Establishment of Comprehensive Evaluation Model of the New Generation Migrant Workers' Employability

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Abstract Through literature research and expert interviews, we extract 10 variables influencing the new generation migrant workers' employability, and establish the comprehensive evaluation model of the new generation migrant workers' employability. Using factor analysis, we derive that the model includes three factors: skill literacy, relationship literacy and basic literacy. The weights of each factor are 0.580, 0.244 and 0.174 8, respectively. Skill literacy is affected by skill level, learning ability, career aspiration, ability to analyze problems, physical health status and other factors. Relationship literacy is affected by the sense of teamwork, interpersonal skills, social support and other factors. Basic literacy is affected by educational level, hardworking spirit and other factors. According to the results, we put forth the following recommendations to improve the new generation migrant workers' employability: strengthening the vocational skill training; coordinating the vocational education resources.

Key words The new generation migrant workers, Employability, Evaluation model

With the acceleration of the process of China's industrialization and urbanization, the transfer of rural surplus labor force is a problem that must be carefully addressed in the process of modernization. In a sense, issues concerning migrant workers have special social and historical status in China's modernization process, which is not only related to the transfer of surplus labor and farmers' income increase, but also related to the development of China's urban-rural integration and the rapid advance of China's modernization process[1]. The new generation migrant workers mainly refer to the rural migrant workers born after 1980. The number of China's new generation migrant workers is about 100 million, accounting for more than 60% of the total migrant workers, and accounting for nearly 50% of 230 million of workforces in China[2].

This shows that the new generation migrant workers increasingly play the role of the main force in the economic and social development. However, the key to making the new generation migrant workers effectively integrated into the city is to continue to enhance their employability, to meet the employment needs of enterprises, thus achieving their career development[3]. The scientific quantitative evaluation model of employability can offer important guarantee for the government and employers to provide suitable employment promoting policies and initiatives for the new generation migrant workers.

1 Research review

The "new generation migrant workers" is a concept unique in China, and there is no literature study on it overseas. As for employability, it began to be widely discussed from the late 20th century in the West[4-6]. The International Labor Organization (ILO) considers that employability is the ability of individuals to get job, make progress in the work, and respond to the changes in the work[7]. And domestic scholars generally believe that the employability of workers is the ability to acquire skills, find and retain existing jobs, and flow with the changing context.

The new generation migrant workers' employability is put forth for the special group of the new generation migrant workers. The new generation migrant workers are mainly engaged in some concentrated industries, such as manufacturing, services, *etc.* The jobs of production, processing, and service are the majority. Such groups account for more than 50% of the professional teams in the country, then their employment problem to some extent affects the improvement of the overall level of employment, and even affects the process of industrialization and urbanization, so finding the structure of factors influencing the successful employment of such groups, and the influence of various factors within the structure, is a meaningful topic.

Domestic attention to migrant workers' employability began in the late 1990s. From the perspective of intergenerational characteristics, social integration and social capital, Bai Xiaoyu conducted research on the new generation migrant workers' employability[8]. Li Xiaohong discussed how to enhance the new generation migrant workers' employability[9]. Zhou Qiren pointed out that the quality of migrant workers determines their employment opportunities[10].

Using Fugate's research framework, Zhang Xinling conducted qualitative analysis of migrant workers' employability[11]. By constructing a theoretical framework for research based on generalized perspective, Luo En'li discussed the macroeconomic policies of

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constraint mechanism of the new generation migrant workers' employability[12]. These studies are basically based on the precondition of migrant workers in the state of employment, and do not put forward mature assessment framework of the new generation migrant workers' employability[13]. The study conducts initial exploration in order to provide consulting, training and other public services for the new generation migrant workers' employment and provide instrumental support to the management departments.

2 Establishment of quantitative evaluation model of the new generation migrant workers' employability

2.1 Selection of evaluation elements Employability indicators can reveal the specific characteristics of the employment capacity, reflecting the overall situation, capacity characteristics and regularity of migrant workers' employability. Relevant indicators must have the following characteristics: quantified as far as possible, clear meaning, able to reflect the main features of things, easy to explain, dynamic.

Under the basic premise of the above 5 characteristics, through the analysis of characteristics and connotation of "the new generation migrant workers" and "employability", a series of indicators are selected, which can be closely related to the research object features and embody the relevant evaluation characteristics. Based on the domestic and foreign experts and scholars' views and communication with lots of small and medium-sized private enterprises and the service industry employers which employ migrant workers, 10 factors that affect the new generation migrant workers' employability are extracted as follows: educational level (X_1), physical health status (X_2), skill level (X_3), learning ability (X_4), ability to analyze problems (X_5), hardworking spirit (X_6), career aspiration (X_7), sense of team cooperation (X_8), interpersonal skills (X_9), social support (X_{10}).

2.2 KMO and Bartlett sphericity test There may be correlation between these 10 influencing factors, not conducive to analysis, so the factor analysis in the multivariate statistical analysis is used to reasonably reduce dimensionality, and find the potential variables that can dominate these observable variables. The questionnaire is designed around 10 influencing factors, and the survey content is the size of influence of each factor to employability. The judgment of the relative importance adopts 1 to 5 scale method. The survey objects are the small and medium-sized private enterprises and the service industry employers which employ a large number of migrant workers in Shandong Province as well as the migrant workers themselves. A total of 200 questionnaires were distributed and 196 questionnaires were valid, with response rate of 98%.

The statistical tool SPSS 16.0 is used to conduct factor analysis of valid questionnaires collected. KMO value is used to verify whether this sample is suitable as the standard value for the factor analysis. If KMO <0.5, it is inappropriate; if $0.5<\text{KMO}<0.6$, it is poor; if $0.6<\text{KMO}<0.7$, it is common; if $0.7<\text{KMO}<0.8$, it is moderate; if $\text{KMO}>0.8$, it is excellent. Bartlett sphere test is to test whether the correlation matrix is unit matrix, to illustrate whether the factor analysis is appropriate. If the value is large, it is suitable factor analysis.

Assumption 1: The correlation coefficient matrix is unit matrix.

KMO and Bartlett sphere test was conducted on 196 questionnaires collected. The results show that KMO value is 0.782, the approximate chi-square value is 588.718, and the degree of freedom is 45. The sphere test results show that under the null hypothesis that the correlation coefficient matrix is a unit matrix, the significance level observed is 0.000, indicating that there is linear relationship between these variables, thus rejecting the null hypothesis, suitable for factor analysis.

2.3 Model establishment and analysis After factor analysis, the total variance explained by various factors can be shown in Table 1. Rotated component matrix is shown in Table 2, and the factor score coefficient matrix is shown in Table 3.

Table 1 Total variance explained

Component	Initial eigenvalue		
	Total	% of Variance	Cumulative%
1	3.628	36.276	36.276
2	1.526	15.260	51.535
3	1.092	10.917	62.452
4	0.842	8.421	70.873
5	0.724	7.242	78.115
6	0.620	6.195	84.310
7	0.502	5.016	89.326
8	0.459	4.586	93.912
9	0.379	3.791	97.703
10	0.230	2.297	100.000

Table 1 shows that there are 3 with eigenvalue greater than 1, so 3 common factors can be extracted. Rotated component matrix of variance can be shown in Table 2.

Table 2 Rotated component matrix of variance

Variable	Component 1	Component 2	Component 3
Skill level	0.719	−0.278	0.100
Career aspiration	0.704	−0.109	−0.089
Learning ability	0.624	−0.283	0.004
Ability to analyze problems	0.612	−0.084	−0.071
Physical health status	0.599	−0.166	0.426
Sense of teamwork	−0.042	0.858	−0.015
Interpersonal skills	−0.408	0.812	−0.055
Social support	−0.314	0.779	−0.025
Educational level	0.143	−0.097	0.838
Hardworking spirit	−0.194	0.066	0.810

As can be seen from Table 2, in the first common factor, skill level, career aspiration, learning ability, ability to analyze problems and physical health status have a high load, thus the first common factor can be named skill literacy; in the second common factor, the sense of teamwork, interpersonal skills and social support have a high load, thus the second common factor can be named relationship literacy; in the third common factor, educa-

tional level and hardworking spirit have a high load, thus the third common factor can be named basic literacy. Table 3 lists the factor score coefficient matrix, for explaining the coefficient of influence of each variable on the corresponding common factors.

Table 3 Factor score coefficient matrix

Variable	Component 1	Component 2	Component 3
Educational level (X_1)	0.016	0.011	0.534
Physical health status (X_2)	0.271	0.098	0.246
Skill level (X_3)	0.318	0.055	0.026
Learning ability (X_4)	0.266	0.018	-0.032
Ability to analyze problems (X_5)	0.325	0.138	-0.074
Hardworking spirit (X_6)	-0.122	0.007	0.535
Career aspiration (X_7)	0.370	0.150	0.090
Sense of teamwork (X_8)	0.247	0.527	0.020
Interpersonal skills (X_9)	0.026	0.381	0.007
Social support (X_{10})	0.068	0.391	0.022

According to the factor score matrix, the expression of principal component score is constructed as follows:

$$F_1 = 0.016X_1 + 0.271X_2 + 0.318X_3 + 0.266X_4 + 0.325X_5 - 0.122X_6 + 0.370X_7 + 0.247X_8 + 0.026X_9 + 0.068X_{10}$$

$$F_2 = 0.011X_1 + 0.098X_2 + 0.055X_3 + 0.018X_4 + 0.138X_5 + 0.007X_6 + 0.150X_7 + 0.527X_8 + 0.381X_9 + 0.391X_{10}$$

$$F_3 = 0.534X\_0.246X_2 - 0.026X_3 + 0.032X_4 + 0.074X_5 + 0.535X_6 + 0.090X_7 - 0.020X_8 - 0.007X_9 + 0.022X_{10}$$

Through the weighting processing of the proportion of variance contribution rate of three principal components, the evaluation model of the new generation migrant workers' employability is derived as follows:

$$F = 0.5809F_1 + 0.2243F_2 + 0.1748F_3$$

The covariance matrix of factor score can be seen in Table 4.

Table 4 The covariance matrix of factor score

Component	1	2	3
1	1	0	0
2	0	1	0
3	0	0	1

As can be seen from Table 4, various factors are orthogonal, namely they are independent, and the model passes the test. Through the above analysis, we see that in the comprehensive evaluation of the new generation migrant workers' employability in China, skill literacy (including skill level, learning ability, career aspiration, ability to analyze problems and physical health status), plays the largest role, accounting for the weight of up to 0.5 809. This is closely linked to the characteristics of the object. For the employment of the new generation migrant workers, the level of education and employment expectation are higher than that of the older generation migrant workers, so the employment expectation depends on whether they have the skills required by the employers, whether they meet the job requirements, whether they have good physical health status. For skills requirement, it is the same as that of the previous generation migrant workers. Specifically, there are differences in the structure determining their skill literacy. The skill literacy factors of the new generation migrant workers are influenced by skill level, learning ability, career aspiration, ability to analyze problems and physical health status.

It is followed by relationship literacy, with the weight of 0.244 3. For the migrant workers, the access to employment information is mostly from mutual introduction between friends. In addition, the majority of the skills for their work are relatively easy to learn, so for the people with harmonious interpersonal relationship, the learning channels that they can take advantage of are richer. Coupled with strong social support (including family, friends and co-workers, *etc.*), their employability may be further strengthened.

Then it is the basic literacy, with the weight of 0.174 8. The educational level is the most principal aspect making the new generation migrant workers different from the older generation migrant workers. For them, most have received more than junior high school education, higher than that of the older generation, which determines their good learning base. In addition, the hardworking spirit is also a basic requirement on migrant workers' employability.

3 Conclusions and recommendations

This evaluation model is designed to promote the efficiency of the public policy for the new generation migrant workers' employment. In the practical operation, we can flexibly choose indicators and accordingly adjust the indicator weight based on this evaluation model. Through literature research and expert interviews, we extract 10 variables influencing the new generation migrant workers' employability, and establish the comprehensive evaluation model of the new generation migrant workers' employability. Using factor analysis, we derive that the model includes three factors: skill literacy, relationship literacy and basic literacy. According to the results, we put forth the following recommendations to improve the new generation migrant workers' employability:

(1) Strengthening the vocational skill training. The scale of China's vocational education is great, the proportion of the new generation migrant workers who can actually receive vocational education is still quite low; especially there is a serious shortage of workers who have received vocational education and training. National Federation of Trade Unions' research report on issues concerning the new generation migrant workers also pointed out that the new generation migrant workers are more inclined to do the work of certain technical content, but their skill level is not enough to adapt to the needs of the community, which is a key issue hindering the long-term stability of employment in the city.

(2) Coordinating the vocational education resources. The current vocational education resources include some education and training institutions sponsored by Human Resources and Social Security Ministry, the Ministry of Education and National Federation of Trade Unions, or some training institutions sponsored by various types of vocational schools and some private enterprises, lacking unified coordination and management. For the coordination of these

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Guizhou Province includes three levels: comprehensive evaluation index, secondary indicator and tertiary indicator. The formula for calculating evaluation system index of technological innovation performance of Guizhou Province: Step 1: according to original data, to eliminate influence of high absolute value gap due to difference of dimensions on analysis results, and reduce analysis error as far as possible, take natural log of original data of each indicator, calculate performance of each basic level indicator X_{ij} ($j=1, 2, 3, \cdots, m$), and then calculate $\sum_{j=1}^{m} x_{ij}$. Step 2: according to secondary indicator, i. e. the secondary indicator performance degree Y_i ($i=1, 2, 3, 4, 5, 6, 7$), calculate $Y_i \sum_{i=1}^{7} \sum \sum_{j=1}^{m} x_{ij}$. Step 3: use the formula of Rural Comprehensive Well-off Index RCWI $= Y_i \sum_{i=1}^{7} \sum \sum_{j=1}^{m} x_{ij}$ to calculate evaluation index for technological innovation performance of Guizhou Province.

5 Countermeasures and recommendations for evaluation indicator system for technological innovation performance in Guizhou Province

5.1 Enhancing supervision and evaluation Specifically, it is recommended to incorporate transformation of growth mode, conditions of technological innovation, output of technological innovation, improvement of environmental quality, and promoting social progress into annual statistical content. In addition, it should include input of provincial, city (prefecture and district), county (city, district and special district), industrial park, colleges and universities, scientific research institutes and enterprises in technological innovation and improvement of environmental quality into major content of annual evaluation of Provincial Party Committee and Provincial Government on cities (prefectures and districts), departments directly under the control of Provincial Government, and related enterprise and institutions.

5.2 Establishing and perfecting statistical work system At first, it should set up coordination mechanism for statistical statement department. Data of varied statistical statement should be strictly reviewed as per disciplines. Secondly, it should set up statistical indicator evaluation system. The setting of statistical indicators should proceed from the reality. Sci-tech indicators reflecting legal person entities should make clear concept and scope. Indicators of statistical object should be clear, to make indicators of regional technological innovation really provide services for close connection of science and technology with economy, as well as demands. Thirdly, acquisition of statistical data should adopt scientific statistical method.

5.3 Strengthening research and exploration on analysis methods After establishment of the evaluation indicator system for technological innovation performance of Guizhou Province, the key work should be application, conversion of achievements, and analysis of statistical data with the aid of evaluation indicator system. For current situations and development of technological innovation activities, it should carry out scientific research and analysis, and provide valuable evaluation analysis report. In actual analysis, it should apply scientific and reasonable analysis method, to raise working efficiency and improve quality of analysis report.

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career resources, working together to enhance the professional competence of the new generation migrant workers is an important task. It is recommended that various departments should take advantage of these educational resources with clear aim and evaluate the training effect, or conduct short-term or long-term follow-up survey on the training effect of migrant workers, to effectively enhance the employability of migrant workers.

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