Research on Employment Quality Evaluation and Countermeasures in the Context of the New Era: Based on the Empirical Evidence of Sichuan Province

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Abstract. In the context of the new era, one of the key issues to enhance the high-quality development of China's economy is how to promote high-quality employment. Based on the 2022 official statistics of 21 cities and states in Sichuan Province, this study constructs an indicator system to evaluate the quality of employment from four aspects, including employment environment, employability, wage income and labor protection. Through the factor analysis method, three key public factors, including economic development, public input and labor protection, were extracted, and the cities and states were rated accordingly. Subsequently, cluster analysis was applied to categorize these 21 cities and states into different categories, and specific countermeasures and suggestions for employment quality improvement were proposed.

Keywords: new era context, employment quality evaluation index system, factor analysis, cluster analysis.

1   INTRODUCTION

Employment, as the foundation of people's livelihoods, has become a basic guarantee for economic development in the context of China's high-quality economic development in the new era. Since the 18th National Congress of the Party, China has implemented a strategy that prioritizes employment, continuously expanding the scale of employment and striving to achieve the comprehensive development of workers and fuller, higher-quality employment[1].From the existing studies, scholars usually measure and study the employment quality from the aspects of employment group satisfaction, environmental safety, labor protection, etc., to explore the influencing factors of a certain type of employment group or a certain region to achieve high-quality employment. Among them, scholars such as Arestis and others analyze employment quality from the aspect of employment protection for permanent and temporary workers [2]; and scholars such as Peckham and others analyze different types of employment from the perspective of diversification of the nature of employment, which will have different impacts on the quality of employment [3]. And similarly, domestic scholars study whether the employment quality of new business groups such as digital economy and platform

economy is affected [4][5]. Although domestic and foreign scholars have measured and explored the quality of employment from various aspects, there are relatively few empirical studies on the overall quality of employment in the region. Therefore, this paper will be based on the author's province, based on the macro data of official statistics, to empirically analyze the quality of employment in 21 cities and states in Sichuan Province.

2   CONSTRUCTION OF HUMAN RESOURCES DEVELOPMENT EVALUATION INDEX SYSTEM

Employment is a multi-part process, so the evaluation of employment quality needs to be analyzed and studied from multiple perspectives. Most scholars' employment quality is usually measured and evaluated from several aspects, such as employment environment, employability, workers' compensation, labor protection and so on[6]. Then, combining the literature research of several scholars and the actual situation of Sichuan Province, this paper selects the four dimensions of employment environment, employment ability, wage income, and labor protection to evaluate the employment quality of Sichuan Province through the consideration of measurable calculation degree. The overall evaluation index system is detailed in Table 1.

Employment environment is the basis of labor force employment, including economic, political, social and cultural environment; this paper selects GDP per capita, GDP per capita index, registered unemployment rate, public security expenditure, the number of public library institutions, and education expenditure as the indicators for measurement. Employability determines the chances of the employed in the employment competition; this paper selects the number of people with tertiary education and above per 100,000 population, the proportion of employment in the tertiary industry, and the number of people with skill training as the indicators for measurement. Wage income is one of the important standards reflecting the quality of employment; this paper selects indicators such as the average wage of employed persons, personal income tax income and urban per capita disposable income to evaluate the relevant situation of wage income. Labor protection reflects the labor rights and welfare protection of workers in the region, as well as the social fairness and reasonableness of a region; this paper selects indicators such as the participation rate of unemployment insurance, social security and employment expenditures, and the rate of settlement of labor disputes, etc. to measure the situation of labor protection.

Table 1. System of indicators for evaluating the quality of employment.

target level	standardized layer	indicator layer
Quality of employment	Employment environment	X1 GDP per capita (yuan)
		X2 GDP per capita index (previous year = 100)
		X3 Registered unemployment rate (%)
		X4 Public Safety Expenditures (10,000 yuan)

Employability	X5 Number of public library institutions (number)
	X6 Education Expenditures (10,000 yuan)
	X7 Number of persons with tertiary and higher education per 100,000 population (persons)
	X8 Share of tertiary employment (%)
	X9 Number of people trained in skills (10,000 people)
Wage income	X10 Average wage of employed persons (yuan)
	X11 Individual Income Tax Revenue (10,000 yuan)
	X12 Urban disposable income per capita (yuan)
Labor protection	X13 Unemployment insurance participation rate (%)
	X14 Social Security and Employment Expenditures (10,000 yuan)
	X15 Labor Dispute Settlement Rate (%)

3 EMPIRICAL STUDY ON EMPLOYMENT QUALITY IN SICHUAN PROVINCE

This paper takes 21 cities and states in Sichuan Province as the research object, and uses factor analysis and cluster analysis to conduct empirical research on employment quality. The data are mainly from the 2022 Sichuan Statistical Yearbook, the Seventh National Population Census Bulletin of Sichuan Province, and the 2022 Statistical Bulletin on the Development of Human Resources and Social Security in Municipalities and States.

3.1 Factor Analysis

The appropriateness test. In this study, the original index data were firstly used SPSS statistical analysis software to do the one-sample Kolmogorov-Sminov test (NPar test), and the significance results showed that the index data of X1, X4, X7, X8, and X10 obeyed the normal distribution, and the data of the rest of the indexes had a certain bias, but all of them roughly obeyed the normal distribution in conjunction with the observation of the histograms; subsequently, these data were standardized processed and KMO and Bartlett's test were done, the results showed that the KMO value was 0.693, and Bartlett's test of sphericity indicated that the significance was 0.000; the above test indicated that these data were suitable for using factor analysis methods.

Table 2. KMO and Bartlett's test.

KMO Number of Sampling Suitability Measure.		.693
Bartlett's test of sphericity	Approximate chi-square	516.292
	degrees of freedom	105
	significance	.000

Common factor determination. After standardization, the public factor extraction was carried out to get the total variance explanation table (as shown in Table 3), and the results showed that three public factors (F1, F2 and F3) were selected. The variance explained ratio of the three public factors is 81.638%, i.e. greater than 80%, indicating that the three public factors can basically reflect the employment quality of the 21 cities and states.

Table 3. Total Variance Explained.

ingredient	Initial eigenvalue			Rotational load sum of squares		
	total	Percentage of variance	Cumulative %	total	Percentage of variance	Cumulative %
1	8.597	57.311	57.311	6.065	40.432	40.432
2	2.087	13.916	71.227	4.538	30.252	70.685
3	1.562	10.411	81.638	1.643	10.953	81.638
4	0.939	6.257	87.895			

In order to make the interpretation of the public factors clearer, this study uses the rotated component matrix and extracts the public factors using Kaiser normalization and maximum variance method. The results show that among the eight indicators, the public factor F1 loads more in X12, X8, X1, X13, X7, X9, X11, and X2 which are related to the economic level, so it is named as the economic development factor. The public factor F2 loads more on X5, X6, X14, X4 which are indicators related to governmental inputs, thus naming it as the public input factor. The public factor F3 loads more on X3, X10, X15 which are indicators in the category of labor relations, so it is named as the labor security factor. From the maximum variance method to rotate to get the component score coefficient matrix, according to the following F1, F2, F3 of the calculation of the public notice to calculate the score of each city and state respectively, and then use the variance contribution rate of the public factor as the calculation of the weight coefficient of the quality of employment to calculate the quality of employment of the composite score of the F, the specific ranking results are shown in Table 4.

$F1=0.235X1+0.156X2+0.089X3+0.044X4-0.110X5-0.001X6+0.148X7+0.242X8+0.083X9-0.036X10 +0.073X11+0.197X12+0.148X13+0.023X14+0.041X15$

$F2=-0.178X1-0.242X2-0.214X3+0.134X4+0.232X5+0.190X6-0.039X7-0.178X8+0.084X9+0.053X10 +0.099X11-0.094X12-0.022X13+0.162X14-0.132X15$

$F3=0.039X1-0.142X2+0.162X3-0.050X4+0.203X5-0.129X6+0.167X7-0.078X8-0.046X9+0.485X10-0.063X11+0.006X12+0.098X13-0.151X14+0.460X15$

$F=(0.40432F1+0.30252F2+0.10953F3)/0.81638$

Table 4. Employment Quality Score and Ranking of 21 Municipalities and States.

	F		F1		F2		F3	
	score	rankings	score	rankings	score	rankings	score	rankings
Chengdu	2.59	1	3.162	1	2.787	1	-0.058	12

Panzhihua	0.38	2	1.589	2	-1.602	21	1.404	3
Mianyang	0.18	3	0.302	6	0.101	8	-0.051	11
Aba	0.15	4	-0.121	11	-0.161	12	2.017	2
Deyang	0.09	5	0.718	3	-0.814	19	0.299	5
Leshan	0.07	6	0.357	5	-0.541	14	0.663	4
Ganzi	0.04	7	-1.382	20	1.082	3	2.396	1
Yibin	-0.04	8	-0.179	13	0.327	6	-0.514	15
Liangshan	-0.08	9	-1.517	21	1.746	2	0.149	8
Luzhou	-0.12	10	-0.457	17	0.758	4	-1.293	20
Meishan	-0.14	11	-0.237	14	-0.126	11	0.191	7
Nanchong	-0.16	12	-0.147	12	-0.092	10	-0.399	14
Guangyuan	-0.25	13	-0.110	9	-0.523	13	-0.042	10
Neijiang	-0.25	14	0.418	4	-1.264	20	0.056	9
Ya'an	-0.26	15	0.070	8	-0.586	16	-0.594	16
Zigong	-0.3	16	0.177	7	-0.548	15	-1.395	21
Bazhong	-0.32	17	-1.118	19	0.531	5	0.291	6
Dazhou	-0.32	18	-0.391	16	0.085	9	-1.199	19
Guangan	-0.37	19	-0.655	18	0.193	7	-0.881	17
Suining	-0.43	20	-0.121	10	-0.648	17	-0.964	18
Ziyang	-0.45	21	-0.356	15	-0.648	17	-0.964	18

Economic Development Score Analysis. The economic development factor F1 is the factor with a relatively high contribution rate of about 40.432%, which indicates that the economic development factor is a relatively important indicator of the quality of employment in the 21 cities and states of Sichuan Province. Economic development can reflect the current situation of material life in a region and affect the development of social culture in the region, thus it has the importance of "economic foundation determines the superstructure". In the F1 score of economic development factor, Chengdu city scores far ahead, Panzhihua also performs better, Deyang, Neijiang, Leshan, Mianyang also score higher, and economic development is slightly higher than other cities and states accordingly. On the contrary, Bazhong, Ganzi and Liangshan have low scores.

Public Input Score Analysis. The contribution of the public input factor F2 reaches 30.252%, which is slightly lower than that of the economic development factor F1, but the degree of importance attached by the government to employment policy, economy, education and training usually affects the quality of employment. Employment quality tends to be higher in regions where the government pays attention than in regions where

it does not. Chengdu still leads in the public input factor F2 score, indicating that economic development and public input are positively correlated to some extent. However, the degree of government attention is the key factor. Liangshan and Ganzi, which follow closely behind, have higher scores, suggesting that they are higher than other municipalities in terms of public input. Although these two city-states have the lowest scores in the economic development factor F1, they invest more in public input, proving that they attach great importance to the local employment situation and try to promote local economic development by improving the quality of employment. In contrast, Panzhihua has the lowest public input score, but is second only to Chengdu in economic development score, which proves that economic development and public input need to be highly emphasized by the government if they are to be positively correlated.

Labor Security Score Analysis. The contribution rate of labor security factor F3 is 10.953%, ranking last among the three factors. However, labor security is still an important indicator of employment quality because it reflects the condition of the labor environment in which the employed person lives and whether the labor rights and interests are well protected. The scores show that Ganzi, Aba and Panzhihua are ahead of other cities and states in terms of labor security. In addition, Leshan, Deyang, Meishan, Bazhong and Liangshan also perform well in terms of labor security and labor rights and interests maintenance. Although Chengdu is far ahead in terms of economic development and public investment, it is slightly behind the previous cities and states in terms of labor security, which suggests that Chengdu needs to continue to work hard on labor security.

Composite Score Analysis. The total score F is derived by weighting and combining the scores of the 21 municipalities and states in Sichuan Province, and is used to comprehensively assess the employment quality of these 21 municipalities and states. The top five cities and prefectures in the overall score are Chengdu, Panzhihua, Mianyang, Aba and Deyang, which indicates that the employment quality of these five cities and prefectures is at a high level in Sichuan Province. Among them, Chengdu, Panzhihua and Deyang are in the top five in public factors F1, F2 and F3, while Aba jumps to the top five in the overall score because of its leading position in public factor F3. It is worth noting that Mianyang, although it is not in the top five in public factors F1, F2 and F3, is ranked third in the overall score ranking, which indicates that it has achieved a balance in economic development, public inputs and labor security, and has performed relatively well.

3.2   Cluster Analysis

After factor analyzing the indicator data of each city and state in Sichuan Province, the employment quality of each city and state is measured with the aid of cluster analysis method. By clustering members of the results shown in Table 5, the 21 cities and states can be divided into 4 categories. The first category is leading employment quality areas,

with only Chengdu showing advantages in economic development and public investment; the second category is higher employment quality areas, with only Panzhihua leading other cities and states as a whole, but slightly behind Chengdu; the third category is average employment quality areas, including 17 prefectural-level cities other than Chengdu, Panzhihua, and the three national minority autonomous prefectures; and the fourth category is ethnic employment quality areas, including the three ethnic minority autonomous prefectures.

Table 5. Cluster membership table.

city	5 clusters	4 clusters	3 clusters	2 clusters
Chengdu	1	1	1	1
Panzhihua	2	2	2	2
Mianyang	3	3	3	2
Aba	4	4	3	2
Deyang	3	3	3	2
Leshan	3	3	3	2
Ganzi	4	4	3	2
Yibin	3	3	3	2
Liangshan	4	4	3	2
Luzhou	3	3	3	2
Meishan	3	3	3	2
Nanchong	3	3	3	2
Guangyuan	3	3	3	2
Neijiang	3	3	3	2
Ya'an	3	3	3	2
Zigong	3	3	3	2
Bazhong	5	3	3	2
Dazhou	3	3	3	2
Guang'an	3	3	3	2
Suining	3	3	3	2
Ziyang	3	3	3	2

4   CONCLUSIONS AND RESPONSES

For the first category, Chengdu, as the capital city of Sichuan Province, has reached the forefront of economic development in China. According to the above analysis, Chengdu has a high level of economic development and relatively high public investment, but labor security, especially the construction of harmonious labor relations, still needs to be strengthened. In this regard, Chengdu can take advantage of Xindu District's

status as a national pilot for comprehensive reform of harmonious labor relations to strengthen district-to-district and inter-district cooperation, optimize the governance of labor relations, and achieve the goal of extending harmonious labor relations to each and every worker.

The reason Panzhihua is separately classified as a second category city is that its scores on the three public factors of economic development, public inputs and labor security are unbalanced, but it also presents a higher overall employment quality. In terms of economic development, Panzhihua has long been located in the lower end of the economic development rankings in Sichuan Province, but factors such as GDP, educational attainment, skills training and disposable income per capita are taken into account in this paper to synthesize the level of economic development. As a result, Panzhihua has shown more effort in these areas than other cities and states. Panzhihua needs to strengthen public investment, especially in public cultural accessibility, such as increasing spending on education, social security, and employment, including building multimedia facilities to improve the digitization of education, improving employment policies, and increasing subsidies for all types of employment.

In the third category, the cities with the highest overall scores are Mianyang, Deyang and Leshan. Despite the imbalances and insufficiencies in economic development, public investment and labor security, these cities ranked second only to Chengdu and Panzhihua in terms of employment quality. This situation requires these cities to identify their own weaknesses and take targeted measures: first, cities that are weak in economic development should increase support for local pillar industries, stabilize local talents and absorb foreign talents by expanding the scale of employment and improving the treatment of skilled and professional talents. Secondly, for cities that are weak in public investment, they should deeply understand the local cultural and educational needs and improve the cultural and educational hardware facilities. Finally, for cities with weak labor security, they need to optimize the social security system and increase the coverage rate, as well as focus on the management of harmonious labor relations and promote the development of healthy labor-management relations.

The three autonomous prefectures in the fourth category all scored in the upper middle range in the factor analysis statistics, showing that the quality of employment in the three places is higher than that in many prefecture-level cities. However, the scores of the three places in terms of economic development are in the lower middle or even the lowest position, mainly due to the complex topography and transportation bottlenecks caused by their geographic locations, which limit their economic construction and development. Therefore, if the local economic development can be improved, the quality of employment will be significantly enhanced. To this end, the following three measures can be considered. First, it can focus on the development of tourism industry according to the local situation, make full use of the geographical environment, improve the tourist attractions and optimize the tourism additional industry. Secondly, full consideration should be given to local production characteristics, focusing on the development of animal husbandry and its additional industries. Finally, it should increase the investment in infrastructure construction and optimize the transportation so as to facilitate the smooth transportation of tourists and agricultural products.

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