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Research Article

Analysis of Influencing Factors of Academic Entrepreneurship Based on Blockchain

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Under the background of mass entrepreneurship, academic entrepreneurship activities in universities are booming. DEA model is used to analyze the input-output data of academic entrepreneurship in colleges and universities in 2012 and 2016. According to the validity of the input-output data of academic entrepreneurship in different regions, the differences in efficiency between regions are compared and the reasons are analyzed. The research shows that the economic service function of colleges and universities to regional economic and social development is becoming increasingly prominent, resulting in a certain scale effect; the overall development of academic entrepreneurship efficiency, pure technical efficiency, and scale of colleges and universities in various regions is good, showing an upward trend; academic entrepreneurship activities of colleges and universities in different regions show different development trends. The scale efficiency of each region is at a higher level, but we should also actively pay attention to the utilization efficiency of academic entrepreneurship resources in colleges and universities, improve the allocation of resources, and prevent excessive investment in human and financial resources to produce redundancy, so as to achieve scale expansion while improving efficiency.

1. Introduction

In the era of mass entrepreneurship, stimulating the vitality of regional innovation and entrepreneurship, fully promoting the innovation of the masses, and actively practicing innovation and entrepreneurship have become the main impetuses to promote regional economic development. Academic entrepreneurship is based on academic capacity building and academic capital accumulation in colleges and universities [1]. Academic capital, such as new technology and new knowledge, is transformed into actual products or services according to market demand to realize innovation and entrepreneurship activities of scientific and technological achievement transformation [2]. With academic entrepreneurship as the label, entrepreneurial universities have been paid more and more attention by the society because they are keen to capture the actual demand of the market for the innovative output of colleges and universities so as to realize knowledge innovation and technology transfer [3]. It should be said that in the process of the transformation of entrepre-

neurial universities, universities have won development opportunities by transforming scientific research achievements into their own development through academic entrepreneurship and will also have an important impact on regional economic development [4]. The development of the blockchain industry policy must be familiar with various blockchain compliances, establish the resource advantages of each branch industry in the blockchain industry, enhance one's own blockchain awareness, and improve the business insight of the blockchain industry.

For academic entrepreneurship, there is no clear definition. The definition of academic entrepreneurship is mainly divided into three different concepts: entrepreneurship orientation, academic orientation, and academic and entrepreneurial consideration [5]. Academic entrepreneurship should integrate the connotations of academic and entrepreneurship with different characteristics and be understood from both narrow and broad sense. In a narrow sense, academic entrepreneurship is a business venture involving scholars or academic organizations; in a broad sense,

academic entrepreneurship also includes entrepreneurial management of academic career. Academic entrepreneurship is a dynamic entrepreneurship system, which includes both the internal entrepreneurial activities of academic organizations and the interaction with other external institutions, such as enterprises and governments [6]. Academic entrepreneurship is a holistic concept. It is now generally believed that it includes not only activities at all levels within the university but also various contacts and cooperation between the University and external institutions. At the same time, attention should be paid to the balance between academic and entrepreneurship [7]. It should be said that academic entrepreneurship should take into account academic and entrepreneurial two aspects, which has been widely recognized by industry scholars [8].

The specific contributions of this paper include

(1) Use the DEA model to analyze the input-output data of college academic entrepreneurship in 2012 and 2016

(2) The difference in efficiency between regions is compared, and the difference in efficiency between regions is obtained

(3) The paper studies the utilization efficiency of academic entrepreneurial resources, which has important guiding significance for improving resource allocation and preventing excessive human and financial investment from generating redundancy

The rest of this paper is organized as follows. Section 2 discusses related work, followed by modelling and evaluation of academic entrepreneurial efficiency in Chinese Universities is discussed in Section 3. Prospects of academic entrepreneurship efficiency research in universities are discussed in Section 4. Section 5 concludes the paper with summary and future research directions.

2. Related Work

The activities were divided in more detail. First, foreign scholars classify the forms of academic entrepreneurship activities in the most detailed way. From the hard to the soft, the activities are divided into science and technology parks, derivative enterprises, patents and licenses, contract research, industrial training courses, consultants, financing, academic publishing, and training of high-quality undergraduates. Hard activities mostly refer to tangible output, while soft activities refer to soft activities [9]. On the contrary, more refers to invisible output. At the same time, it is also believed that academic entrepreneurship in colleges and universities should not be limited to soft or hard activities and should pay attention to whether academic entrepreneurship activities in colleges and universities can promote regional economic development. Second, a domestic scholar divides academic entrepreneurship into three forms according to the different orientations of entrepreneurship: introverted academic entrepreneurship, which externalizes knowledge as a public product and realizes knowledge diffusion by publishing academic achievements [10], outward-looking aca-

demic entrepreneurship (such academic entrepreneurship seeks economic profits through invention patents or invention licensing or the creation of derivatives, the most common forms are patent licensing and academic derivatives), and intermediate academic entrepreneurship (such academic entrepreneurship through interagency cooperation to build entrepreneurial networks, so that team growth Maximization, the most common form is joint development). The pattern of academic entrepreneurship is shown in Figure 1 [11].

On the basis of theoretical research, academic entrepreneurship activities in Chinese universities are also growing in practice [12]. At present, the practice of academic entrepreneurship mainly focuses on technology licensing, supplemented by derivatives, and the soft activities mainly publish academic achievements [13]. In order to effectively promote the development of academic entrepreneurship in colleges and universities, the state has formulated and revised laws and regulations concerning property right protection and management, financial loan services, science and technology intermediaries, entrepreneurship service platforms, rewards for the transformation of achievements, tax incentives, personnel training, and financing of venture funds, with special emphasis on passing them [14]. Reform releases the vitality of scientific researchers and encourages those who make major contributions to research and development and transformation of research results to hold equity and options [15]. It should be said that the state at the policy level for academic entrepreneurship to create a good environment for innovation and entrepreneurship, while provinces and regions also actively take various measures to build a good ecological environment for innovation and entrepreneurship, promote innovation and entrepreneurship personnel training, and actively promote the implementation of innovation and entrepreneurship strategy [16].

However, due to the short development of academic entrepreneurship activities in domestic universities, its level and influence need to be improved. According to the statistics of China Science and technology statistical yearbook, 2012-2016 years of colleges and universities sell as a reference [17].

Colleges and universities provide strong support for regional economic development with the advantages of talents, scientific research, and scientific and technological achievements and information. The academic entrepreneurial activities in colleges and universities maintain a benign and mutually beneficial relationship with regional economic and social development. Academic entrepreneurship can produce better social and economic benefits and produce agglomeration effects. The indirect economic benefits of academic entrepreneurship are as follows: first, the effect of knowledge transformation [18].

Academicians start their own businesses with the help of accumulated knowledge and technology, which is conducive to knowledge spillover and industrialization of scientific and technological achievements. The second is the effect of industrial agglomeration. Academic entrepreneurship has formed the centralization of derivative enterprises in universities [19].

Third, the cooperation effect. For experts, scholars, inventors to effectively participate in the in-depth development of their technology to open up new avenues [20].
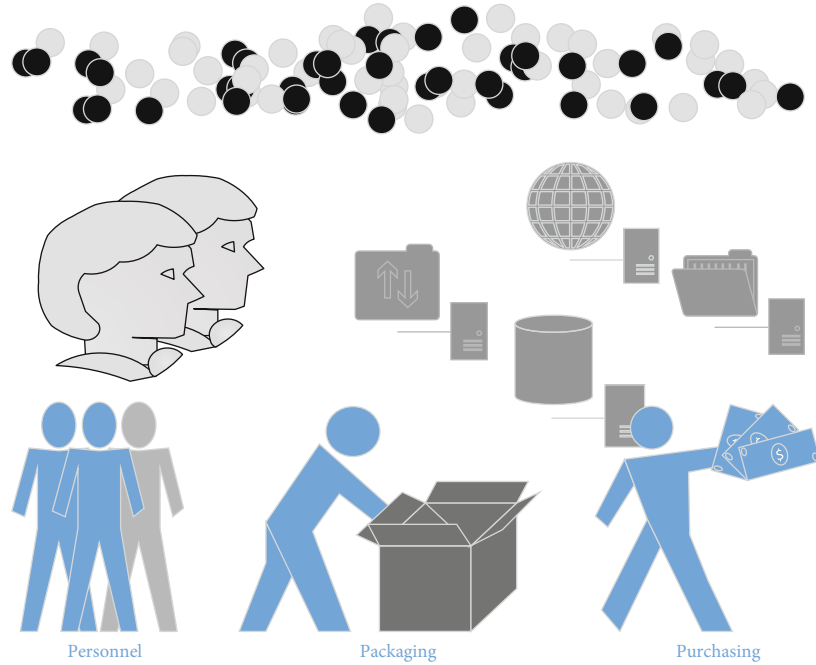
Figure 1: The pattern of academic entrepreneurship.

Colleges and universities gather human resources, scientific and technological resources, and technological resources and constitute a regional innovation and entrepreneurship network carrier, which has an important impact on the industrial development of the regional economy [21]. Especially, the evolution of the relationship between universities and regional cooperation has constantly tried new ways of cooperation, from the mode of technology licensing or transfer of achievements to the mode of using and exploring innovation to realize the transfer of key technology knowledge, and promote regional economic development [22, 23]. Academic innovation, technological research and development in colleges and universities, and the transformation of scientific research achievements into productive forces can promote the development of the regional economy [24]. Through the feedback mechanism, enterprises put forward higher requirements to the technology research and development and innovation and entrepreneurship education in colleges and universities and improve their effectiveness in serving the local economic development [25, 26]. Figure 2 is the educational background of entrepreneurs, Figure 3 is the career characteristics of entrepreneurs, Figure 4 is the attributes of entrepreneurs, and Figure 5 is the frequency characteristics of entrepreneurs.

3. Modelling and Evaluation of Academic Entrepreneurial Efficiency in Chinese Universities

3.1. Research Method. Data envelopment analysis (DEA) is based on the concept of relative efficiency; this paper evaluates the relative effectiveness of the same kind of multi-index input-output economic system. This method does not need to determine the explicit expression of the relationship between input and output and exclude many subjective factors and has a strong objectivity [27]. Therefore, the DEA method is the most important one. Typical nonparametric methods are widely used in the efficiency evaluation of various systems. At the same time, a large number of studies have found that the efficiency frontier evaluated by the DEA model has considerable robustness and is more suitable for small sample efficiency analysis network. Therefore, this paper uses the DEA model to analyze the academic entrepreneurship efficiency of colleges and universities in 2012 and 2016. According to the effectiveness of academic entrepreneurship output in different regions, this paper compares the efficiency differences between regions and analyzes the reasons for this gap [28].

Suppose there are x evaluation areas, each of which is denoted as a DMU, and each DMU has a type of academic venture capitalist and a type of academic venture output. The Y academic venture capitalist of DMUm is represented by rym, and the A academic venture output of DMUm is represented by Sam. The input matrix R, the input weight coefficient matrix J, the output matrix S, and the output weight coefficient I are represented by rym [29]. For each region DMU, the corresponding academic entrepreneurial efficiency evaluation index can be expressed as

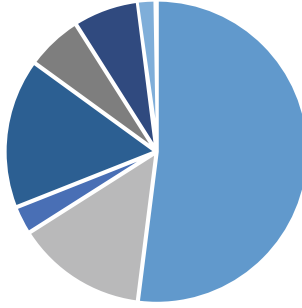$$Bm = I^C Sn / J^C Rm = \frac{\sum_{i=1}^{l} I_i S_{in}}{\sum_{i=1}^{l} J_i R_{in}}, \tag{1}$$

$$Rm = (r1m, r2m, \cdots, rlm)^T, \tag{2}$$

$$Sm = (s1m, s2m, \cdots, slm)^T, \tag{3}$$
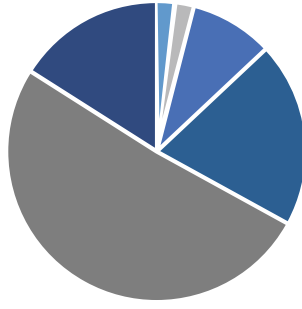
Figure 2: Academic qualifications of entrepreneurs.

Figure 3: Career characteristics of entrepreneurs.
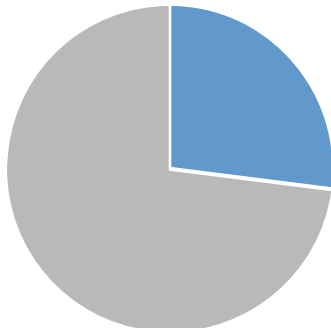
Figure 4: Attributes of the entrepreneur.

$$J = (j1, j2, \cdots, jl)^T, \qquad (4)$$
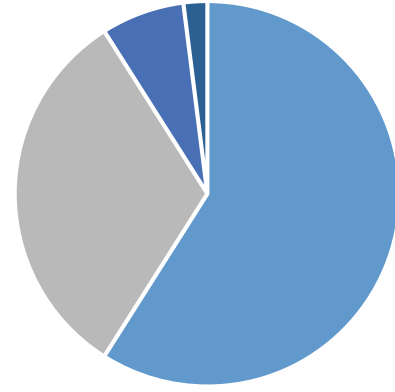
Figure 5: The entrepreneurial frequency characteristics of the entrepreneur.

$$I = (i1, i2, \cdots, il)^T. \qquad (5)$$

In which, $j = (1, 2, \cdots, x)$, $i = (1, 2, \cdots, x)$. Where I^c and J^c represent the weight vector output by the input, respectively, and the weight I and J are selected appropriately to enable $Bm < 1 (m = 1) \cdots, x)$ [30].

If M is set as a parameter, the evaluation of each DMU is denoted as DMU_0, whose input is R_0 and output is S_0, then the m. $E_2 F$ evaluation model of the relative entrepreneurial efficiency of individual DUM is

$$\mathrm{Min}\ \theta \mathrm{s.t.} \left\{ \begin{array}{c} \displaystyle\sum_{m=1}^{l} R_m G_m \leq \theta R0, m = 1, 2, \cdots, \times \\ \\ S0 \leq \displaystyle\sum_{m=1}^{l} R_m G_m \end{array} \right\} \qquad (6)$$

The relaxation variable a^+ and the residual variable a^- are further introduced, and the non-Archimedean infinitesimal h is introduced. The $E_2 F$ model with the non-Archimedean infinitesimal h is established:

$$\mathrm{Min} \left[\theta - h \left(\sum_{m=1}^{l} a^+ + \sum_{m=1}^{l} a^- \right) \right] = Jk(h), \qquad (7)$$

$$\mathrm{s.t.} \left\{ \begin{array}{c} \displaystyle\sum_{m=1}^{l} R_m G_m \leq \theta R0, m = 1, 2, \cdots, \times \\ \\ S0 \leq \displaystyle\sum_{m=1}^{l} R_m G_m \end{array} \right\} \qquad (8)$$

The optimal solution is θ_0, $g0$, $a_0{}^+$, $a_0{}^-$. In this model, R, the output S of academic entrepreneurship, gm, and 0 value of academic entrepreneurship efficiency of a local university. When the value of $\theta_0 = -1$, it indicates that the evaluated region DMU_0 academic entrepreneurship is relatively

TABLE 1: The output of academic entrepreneurship.

Region ID	Torch	Mode	Index name
1	R1		Number of local colleges and universities
2	R2		Number of R&D projects
3	R3	Input index	Number of personnel (persons)
4	R4		Investment fund (10,000 yuan)
5	S1		Number of published papers
6	S2		Scientific and technical publications (division)
7	S3		Valid invention patent (item)
8	S4	Output index	Number of patent ownership transfer and license
9	S5		Patent transfer licensee (ten thousand yuan)
10	S6		Form national or industry standards (individual)

effective, that is, in the n evaluated regions, the output of S_0 is optimal on the basis of the input of R_0. When the value of θ is less than 1, it indicates that DMU_0 investment is relatively ineffective, and $1 - \theta$ is the proportion of multiple investors for academic entrepreneurship of colleges and universities in this region, that is, it can reduce the investment to θR_0 while keeping the original output S_0 unchanged.

3.2. The Data Source. This paper uses part of higher education data from China statistical yearbook of science and technology in 2012 and 2016 to analyze the overall situation of investment output of academic entrepreneurship in universities.

The establishment of the evaluation index system of academic entrepreneurship efficiency in colleges and universities is a complex problem. The evaluation index system is considered from the perspective of operability, comparability, and scientificity, and the opinions of relevant experts are also consulted.

As for the current situation of academic entrepreneurship activities in Chinese universities, this paper mainly chooses the input-dea model to determine the input-output index of academic entrepreneurship in colleges and universities from the perspective of whether it is effective to invest when the output of academic entrepreneurship is certain in Table 1.

3.3. The Evaluation Results. CZR model was applied to evaluate the academic entrepreneurship efficiency of universities in 2012 and 2016, and the output results are shown in Table 2.

The input and output comprehensive efficiency (CB), pure technical efficiency (UCB), and scale efficiency (AB) of academic entrepreneurship in universities have the following relations: CB = UCB ∗ AB, so as to analyze the relationship between the comprehensive efficiency of academic entrepreneurship in universities and pure technical efficiency and scale efficiency. The value of comprehensive efficiency is equal to 1, which indicates that the academic entrepreneurship DEA is effective in the evaluated region, indicates that the academic entrepreneurship resources are fully utilized, and the investment output is brought into full play. The value of comprehensive efficiency is less than 1, indicating that the DEA is invalid for academic entrepreneurship in the evaluated region, indicating that technical inefficiency and scale inefficiency exist in academic entrepreneurship. However, it

TABLE 2: The output results 1.

| Year | 2012 | | | 2016 | | |
Province name	CB	UCB	AB	CB	UCB	AB
Beijing	1.00	1.00	1.00	1.00	1.00	1.00
Tianjin	0.86	0.85	0.91	0.81	0.84	0.95
Hebei	1.00	1.00	1.00	1.00	1.00	1.00
Shanghai	1.00	1.00	1.00	1.00	1.00	1.00
Jiangsu	1.00	1.00	1.00	1.00	1.00	1.00

should be noted that the academic entrepreneurship efficiency value calculated by the DEA model is a kind of "relative efficiency," and the actual efficiency level is less than or equal to the DEA estimate.

As a whole, the comprehensive efficiency of academic entrepreneurship, pure technology efficiency, and scale efficiency of colleges and universities in various regions are developing well, showing an upward trend. It can be seen from Table 2 in 2012, the overall efficiency of academic entrepreneurship output of colleges and universities reached the optimal efficiency in 17 provinces including Beijing, Shanghai, Hebei, Jiangsu, Zhejiang, and Fujian. In 2012, the overall efficiency ratio of academic entrepreneurship in colleges and universities was 0.864. There are 11 provinces and regions below the average line and 20 provinces and regions above the average. In 2016, the comprehensive efficiency reached the optimal DEA efficiency in 13 provinces, including Beijing, Hebei, Jiangsu, Shanghai, and Hainan. In 2016, the national average of comprehensive efficiency of academic entrepreneurship in colleges and universities was 0.937, with 14 provinces and cities below the average, and 17 provinces and cities above the average. It can be seen that, compared with 2012, the average level of comprehensive efficiency of academic entrepreneurship in colleges and universities in various regions in China has increased by 0.07, and the overall level is continuously improving.

In terms of pure technical efficiency, in 2012, there were 18 regions with the optimal pure technical efficiency of academic entrepreneurship in universities, 7 of which were less than 80% effective, and 24 of which were more than 80% effective. The national average of pure technical efficiency was 0.916. In 2016, there were 14 regions with the optimal
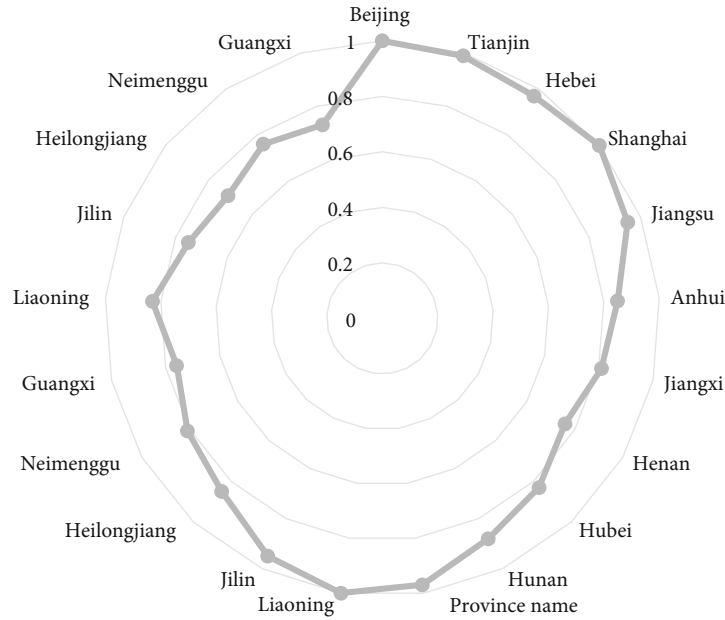
FIGURE 6: The output efficiency of academic venture capital investment.

technical efficiency of academic entrepreneurship in colleges and universities. Only 2 regions were less than 80% effective, and the remaining 29 regions were all higher than 80%. The national average of pure technical efficiency was 0.946. Although the number of optimal efficiency areas has decreased, the average level of national pure technical efficiency has increased significantly.

From the perspective of scale efficiency, the national average of academic entrepreneurship scale efficiency in universities was 0.978 in 2012 and 0.9893 in 2016. It can be seen that the scale efficiency of various regions has increased and maintained a high running trend.

From the perspective of individuals, the comprehensive efficiency of each region in 2012 and 2016 showed an upward trend in 11 regions, among which Jiangxi and Tibet had the fastest growth rate, with an increase of more than 30%; It was followed by Hunan, Inner Mongolia, Guizhou, Yunnan, and Gansu, with an increase of more than 20 percent. In 2012 and 2016, the pure technical efficiency increased in 11 regions, among which Jiangxi, Hunan, Inner Mongolia, Guizhou, Yunnan, and Gansu showed rapid growth. Tibet and Gansu showed the fastest growth in scale efficiency in 2012 compared with 2016. It is not hard to find that the growth areas are mainly in the central and western regions, such as Tibet, Guizhou, Yunnan, and Gansu, where the comprehensive efficiency level is not at a very high level nationwide. However, these regions have attached great importance to academic venture capital investment, which has developed rapidly and achieved rapid development in the output efficiency of academic venture capital investment, as shown in Figure 6.

At the same time, Shandong, Guangdong, Shaanxi, and other regions showed a certain downward trend, with a decreasing range of 0. The academic entrepreneurship efficiency of the universities in these regions needs to be further

TABLE 3: The output results 2.

Year	2012			2016		
Province name	CB	UCB	AB	CB	UCB	AB
Anhui	0.81	0.88	0.87	0.91	0.77	0.91
Jiangxi	0.66	0.67	0.72	0.85	0.73	0.44
Henan	1.00	1.00	1.00	1.00	1.00	1.00
Hubei	1.00	1.00	1.00	1.00	1.00	1.00
Hunan	0.89	0.91	1.00	1.00	1.00	1.00

improved to increase the effective investment in academic entrepreneurship and improve the output efficiency.

The east, west, central, and northeast regions showed different development trends. It can be seen from Table 3 that academic entrepreneurship in universities in the east, west, and northeast of China presents different development trends. Overall, the scale efficiency of the east, west, and northeast is at a high level, and the main factor affecting the comprehensive efficiency of each region is the pure technical efficiency. From the perspective of regional comparison, first of all, the efficiency of eastern regions declined slightly in 2016, mainly because the academic entrepreneurship efficiency of universities in the eastern regions of Tianjin, Shandong, and Guangdong decreased significantly. At the same time, it also indicates an important information that the resource utilization of academic venture capital output in the eastern region needs to be concerned. More investment in academic entrepreneurship does not mean greater output. Effective and reasonable utilization of academic achievement resources and active realization of transformation are the key to improve resource utilization. Second, the academic entrepreneurship efficiency of colleges and universities in the central and western regions has been outstanding. From the numerical perspective, it can be seen that great progress has

been made. In the past five years, after the rapid economic development of the central and western regions, various regions have been stepping up their efforts in the construction of colleges and universities, and academic investment and output of colleges and universities have achieved substantial development. The amount and quality of academic research projects have been improved in terms of investment in academic research, personnel allocation, and research projects, and the efficiency of academic entrepreneurship has been improved rapidly. Finally, the academic entrepreneurship efficiency of universities in northeast China is in a stable state.

The results of academic entrepreneurship efficiency of universities in Zhejiang and Jiangxi in 2012 and 2016 were analyzed. The results are shown in Tables 4 and 5.

It can be seen from Tables 2 and 4, the comprehensive efficiency of academic entrepreneurship in universities in Zhejiang province reached the optimization of DEA efficiency, with the highest efficiency of venture capital investment and output without any shortage or redundancy. In 2016, the comprehensive efficiency of academic entrepreneurship in universities in Zhejiang was 0.961, the pure technical efficiency was 0.964, the scale efficiency was 0.997, and the scale return was increasing. In the case of a given output, in 2016 in Zhejiang university academic entrepreneurship in investment funds, personnel, and R&D project number, there are varying degrees of redundancy, in terms of investment, investment research elements to reduce 122.27 million yuan, for personnel quality to reduce 508, redundancy factors of R&D projects is 1617 items, still can keep output unchanged.

It can be seen from Tables 2 and 5, the comprehensive efficiency of academic entrepreneurship of colleges and universities in Jiangxi is 0.539, the pure technical efficiency is 0.553, the scale efficiency is 0.975, and the scale return is increasing. In 2016, the comprehensive efficiency of academic entrepreneurship of colleges and universities in Jiangxi was 0.856, the pure technical efficiency was 0.871, the scale efficiency was 0.983, and the scale return was decreasing. In terms of overall efficiency, 2016 was 0.3 higher than 2012. However, in 2016, the academic entrepreneurship efficiency of colleges and universities in Jiangxi province was in the stage of diminishing returns on scale, and there was still a certain amount of redundancy for venture capital investors. Therefore, it was necessary to reasonably allocate resources and improve the utilization rate of resources, so that the output efficiency of academic entrepreneurship became more effective.

4. Prospects of Academic Entrepreneurship Efficiency Research in Universities

The academic entrepreneurship activities of colleges and universities in the east, west, and northeast show different development trends. The scale efficiency of the eastern, western, central, and northeastern regions is at a high level. With the further development of the western economy, the academic venture investment and output of the universities in the western regions have performed well, and they are actively exceeding the national average. The eastern region has a solid economic foundation and strong ability to invest in academic

TABLE 4: The output results 3.

| Year | 2012 | | | 2016 | | |
Province name	CB	UCB	AB	CB	UCB	AB
Liaoning	0.71	0.77	0.77	0.91	0.77	0.91
Jilin	0.66	0.67	0.72	0.75	0.73	0.44
Heilongjiang	0.61	0.66	0.66	0.91	0.66	0.91
Neimenggu	0.66	0.66	0.62	0.65	0.63	0.44
Guangxi	0.79	0.91	1.00	1.00	1.00	1.00

TABLE 5: The output results 4.

| Year | 2012 | | | 2016 | | |
Province name	CB	UCB	AB	CB	UCB	AB
Liaoning	0.71	0.77	0.77	0.71	0.77	0.71
Jilin	0.99	0.97	0.72	0.75	0.73	0.44
Heilongjiang	0.91	0.99	0.99	0.71	0.99	0.71
Neimenggu	0.99	0.99	0.92	0.95	0.93	0.44
Guangxi	0.77	0.71	1.00	1.00	1.00	1.00

entrepreneurship in universities. It should be said that the academic entrepreneurship activities of colleges and universities in various regions are developing vigorously, which is very strong for the regional economic development. But at the same time, the complexity of academic entrepreneurship in universities determines the complexity of regional economic development, and the interaction between universities in various regions and regional economic development will also show a different development trend.

It is necessary to pay attention to efficiency in the output of academic entrepreneurship in universities in various regions. Shandong, Guangdong, Hubei, and other regions are in the stage of diminishing returns to scale, and the increase rate of output is lower than that of investors, which is worthy of attention. Especially in the eastern region, we should pay attention to the utilization efficiency of resources in the output of academic venture investment in universities and prevent the surplus of scientific research staff, financial staff, and material investment staff. Therefore, in the context of increasing regional support for the development of academic entrepreneurship in colleges and universities, colleges and universities need to adjust their layout reasonably, improve resource allocation, and achieve scale expansion while improving efficiency.

It is feasible to evaluate the efficiency of academic entrepreneurship in colleges and universities by the DEA method. At the same time, it is more important to analyze the significant factors influencing the academic entrepreneurship efficiency of each region. At the same time, the efficiency evaluation system of academic entrepreneurship will be further subdivided and deepened, which is the focus of further research.

5. Conclusions

Academic entrepreneurship has become an important way to realize the development of colleges and universities. Reconstruct themselves through self-employment spirit in colleges

and universities of the organizational structure and culture, by emphasizing the knowledge creation and knowledge transfer activity is effective and practical, the transformation of knowledge resources in colleges and universities to intellectual capital for the development of colleges and universities to provide continuous power of a kind of educational strategy, as well as regional economic development has brought new vigor and vitality Sichuan. This paper uses DEA model academic entrepreneurship and has carried on the comprehensive evaluation of efficiency in colleges and universities, both make up for the traditional method of analyzing the present situation of academic entrepreneurial activities in colleges and universities, also from the new angle of view opens up college academic entrepreneurship and regional economic development of the interactive space.

Academic entrepreneurship activities in universities in various regions of China are developing rapidly. Overall, scale efficiency is always high and running at a high level. Colleges and universities have a certain scale effect on the economic service function of regional economic and social development. It should be said that as an important participant of regional knowledge innovation, technology transfer and innovation, and entrepreneurship, the close combination of scientific research advantages and regional scientific and technological demands will greatly improve the technology conversion rate and promote social and economic development.

Data Availability

All data can be obtained from the author.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

References

[1] T. Åstebro, P. Braunerhjelm, and A. Broström, "Does academic entrepreneurship pay?," *Industrial and Corporate Change*, vol. 22, no. 1, pp. 281–311, 2013.

[2] D. S. Siegel and M. Wright, "Academic entrepreneurship: time for a rethink?," *British Journal of Management*, vol. 26, no. 4, pp. 582–595, 2015.

[3] M. Wright, "Academic entrepreneurship, technology transfer and society: where next?," *Journal of Technology Transfer*, vol. 39, no. 3, pp. 322–334, 2014.

[4] M. Abreu and V. Grinevich, "The nature of academic entrepreneurship in the uk: widening the focus on entrepreneurial activities," *Research Policy*, vol. 42, no. 2, pp. 408–422, 2013.

[5] J. Y. Farsi, M. Modarresi, M. Motavaseli, and A. Salamzadeh, "Institutional factors affecting academic entrepreneurship: the case of university of tehran," *Economic Analysis*, vol. 47, no. 1-2, pp. 139–159, 2014.

[6] B. Bozeman, D. Fay, and C. P. Slade, "Research collaboration in universities and academic entrepreneurship: the-state-of-the-art," *Journal of Technology Transfer*, vol. 38, no. 1, pp. 1–67, 2013.

[7] H. Shaheen, "The Chicago handbook of university technology transfer and academic entrepreneurship," *Journal of Educational Technology & Society*, vol. 18, no. 3, pp. 326-327, 2015.

[8] C. Kolb and M. Wagner, "Crowding in or crowding out: the link between academic entrepreneurship and entrepreneurial traits," *Journal of Technology Transfer*, vol. 40, no. 3, pp. 387–408, 2015.

[9] D. Urbano and M. Guerrero, "Entrepreneurial universities," *Economic Development Quarterly*, vol. 27, no. 1, pp. 40–55, 2013.

[10] C. S. Hayter, "Constraining entrepreneurial development: a knowledge-based view of social networks among academic entrepreneurs," *Research Policy*, vol. 45, no. 2, pp. 475–490, 2016.

[11] C. Kolympiris, N. Kalaitzandonakes, and D. Miller, "Location choice of academic entrepreneurs: evidence from the US biotechnology industry," *Journal of Business Venturing*, vol. 30, no. 2, pp. 227–254, 2015.

[12] K. Nielsen, "Human capital and new venture performance: the industry choice and performance of academic entrepreneurs," *Journal of Technology Transfer*, vol. 40, no. 3, pp. 453–474, 2015.

[13] M. E. Braun, "Academic entrepreneurship and community engagement: scholarship in action and the Syracuse miracle," *Community Development*, vol. 47, no. 4, pp. 581-582, 2016.

[14] J. P. Walsh and H. Huang, "Local context, academic entrepreneurship and open science: publication secrecy and commercial activity among Japanese and us scientists," *Research Policy*, vol. 43, no. 2, pp. 245–260, 2014.

[15] G. Secundo and G. Elia, "A performance measurement system for academic entrepreneurship: a case study," *European Journal of Marketing*, vol. 18, no. 3, pp. 23–37, 2014.

[16] C. S. Hayter, "Public or private entrepreneurship? Revisiting motivations and definitions of success among academic entrepreneurs," *Journal of Technology Transfer*, vol. 40, no. 6, pp. 1003–1015, 2015.

[17] F. J. Miranda, A. Chamorro-Mera, and S. Rubio, "Academic entrepreneurship in Spanish universities: an analysis of the determinants of entrepreneurial intention," *European Research on Management and Business Economics*, vol. 23, no. 2, pp. 113–122, 2017.

[18] A. P. Wall, P. Mcgowan, and M. C. Brennan, "Academic entrepreneurship," *International Journal of Humanities & Social Science*, vol. 2, no. 1, pp. 14–22, 2013.

[19] T. B. Astebro, S. Braguinsky, P. Braunerhjelm, and A. Broström, *Academic entrepreneurship: Bayh-Dole versus the 'professor's privilege*, Social Science Electronic Publishing, USA, 2015.

[20] M. D. Silva, "Academic entrepreneurship and traditional academic duties: synergy or rivalry?," *Studies in Higher Education*, vol. 41, no. 1, pp. 1–15, 2016.

[21] M. A. Lundqvist and K. L. Williams Middleton, "Academic entrepreneurship revisited – university scientists and venture creation," *Journal of Small Business & Enterprise Development*, vol. 20, no. 3, pp. 603–617, 2013.

[22] C. Lin, N. Xiong, J. H. Park, and T. Kim, "Dynamic power management in new architecture of wireless sensor networks,"

International Journal of Communication Systems, vol. 22, no. 6, pp. 671–693, 2009.

[23] Y. Sang, H. Shen, Y. Tan, and N. Xiong, "Efficient protocols for privacy preserving matching against distributed datasets," in *International Conference on Information and Communications Security*, pp. 210–227, Springer, Berlin, Heidelberg, 2006.

[24] F. Long, N. Xiong, A. V. Vasilakos, L. T. Yang, and F. Sun, "A sustainable heuristic QoS routing algorithm for pervasive multi-layered satellite wireless networks," *Wireless Networks*, vol. 16, no. 6, pp. 1657–1673, 2010.

[25] J. Li, N. Xiong, J. H. Park, C. Liu, S. MA, and S. E. Cho, "Intelligent model design of cluster supply chain with horizontal cooperation," *Journal of Intelligent Manufacturing*, vol. 23, no. 4, pp. 917–931, 2012.

[26] W. Guo, N. Xiong, A. V. Vasilakos, G. Chen, and C. Yu, "Distributed k–connected fault–tolerant topology control algorithms with PSO in future autonomic sensor systems," *International Journal of Sensor Networks*, vol. 12, no. 1, pp. 53–62, 2012.

[27] Z. Chen, D. Chen, Y. Zhang, X. Cheng, M. Zhang, and C. Wu, "Deep learning for autonomous ship-oriented small ship detection," *Safety Science*, vol. 130, article 104812, 2020.

[28] Z. Huang, X. Xu, J. Ni, H. Zhu, and C. Wang, "Multimodal representation learning for recommendation in Internet of Things," *IEEE Internet of Things Journal*, vol. 6, no. 6, pp. 10675–10685, 2019.

[29] W. Wei, M. Wozniak, R. Damaeviius, X. Fan, and Y. Li, "Research of known-plaintext attack on double random phase mask based on WSNs," *Journal of Internet Technology*, vol. 20, no. 1, pp. 39–48, 2019.

[30] L. Dong, W. Wu, Q. Guo, M. N. Satpute, T. Znati, and D. Z. du, "Reliability-aware offloading and allocation in multilevel edge computing system," *IEEE Transactions on Reliability*, vol. 12, pp. 1–12, 2019.