT industry, and then clarify the direction they have learned. In addition to the basic compulsory courses, the relevant courses are purposefully selected. For students with different interests and abilities, set different professional training models, develop different learning plans, and maximize the potential of students.

The recent graduates entering the enterprise from the campus, how to quickly adapt to the needs of enterprises and society, is the main problem facing the employment of college students. Especially for IT students, development experience and practical ability are the best step to success in employment. With the continuous advancement of computer science and modern technology, the form of the information industry has also undergone major changes, and the requirements for the knowledge structure and innovation ability of computer professionals have gradually increased, so it is necessary to build up with the times. Undergraduate IT talent training mode is an important goal for the research and reform of computer science professional training system in China. We should aim at the cultivation of applied professionals, aim at market demand, and actively promote the coordination of schools and enterprises according to the professional characteristics of their own institutions, so that students can contact enterprises on campus, understand the business model and practical operation forms, and make students graduate. Can be integrated into the business as soon as possible.

8. Conclusion

Using BP neural network to analyze the potential talent demand in the next three years, BP neural network has strong nonlinear mapping ability; it has strong self-learning and self-adaptive ability. Using the idea of analytic hierarchy process to model and quantify the emerging employment tendencies of college students is convenient and practical. The analytic hierarchy process is a combination of qualitative methods and quantitative methods. Apply to the data adequately.

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