

# Research on Total Factor Productivity of Chengdu-Chongqing Urban Agglomeration Based on DEA-Malmquist Index\*

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**Abstract**—In recent years, the state has proposed development models based on urban agglomerations, such as the Beijing-Tianjin-Hebei urban agglomeration, the Yangtze River Delta urban agglomeration, the Guangdong-Hong Kong-Marco Greater Bay Area, and the Chengdu-Chongqing urban agglomeration. The paper is based on the DEA-Malmquist index method. By empirical analysis of the total factor productivity of the urban agglomerations, it is mainly concluded as follows: first, the total factor productivity of Chengdu-Chongqing urban agglomeration increased by 0.8% per year during 2006-2016. The Total Factor Productivity Index showed volatility and reached a wave bottom of 0.878 during 2008-2009 and a peak of 1.163 during 2010-2011. Through this series of fluctuations, it can be found that changes in total factor productivity are closely related to the changes in technological progress and scale efficiency. Second, there are 9 cities with improved total factor productivity accounting for 56.25% of the total sample. However, the technical improvement between the nine cities is not balanced. The city with the largest improvement in the total factor productivity index has reached 8.5%, and the largest decline has been -5.2%. Only three cities have achieved technological progress and improved technological efficiency. It accounts for 18.75% of the total number of samples, and there is still a distance from the general improvement of the technical level of Chengdu-Chongqing urban agglomeration. At the same time, this paper also finds that for cities in Chengdu-Chongqing urban agglomeration where the efficiency of total factor technology has not improved, technical efficiency and technological progress have negative effects. The double reverse effect makes the TFP index lower than 1.

**Keywords**—DEA; Malmquist index; total factor productivity; Chengdu-Chongqing urban agglomeration

## I. INTRODUCTION

Economic growth is the primary consideration of a country or region. Many countries and regions use economic growth to talk about heroes. There are many indicators for measuring economic growth, such as total GDP, per capita disposable income, and Gini coefficient. According to economic theory, economic growth mainly comes from three

factors: capital, labor, and technological progress. The Total Factor Productivity (TFP) referred to in this paper is the additional productivity achieved by the input of various factors of production. That is, the measure removes capital and labor and can be used to explain the increase in output brought about by technological advancement, increased productivity, and scale of production.

After reviewing the literature, most of the objects studied through the total factor productivity index are the whole country, province, and provincial capital city. However, the research on the development of urban agglomeration through total factor productivity is still relatively rare. This paper measures the development status of Chengdu-Chongqing urban agglomeration through the measurement of total factor productivity.

## II. RESEARCH STATUS AND METHOD

### A. Research Status

In the existing literature on the analysis of total factor productivity, from the research method, Solow residual method (1957) [1] is one of the more commonly used methods. The main idea is to subtract the growth rate of the input variable by calculating the total production function, and the difference obtained represents the growth of total factor productivity. Mankiw et al (1992) [2] used the extended Solow model to quantitatively analyze the panel data of 195 countries in 1960-1985 for 26 years, and to explore the decisive factors affecting the economic growth differences of various countries by comparing the data. Studies have shown that capital and labor, that is, material and human resources, are important factors affecting the economic gap between countries, and total factor productivity is negligible here. Miller and Upadhyay (2002) [3] collected panel data of 83 countries in the 60s, 70s, and 80s for 30 years, and calculated the total factor productivity index of each country, which is based on the two factors of trade openness and human capital. For further analysis, the article finds that the higher the degree of trade openness in these 83 countries, the higher the total factor productivity index can be, and the degree of influence of human capital factors in each country is very different, and some countries

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are promoting. And some countries are the opposite. Kumar and Russell (2002) [4] used the DEA and total decomposition methods to analyze the sources of economic growth in 57 countries during the 25-year period from 1965 to 1990. The results show that capital deepening is the main driver of output growth and cross-country differences. Kankana Mukherjee (2001) [5] started from the data envelopment method, measured and studied the total factor productivity of large commercial banks in the United States, and independently analyzed the effects of the three parts of total factor productivity and productivity growth. The production frontier function method is also an important method to study the total factor productivity. Inmaculada Alvarez-Ayuso et al. (2011) [6] measured the total factor productivity of various industries in Europe according to this method, and at the same time, the possible factors affecting the TFP value. A detailed analysis shows that human capital promotes the growth of total factor productivity, and technological progress is one of the main factors for the growth of total factor productivity. Liu Bingyan et al. (2009) [7] analyzed the dynamic changes of urban total factor productivity in 196 major cities in China during 1990-2006 on the basis of Malmquist index method and DEA model. The study found that during the period 1990-2006, urban total factor productivity increased by 2.8%. The main source was technological improvement, and technological efficiency changes played a drag role.

### B. Research Method

Data Envelopment Analysis (DEA) is a nonparametric, stochastic frontier analysis. This method can allow the research object to have a technical inefficiency state, and does not need to assume any form of production function, nor does it need to set estimation parameters. It is suitable for various forms of input and output, and has high practicability. Among them, the Malmquist index based on the DEA model is the most common. The first is to calculate the distance function by DEA, and then calculate and decompose the Malmquist index by the distance function. The distance function can compare the production techniques of multi-input and multi-output under unconstrained conditions, analyze the change caused by the small change and decrease of the input vector under the given output vector, and use the input distance function to characterize the technical features. The Malmquist Productivity Index is based on the benchmark technology. The Technology T is the reference. The Malmquist indices for the t and t+1 reference technologies are:

$$M^t(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{D^t(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)}$$

$$M^{t+1}(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^{t+1}(x^t, y^t)}$$

Wherein,  $(x^{t+1}, y^{t+1})$  and  $(x^t, y^t)$  represent the input and output vectors of t+1 and t, respectively.  $D^{t+1}(x^{t+1}, y^{t+1})$  and  $D^t(x^{t+1}, y^{t+1})$  is t+1; given the input-output combination  $(x^{t+1}, y^{t+1})$ , the distance function with reference to technique T+1 and technique T,  $D^{t+1}(x^t, y^t)$  and  $D^t(x^t, y^t)$  is

the distance function of the t-phase input-output combination  $(x^t, y^t)$  with respect to the two-stage technical front. According to the above four distance functions, the Malmquist index of the productivity change from t to t+1 can be further obtained as follows:

$$M^t(x^{t+1}, y^{t+1}, x^t, y^t) = \sqrt{\frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^{t+1}(x^t, y^t)} \times \frac{D^t(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)}}$$

Further decomposition can be obtained:

$$M^t(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)} \sqrt{\frac{D^t(x^{t+1}, y^{t+1})}{D^{t+1}(x^{t+1}, y^{t+1})} \times \frac{D^t(x^t, y^t)}{D^{t+1}(x^t, y^t)}}$$

$$= Effch \times Techch$$

In the above formula, the first part is technical efficiency (denoted as Effch), and the second part is the rate of technological progress (denoted as Techch). Decomposing Effch again can yield pure technical efficiency changes (denoted as Pech) and scale efficiency changes (denoted as Sech). Then there are:

$$M^t(x^{t+1}, y^{t+1}, x^t, y^t) = Techch \times Effch = (Pech \times Sech) \times Techch$$

Therefore, the decomposition of the Malmquist Productivity Index is as follows ("Fig. 1"):

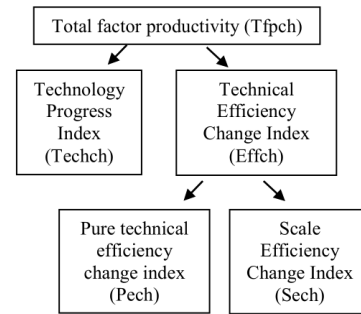


Fig. 1. Malmquist productivity index exploded view.

## III. AN OVERALL ANALYSIS OF THE TOTAL FACTOR PRODUCTIVITY OF CHENGDU-CHONGQING URBAN AGGLOMERATION

### A. Analysis on the Trend of Total Factor Productivity of Chengdu-Chongqing Urban Agglomeration

Chengdu-Chongqing urban agglomeration (including one municipality of Chongqing, one provincial capital city of Chengdu and 14 prefecture-level cities) analysis of the trend of total factor productivity is based on input-orientated measures, using DEAP 2.1 software to obtain The total factor productivity and index decomposition results of Chengdu-Chongqing urban agglomerations from 2006 to 2016 are as shown in "Table I" and "Fig. 2".

TABLE I. TABLE-STYLE TOTAL FACTOR PRODUCTIVITY INDEX (TFPCH) DECOMPOSITION OF CHENGDU-CHONGQING URBAN AGGLOMERATION

Year	Effch	Techch	Pech	Sech	Tfpch
2006-2007	1.042	1.023	1.044	0.999	1.066
2007-2008	1.048	0.973	1.045	1.002	1.02
2008-2009	1.057	0.83	1.057	1	0.878
2009-2010	0.999	1.08	0.999	1.001	1.079
2010-2011	0.989	1.176	0.993	0.995	1.163
2011-2012	0.98	1.026	0.981	0.999	1.005
2012-2013	1.003	0.964	0.992	1.011	0.967
2013-2014	0.97	0.993	0.962	1.008	0.963
2014-2015	0.959	1.014	0.982	0.976	0.972
2015-2016	0.989	1.005	0.977	1.012	0.994
mean	1.003	1.005	1.003	1.000	1.008

<sup>a</sup> Note: Effch represents the technical efficiency change index, Techch represents the technological progress index, Pech represents the pure technical efficiency change index, Sech represents the scale efficiency change index, and Tfpch represents the total factor productivity index.

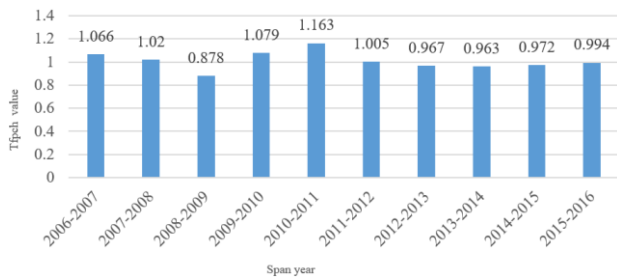


Fig. 2. Chengdu-Chongqing urban agglomeration total factor productivity index (Tfpch) distribution.

From "Fig. 2", the total factor productivity index (Tfpch) value of 2006-2009 is gradually decreasing. In 2008-2009, the total factor productivity index (Tfpch) is 0.878, which is the lowest value in a decade, and the next year is 2009-2010. The Factor Productivity Index (Tfpch) began to rise and peaked at 1.163 in 2010-2011. After the period of 2011-2016, it stabilized, but there was a slight decline and rebound.

It can be seen from "Table I" that the average factor of the total factor productivity index (Tfpch) in 2006-2016 is 1.008, indicating that the total factor productivity of Chengdu-Chongqing urban agglomeration is between 0.8% in 2006-2016. Growth has a positive effect on total factor productivity. This result is the result of a combination of technological advancement (Techch) and technological efficiency change (Effch). Among them, the Technology Progress Index (Techch) increased by an average of 0.5% per year, and the Technical Efficiency Change Index (Effch) increased by an average of 0.3% per year. After decomposition, the pure technical efficiency change index (Pech) dynamic average annual increase of 0.3%, scale efficiency change index (Sech) is flat on average every year. It can be seen that the overall technological progress index (Techch) and technical efficiency index (Effch) of Chengdu-Chongqing urban agglomeration have been improved, and the total factor productivity index (Tfpch) has also been improved.

By observing the dynamic evolution characteristics of the annual total factor productivity index (Tfpch) and further in-depth analysis, the total factor productivity change index

(Tfpch) and its decomposition of the Chengdu-Chongqing urban agglomeration during 2006-2016 can be obtained:

- The Total Factor Productivity Change Index (Tfpch) for 2006-2007 is 1.066, which is an increase of 6.6%. The Technology Progress Index (Techch) and the Technical Efficiency Index (Effch) have an important impact on this increase process, but scale efficiency change index (Sech) lacks motivation, which pulls down the promotion of the technical efficiency index (Effch).
- The Total Factor Productivity Change Index (Tfpch) for 2007-2008 is 1.02, which is an increase of 2%. The specific reason is that the Technical Efficiency Index (Effch) has a pull-up effect on this increase process, but the Technology Progress Index (Techch) is less than 1, resulting in a pull-down effect.
- The Total Factor Productivity Change Index (Tfpch) for 2008-2009 is 0.878, down 12.2%, the lowest value of the Tfpch index in the past decade, and the Technology Progress Index (Techch) decreased by 17%, affecting this decline process seriously.
- Compared with the previous year, the total factor productivity change index (Tfpch) in 2009-2010 increased sharply from negative to 7.9%, among which the Techch Index played a positive role;
- The 2010-2011 Total Factor Productivity Change Index (Tfpch) reached a peak of 1.163, an increase of 16.3%. Intuitively, this time the rise is the technology advancement index (Techch) has greatly promoted. However, the Technical Efficiency Index (Effch) has declined.
- During the period of 2011-2016, the Tfpch index stabilized, but there have also been small declines and rebounds.

B. Analysis of the Distribution Characteristics of Chengdu-Chongqing Urban Agglomeration Efficiency

Through the analysis of the technical efficiency changes of Chengdu-Chongqing urban agglomeration (including pure technical efficiency and scale efficiency change) and the distribution of technological progress, it is more clear to understand the influence and effect of technological efficiency and technological change on the change of total factor productivity, which is conducive to clear The future development of Chengdu-Chongqing urban agglomeration (see "Table II" and "Table III").

TABLE II. DISTRIBUTION CHARACTERISTICS OF CHENGDU-CHONGQING URBAN AGGLOMERATION

city	effch	techch	pech	sech	tfpch
Chongqing	0.990	1.052	1.000	0.990	1.042
Chengdu	1.000	1.085	1.000	1.000	1.085
Zigong	1.002	0.946	1.000	1.002	0.948
Luzhou	0.988	0.972	0.991	0.997	0.961
Deyang	0.994	1.006	0.996	0.998	1.000
Mianyang	1.000	1.019	1.000	1.000	1.019

city	effch	techch	pech	sech	tfpch
Suining	0.989	1.041	0.990	0.999	1.029
Neijiang	1.015	0.952	1.020	0.996	0.966
Leshan	1.022	1.032	1.029	0.993	1.055
Nanchong	1.018	0.992	1.002	1.015	1.010
Meishan	1.004	1.032	1.003	1.001	1.036
Yibin	1.018	0.960	1.005	1.013	0.978
Guang'an	1.005	0.972	1.006	0.999	0.977
Dazhou	0.997	1.017	1.003	0.994	1.014
Ya'an	1.009	1.036	1.000	1.009	1.045
Ziyang	0.999	0.975	1.000	1.000	0.974
mean	1.003	1.005	1.003	1.000	1.008

a. Note that all Malmquist index averages are geometric means

TABLE III. STATISTICS ON THE DISTRIBUTION OF THE MEAN VALUE OF THE TOTAL FACTOR PRODUCTIVITY OF CHENGDU-CHONGQING URBAN AGGLOMERATION

Indicator	Min	Max	Mean	Standard deviation	No of cities greater than 1	Proportion (%)
effch	0.988	1.022	1.003	0.010763	8	50.00
techch	0.946	1.085	1.005	0.040185	9	56.25
pech	0.990	1.029	1.003	0.009642	7	43.75
sech	0.990	1.015	1.000	0.006801	5	31.25
tfpch	0.948	1.085	1.008	0.038898	9	56.25

The highest improvement in total factor productivity index (tfpch) is in Chengdu, which is 8.5%, and the largest decline is in Zigong, which is -5.2%. The difference in total factor productivity index (tfpch) among cities is large, indicating the improvement of technology is uneven and the differences between regions are large of the Chengdu-Chongqing urban agglomeration. According to "Table III", there are 9 cities, the total factor productivity index (tfpch) has improved, and at the same time, 9 cities have achieved improvements in the techch index, accounting for 56.25%; 8 cities with improved technical efficiency (effch), accounting for 50 %; there are 7 cities with improved pure technical efficiency (pech), accounting for 43.75%; 5 cities with scale efficiency (sech) increase, accounting for 31.25%. For the Chengdu-Chongqing urban agglomeration as a whole, the economic growth mode still needs further improvement and adjustment. For the cities with lower tfpch index, this means that technological progress and technological efficiency have not formed a general atmosphere. The road to economic development of Chengdu-Chongqing urban agglomeration faces numerous opportunities and challenges.

TABLE IV. DECOMPOSITION OF THE TOTAL FACTOR PRODUCTION INDEX OF CHENGDU-CHONGQING URBAN AGGLOMERATION

Indicator	No	Indicator	No	Indicator	No	Indicator	No
Tfpch>1	9	Effch>1	8	Tfpch≤1	7	Effch≤1	8
Effch>1	8	Pech>1	7	Effch≤1	8	Pech≤1	9
Techch>1	9	Sech>1	5	Techch≤1	7	Sech≤1	11
Effch>1 and Techch>1	3	Pech>1 and Sech>1	3	Effch≤1 and Techch≤1	2	Pech≤1 and Sech≤1	7

a. unit: pcs

According to "Table IV", the total factor productivity index of the Chengdu-Chongqing urban agglomeration is refined and decomposed. It can be seen that in the 9 cities

with improved total factor productivity, the technical efficiency has improved to 8 cities. Among the 8 cities with improved technical efficiency, 6 cities have achieved improvements in pure technical efficiency, and 5 cities have achieved scale efficiency improvements, and both have been upgraded to 3 cities.

From the data, in the 9 cities where the total factor productivity index has improved, there are 8 cities with improved technological progress efficiency indicators, and there are also 3 cities that have achieved technological progress and technological efficiency changes, but in the sample of decision-making units, the proportion is only 18.75%, which is still a long way from the general improvement of the technical level. Correspondingly, in the 7 cities where the total factor productivity index (tfpch) has not improved, 2 cities have been negatively affected by the technical efficiency change (effch) and the technological progress index (techch), respectively Ziyang and Luzhou. For cities such as Deyang, Luzhou and Suining, where the technical efficiency (effch) has not improved, it is also accompanied by an unimproved scale efficiency index (sech) and pure technical efficiency (pech) (index≤1).

### C. Analysis of Urban Individual Characteristics and Types of Chengdu-Chongqing Urban Agglomeration Efficiency Change

Among the 16 cities in the Chengdu-Chongqing urban agglomeration, the largest improvement in the total factor productivity index was in Chengdu, which reached an average annual growth rate of 8.5%. The biggest decline was Zigong, which reached -5.2%. The research examined the dynamic efficiency changes of each city from the perspective of total factor production efficiency and improvement path. Combined with the distribution of total factor productivity index, the research divided the cities into four types: first, total factor productivity optimization, Effch >1 and Techch >1; second, Technical efficiency change effort type, Effch ≤ 1 and Techch >1; third, technological progress effort type, the index setting standard is Effch >1 and Techch ≤ 1; fourth, technical efficiency change and technological progress work together, the indicator setting standard is Effch ≤ 1 and Techch ≤ 1. Based on this standard, 16 cities in the Chengdu-Chongqing urban agglomeration were classified and the results derived are as shown in "Table V".

TABLE V. DIFFERENT TYPES AND IMPROVEMENT PATHS OF TOTAL FACTOR PRODUCTION EFFICIENCY IN CHENGDU-CHONGQING URBAN AGGLOMERATION

Classification and improvement path	Range of indicators	City
Total factor productivity optimization	Effch>1 and Techch>1	Leshan, Ya'an, Meishan
Technical efficiency change effort	Effch≤1 and Techch>1	Chengdu, Chongqing, Suining, Mianyang, Dazhou, Deyang
Technological advancement	Effch>1 and Techch≤1	Nanchong, Guang'an, Yibin, Neijiang, Zigong
Technological efficiency changes and Technological progress	Effch≤1 and Techch≤1	Ziyang, Luzhou



#### IV. CONCLUSION AND POLICY RECOMMENDATIONS

##### A. Conclusion

This paper uses the Malmquist index method based on DEA model to analyze the dynamic changes of total factor productivity in 16 cities in Chengdu-Chongqing urban agglomeration from 2006 to 2016. The research results are as follows:

Firstly, during 2006-2016, the total factor productivity of Chengdu-Chongqing urban agglomeration increased at an average rate of 0.8% per year, but the technical efficiency changes were relatively small in terms of decomposition. During the eleven years, the total factor productivity index showed the evolution characteristics of “decline-valley-recovery (peak)-slow decline-slow rise-stable” and reached the bottom of 0.878 in 2008-2009, reached the peak of 1.163 in 2010-2011. Through this series of fluctuations, it can be found that changes in total factor productivity are closely related to changes in technological progress and scale efficiency.

Secondly, through the analysis of the technical efficiency and technological progress of the 16 prefecture-level cities in Chengdu-Chongqing urban agglomeration from 2006 to 2016, it can be found that there are 9 cities with improved total factor productivity, accounting for 56.25% of the total sample, but these 9 cities of the technical improvement is not balanced. The city with the largest improvement in the total factor productivity index has reached 8.5%, and the largest decline has been -5.2%. Only three cities have achieved technological progress and improved technological efficiency. It accounts for 18.75% of the total number of samples, and there is still a distance from the general improvement of the technical level of Chengdu-Chongqing urban agglomeration. At the same time, this paper also finds that for cities in Chengdu-Chongqing urban agglomeration where the efficiency of total factor technology has not improved, technical efficiency and technological progress have negative effects. The double reverse effect makes the tfpch index lower than 1.

Thirdly, based on the optimization and improvement of economic growth mode, the cities of Chengdu-Chongqing urban agglomeration are classified according to the distribution of total factor productivity index, which is divided into total factor productivity optimization, technical efficiency change effort, technological progress effort, and technical efficiency change and technological progress work together. Among them, Chengdu and Chongqing, the two core cities in the Chengdu-Chongqing urban agglomeration, are all technical efficiency change efforts.

##### B. Policy Recommendations

1) *Coordinating urban economic development and reducing urban development differences:* Through the measurement of the total factor productivity of Chengdu-Chongqing urban agglomeration in 2006-2016, it is found that although the average annual tfpch index of Chengdu-Chongqing region is greater than 1, the technical efficiency

and technological progress index often fluctuate during the economic development process. Only the improvement of total factor productivity and its various decomposition indices will enable the regional economy to develop more smoothly and healthily, thereby improving economic quality. It is needed to strengthen research on the differences between cities and the factors affecting total factor productivity. It is intended to focus on improving the total factor productivity index, focusing on technological progress, improving technical efficiency, and then playing an important guiding role in the Southwest. At the same time, it is necessary to pay attention to the growth gap between cities and towns, coordinate the optimization of various indicators within the urban agglomeration, reduce the mutual differences and vicious competition between regions, and strive to achieve the synchronization and consistency of the development of cities and towns. Coordinate the economic growth of cities and towns within the urban agglomerations, reduce the gaps in the urban agglomerations, give full play to the role of urban agglomerations, and develop and progress together.

2) *Improving innovation awareness and improving technology policy:* The impact of technological efficiency and technological progress on total factor productivity is beyond doubt. From the decomposition of the total factor productivity of Chengdu-Chongqing urban agglomeration, and the data show that the research funding of Chengdu-Chongqing urban agglomeration has been weak in recent years, especially in Chongqing. The investment in this area is lower than the national average. It is conceivable that the low investment in research funding will inevitably lead to insufficient innovation capacity and insufficient improvement in technological progress. According to the previous data, 7 of the 16 cities in the Chengdu-Chongqing urban agglomeration have less than 1 technical progress index (Techch), accounting for 43.75%; 8 cities with reduced technical efficiency (effch), accounting for 50%. There are 9 cities with a decrease in pure technical efficiency (pech), accounting for 56.25%; 11 cities with reduced scale efficiency (sech), accounting for 68.75%. From these data, it can be seen that the Chengdu-Chongqing urban agglomeration is weak overall in this respect, and there are many places for improvement. Chengdu-Chongqing urban agglomeration should pursue technological innovation with independent innovation as its core, and also exert the great potential brought by scale effect. Innovation is the first driving force for development. The government must vigorously innovate independently, create a platform for innovation and entrepreneurship development, improve the innovation and entrepreneurship service system, and share innovative and entrepreneurial resources. The report of the 19th National Congress also mentioned "to deepen the reform of the science and technology system, establish a technological innovation system with enterprises as the mainstay, market-oriented, and deep integration of

production, education and research, strengthen support for innovation of small and medium-sized enterprises, and promote the transformation of scientific and technological achievements." Groups urgently need to take the road of independent innovation, promote technological advancement and technological efficiency in the southwest region, improve the total factor productivity index, and carry out economic construction more scientifically.

3) *Promoting industrial division of labor and collaboration*: Since Chongqing was directly under the central government in 1997, it has been developing rapidly in accordance with the development ideas of the central and the city. Chongqing has formed a competitive advantage because of its direct jurisdiction and Sichuan, especially Chengdu. This is a good thing, but in reality, it is a reality. There is a vicious competition in many fields, and there is no situation of cooperation, division of labor, and mutual benefit. Therefore, it is necessary to play a decisive role in the market, give play to the comparative advantages of the two places, and promote industrial cooperation and division of labor to achieve a win-win situation. It is needed to cooperate from the following aspects to find a common focus: First, cultivate a cluster of advantageous industries. Chengdu-Chongqing urban agglomeration can carry out in-depth cooperation in the fields of equipment manufacturing, strategic emerging industries, modern service industries, cultural industries, international tourism destinations, etc., and integrate local resources to become bigger and stronger urban agglomerations. Second, orderly undertake industrial transfer. Industries that have moved from the eastern coast to the Midwest can successfully fall into the Chengdu-Chongqing urban agglomeration. Chengdu-Chongqing urban agglomeration should rely on the Yangtze River Golden Waterway, Chongqing-Xinjiang-Europe international railway, Chengdu-Xinjiang-Europe international railway, Shuangliu Airport, Jiangbei Airport, Tianfu Airport and other international major passages to support industrial parks with good transportation locations to undertake industrial transfer, and to build a key industrial transfer in the eastern coastal areas ground. Third, integrate the development of industrial parks. Chengdu-Chongqing urban agglomeration should focus on integrating and optimizing the park resources, promoting the cooperation and construction of the park, and supporting the development of key parks. Efforts will be made to develop the leading role of radiation in the central cities of Chongqing and Chengdu.

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