

A Study on the Evaluation of Operational Efficiency of E-Commerce Demonstration Enterprise in China

Lan Gao¹, Gui-Jung Kim², Hyung-Ho Kim^{3*}

¹Professor, School of Trade and Economics, Jilin Engineering Normal University

²Professor, Faculty of ICT, BaekSeok University

³Professor, Dept. of Air Transport & Logistics, Sehan University

중국 전자상거래 시범기업 운영효율 평가에 관한 연구

고람¹, 김귀정², 김형호^{3*}

¹길림공정기술사범학원 경제무역학부 교수, ²백석대학교 ICT학부 교수,

³세한대학교 항공교통물류학과 교수

Abstract The purpose of this study is to evaluate the operational efficiency of Chinese e-commerce companies and to present measures to improve efficiency. This paper selected 16 enterprises as the research objects, from the e-commerce demonstration enterprises of the Ministry of Commerce of China in 2017-2018, to conduct an empirical study on the operating efficiency of e-commerce enterprises. By using DEA method, we selected 3 input and 2 output indicators to measure the input-output efficiency of enterprises from input-oriented. Using different model in DEA, we calculated the technical efficiency, pure technical efficiency and scale efficiency, also efficiency based on the sample of 2018 and horizontal analysis from 2016 to 2018. The analysis showed that the overall efficiency of Chinese e-commerce companies was continuously improving, and that their business capabilities and business scale were also gradually improving. Through the calculation of efficiency, we evaluated the competitiveness of the e-commerce demonstration enterprises, and explored measures to improve their management efficiency. At the same time, it put forward some reasonable suggestions to adjust the scale, and enhance the competitive advantage.

Key Words : E-commerce Demonstration Enterprise, Operating Efficiency, DEA, Technical Efficiency, Scale Efficiency

요약 본 연구의 목적은 중국 전자상거래 기업의 운영 효율성을 평가하고 효율성을 향상시키기 위한 방안을 제시하는 것이다. 본 논문에서는 중국 상무부가 선정한 2017~2018년도 전자상거래 시범기업 중에서 16개 기업을 대상으로 선정하여 전자상거래 기업의 운영 효율성에 대한 실증적 연구를 진행하였다. 투입관점에서 기업의 운영 효율을 측정하기 위해 3개의 입력지표와 2개의 출력지표를 선정하여 데이터포락분석법(DEA)을 활용하여 분석하였다. 분석은 2018년 데이터를 활용한 횡단면 분석과 2016년부터 2018년까지 3년 데이터를 활용하여 종단면 분석을 실시하여 기술효율, 순수기술효율 및 규모효율을 산출하였다. 분석결과 중국 전자상거래 기업의 전반적인 효율성은 지속적으로 향상되고 있으며, 사업 역량과 사업 규모도 점차적으로 향상되고 있음을 알 수 있었다. 본 연구는 전자상거래 시범기업의 운영 효율성 분석을 통해 전자상거래 시범기업의 경쟁력을 평가하고, 운영 효율을 높이기 위한 대책을 제시하였고, 동시에, 규모를 조정하여 경쟁 우위를 강화하기 위한 몇 가지 합리적인 제안을 제시하였다는데 의의가 있다.

주제어 : 전자상거래시범기업, 경영효율, DEA, 기술효율성, 규모효율성

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*Corresponding Author : Hyung-Ho Kim(hhkim@sehan.ac.kr)

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1. Introduction

China's e-commerce has been in the forefront of the world, despite a late start but remarkable results. Since 2011, China's e-commerce market has developed rapidly. According to "China's e-commerce report 2018"[1], the annual turnover of China's e-commerce reached CNY 31.63 trillion in 2018. With the rapid development of e-commerce economy, the competition between e-commerce enterprises is also intensifying. The operation of e-commerce enterprises under the network economy not only follows the rules of traditional economy, but also shows its different competitive characteristics, such as network externalities, Matthew effect, positive feedback, and increasing marginal utility of consumer products. In market competition, the ultimate goal of e-commerce enterprises is to win a sustained competitive advantage in the same industry. Economics measures the input-output relationship mainly by studying the changes in the relationship between supply and demand in market forces, while management studies efficiency in the formation of market forces. This paper uses non-parametric DEA method to measure the scale efficiency, pure technical efficiency and technical efficiency of e-commerce enterprises, and measures the competitiveness of each enterprise by efficiency evaluation, and then discusses the formation of competitive advantage of e-commerce enterprises. Through the use of real and reliable data and relatively objective analysis methods to conduct empirical research on the operating efficiency of China's e-commerce demonstration enterprises, it is helpful for e-commerce enterprises to correctly handle the relationship between input scale and output, which is of great significance to the improvement of enterprise operating efficiency. It is helpful for enterprises to build competitive advantages and maintain their permanence, at the same time avoid disorderly competition to some extent. By measuring the operating efficiency of e-commerce demonstration enterprises, the paper

further complements and improves the theoretical system of research on the development efficiency of e-commerce enterprises. It can also provide some reference for relevant researchers.

2. Status Analysis

2.1 Concept of e-commerce ecosystem

China's e-commerce has entered a golden period of development. The transaction scale of China's e-commerce market 2012~2017 is shown in Fig. 1.

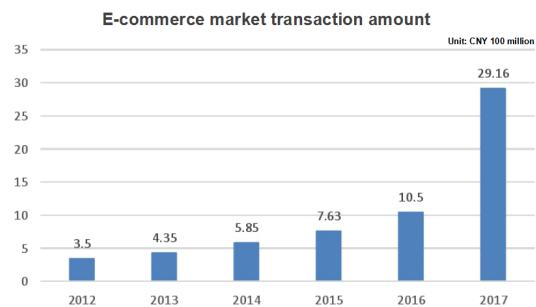


Fig. 1. Transaction scale of China's e-commerce market 2012~2017

As early as 2010, the Ministry of Commerce of China started to carry out e-commerce demonstration work. E-commerce demonstration enterprises played an important role in promoting the healthy and rapid development of e-commerce by demonstration and actively promoting the application of e-commerce, and became an important carrier to promote the innovative development of e-commerce in China. According to the notice about e-commerce demonstration work to the ministry of commerce ([2010] No.428), selected in China in 2011 the first batch of 83 e-commerce demonstration enterprises, after that, according to the general office of the ministry of commerce on further do a good job of e-commerce demonstration enterprise notice ([2013] No.116), e-commerce demonstration enterprise once every

two years for the selection, respectively, in 2013~2014, 2015~2016, 2017~2018 and list the model e-commerce demonstration enterprise of the release. The application should meet the following requirements: first, the annual e-commerce sales should be more than CNY 100 million; Second, the total number of employees is greater than or equal to 50[2]. The classification of China's e-commerce demonstration enterprises[2] is as follows: 1. Online retail enterprises: enterprises that conduct commodity retail business through Internet and other information networks; 2. Online wholesale enterprises: enterprises that conduct commodity wholesale business through Internet and other information networks; 3. Networked service enterprises: enterprises that provide education, culture, tourism and other service products through Internet and other information networks; 4. E-commerce service enterprises: enterprises that provide data, consultation, logistics, financial payment and other e-commerce related services (including cross-border) to e-commerce operators through the third-party e-commerce platform; 5. Comprehensive e-commerce enterprises: enterprises that simultaneously carry out the above two or more kinds of business activities (including two kinds of business activities); 6. Other e-commerce enterprises: enterprises that carry out other types of business activities through the Internet and other information networks. This paper chooses 2017~2018 Chinese e-commerce demonstration enterprises issued by the Ministry of Commerce as the research object. According to statistics, there are 238 enterprises[3]. Development status of China's e-commerce demonstration enterprises: the scale of e-commerce demonstration enterprises keeps expanding, as shown in Fig. 2.

E-commerce enterprises have been listed continuously. According to incomplete statistics, more than 70 enterprises have been listed at home and abroad. The leading role of e-commerce demonstration enterprises is prominent, and provinces and regions have selected provincial and

municipal e-commerce demonstration enterprises. E-commerce demonstration enterprises greatly promote the enterprises in the process of development to strengthen the training of e-commerce talents and information services, technical services, logistics services, financial services, e-commerce industry carrier construction, further improve the basic conditions for the development of e-commerce.

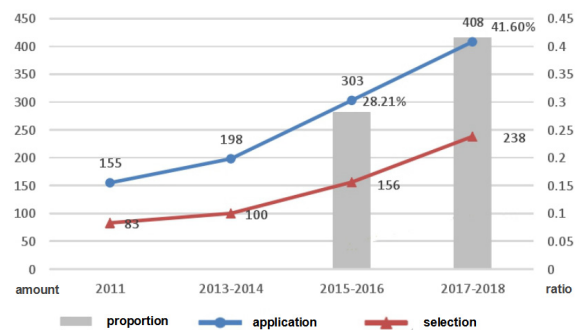


Fig. 2. Change of selection scale of China's e-commerce demonstration enterprises[4]

The problem of operating efficiency directly affects the competitive position of e-commerce demonstration enterprises in the market, while the quality problems, logistics efficiency, integrity problems and web-site maintenance in the process of enterprise management will affect the operating efficiency of enterprises. It is difficult to judge the actual operating conditions of each enterprise intuitively. As a key factor to measure the development of an enterprise, operating efficiency is crucial to its development. Therefore, it is of great practical significance for this paper to select the operating efficiency of e-commerce demonstration enterprises as the research Angle.

3. Previous Research

E-commerce has only appeared for a few decades. Foreign research focuses mainly on the

efficiency evaluation of e-commerce web-sites, the content research of e-commerce enterprise development evaluation, and the efficiency evaluation method research of e-commerce enterprises. There are few specialized studies on the operating efficiency of e-commerce enterprises using DEA method. Ayanso and Mokaya used data envelope-analysis method and principal component analysis method to analyze the search advertising efficiency of 200 online retailers [5]. Storto proposed a comprehensive framework to evaluate the efficiency of e-commerce web-sites from the perspective of users based on DEA[6]. It can be seen that foreign scholars focus on all aspects of e-commerce enterprises, but lack of a comprehensive and objective evaluation method for a certain type of e-commerce enterprises to study their efficiency. Compared with foreign countries, the development of e-commerce in China started late. However, the development speed of e-commerce was on a spurt. In recent years, thanks to the policy support of the state, the development of e-commerce became more prosperous. As for the research on the operating performance of e-commerce, Gan ping used DEA method to analyze and study the operating conditions of 16 e-commerce listed companies in 2007[7]. Li xiaoyu and Tian xinmin used Dea-Malmquist model to conduct an empirical analysis on the operating efficiency of 16 e-commerce listed enterprises from the static and dynamic perspectives from 2007 to 2011[8]. Ma bang constructed an evaluation index system for the operating efficiency of e-commerce enterprises[9]. Hou qiang and Wang dongmei conducted an empirical study on 74 listed retail companies using the super-efficiency SBM model[10]. Tan jing evaluated the efficiency of e-commerce listed enterprises based on a variety of analysis methods[11]. Tian yuzhen, Ma zhanxin and Wang rong used generalized DEA method to evaluate the e-commerce efficiency of retail enterprises based on the financial data of 7 listed traditional retail enterprises in China 2010~2015[12]. In addition,

DEA and Mammquist analyses, including analysis of the operational efficiency of companies and management efficiency of government agencies, are being used in various ways.[14-15]. Carding domestic and foreign literature, on the basis of summary, it is concluded that the scholars on the electronic commerce enterprise management efficiency evaluation of multiple index model is put forward, based on the current literature collection, sorting, induction, summarizes the current domestic part research scholar for e-commerce enterprise management efficiency evaluation index by using input and output, as shown in Table 1.

Table 1. Literature review of input-output variables

Literature	Input	Output
He huihui (2017)	Infrastructure, labor, capital	Industrial benefits, e-commerce transaction volume
Tan jing (2016)	Access response time	The number of pages visited by the web-site per million visitors, marketing, net profit
Chang ganghua (2015)	Total assets, the number of Internet media used in e-commerce, the investment in Internet advertising	Operating income
Zhang yanlin (2015)	Total assets, operating expenses, liabilities	Main business income, shareholder equity, net profit after tax
An kai (2014)	Net fixed assets, number of employees, main business costs	Main business income, total pre-tax profit
Ma bang (2014)	Total assets, administrative expenses, main business costs	Net profit, main business income
Li xiaoyu (2013)	Total assets, total liabilities, operating expenses	Operating income, net profit
Gan ping (2012)	Operating expenses, total assets and liabilities	Main business income, net profit after tax, shareholders' equity
Chuang shaoming (2006)	Total assets, shares outstanding, main business costs	Main business income, earnings per share, net profit, operating cash flow per share, inventory turnover
Ma zhengbing (2005)	Outstanding shares, total assets	Main business income, net profit, return on net assets, earnings per share, net cash flow from operating activities per share

This paper comprehensively uses the combination of horizontal analysis and vertical analysis to evaluate the operating efficiency of

e-commerce enterprises through empirical analysis, and uses the super-efficiency model to further evaluate the enterprises with better operating efficiency and put forward suggestions for improvement. Based on the data of sample enterprises in 2018, vertical efficiency analysis was conducted, and the enterprise operation data of the three years from 2016 to 2018 were used for horizontal analysis. Through the calculation of efficiency value, the competitiveness of various e-commerce demonstration enterprises was evaluated, and measures for improving the enterprise operation efficiency were discussed. The comprehensive method adopted in this study has more practical significance for the evaluation of the efficiency of e-commerce enterprises.

4. Empirical Analysis

4.1 Method Model Construction

It is widely and widely used to analyze and evaluate the scale economy effectiveness of production decision making units by DEA method, which is very mature in theory. DEA method can through the electronic commerce enterprise of input and output data to measure the scale efficiency and comprehensive efficiency, do not need to choose the production function to describe the relationship between the input and output, also need not consider input and output indicators of weight, especially in the field of electronic commerce, DEA is particularly suited to measure the change of scale efficiency and scale reward. In the selection of variables, there are no excessive requirements on categories, and the analysis results can be used to explain and solve the practical problems of e-commerce, with strong operability and time adaptability. In view of the equilibrium and representativeness of efficiency evaluation, 16 enterprises (3 comprehensive enterprises, 9 online retail enterprises and 4 e-commerce service enterprises) are selected as the research objects of this paper in the

classification of e-commerce demonstration enterprises(2017~2018), and each company has total assets of more than CNY 1 billion. The financial data of each enterprise comes from "http://www.eastmoney.com". According to the target principle, feasibility principle, simplicity principle, relevance principle and diversity principle of index selection[4], from the perspective of DEA application and combined with the summary and induction of other scholars, three variables were selected as input variables in this paper: total assets, administrative expenses and main business costs. Two variables are used as output variables: net profit and main business income. By correlation test, the results meet the requirements of DEA variables selection. Total assets is the total value of various resources invested by e-commerce enterprises. It can reflect the scale of enterprise development. Management fees mainly includes general and administrative expenses and sales and marketing expenses. These fees affect the operating efficiency of e-commerce enterprises, the size of enterprises and the number and depth of web-sites visits. Main business cost refers to an embodiment of the cost paid when the main business income is obtained, and it is an embodiment of the external value of resource input. Net profit refers to the final profit of an e-commerce enterprise after deducting the total profit from the enterprise income tax. It can directly show the profitability of the enterprise. Main business income reflects the total inflow of economic benefits obtained by e-commerce enterprises in the main business, as well as the scale and capability of enterprises. CCR model, BCC model and Super-CCR model were used to measure the data of the sample enterprises in 2018 and evaluate the operating efficiency of each enterprise in that year. The three-year data of the sample enterprises from 2016 to 2018 were measured to evaluate the changes in the operating efficiency of each enterprise, so as to obtain the improvement suggestions on the operating efficiency of enterprises.

4.2 Analysis Result

4.2.1 Research overview of e-commerce ecology

Sample data of various e-commerce demonstration enterprises in 2018 were selected for longitudinal efficiency analysis. DEA-Solver Pro5.0 software was applied to calculate the selected sample data by applying input-oriented CCR model, BCC model and Super-CCR model, and the comprehensive efficiency value, pure technical efficiency value and scale efficiency value of each enterprise were obtained, so as to obtain the efficiency effectiveness and RTS change of each enterprise in that year. As can be seen from Table 2, 7 of all sample enterprises have achieved effective technical efficiency, that is, PTE and SE are effective at the same time, and both values are 1. Through calculation, the comprehensive efficiency value of these enterprises is not only 1, but also the slacks are both 0, thus achieving DEA effectiveness, indicating that nearly half of the enterprises in the sample are at the minimum production frontier composed of all enterprises. These enterprises with effective comprehensive efficiency are those with strong profitability, active technological innovation and good business performance. All efficiency values of other enterprises are basically less than 1, so it can be considered that DEA is invalid.

The DEA model of each sample enterprise is input-oriented, which is the state of the minimum input shown under the given output level. Therefore, the 9 enterprises that DEA-invalid can project to the optimal production frontier by adjusting the redundancy of input, so as to improve efficiency. It can also be seen from table 2 that the mean value of SE of all sample enterprises reaches 0.9201. On the whole, SE is relatively high, indicating that these enterprises are in the state of scale economy. The mean value of the PTE of the sample enterprises is 0.9418. After further calculation, there are 3 enterprises with the PTE below 0.9, accounting for 18.75% of the total sample companies, which indicates that the current technical level of these enterprises needs to be

Table 2. DEA efficiency of sample enterprises in 2018

DMU	TE	PTE	SE	RTS
Focus Technology	0.8647	1	0.8647	drs
Huicong	0.7741	0.8300	0.9326	drs
NanJi E-Commerce	1	1	1	-
Yujiahui	1	1	1	-
Baozun	1	1	1	-
Three Squirrels	1	1	1	-
Zhidemai	1	1	1	-
Vipshop	1	1	1	-
Eurasia Group	0.5993	0.9179	0.6529	drs
Joyoung	0.8768	0.9877	0.8877	drs
Rainbow Store	0.7739	0.9844	0.7862	drs
AoKang	0.6388	0.6671	0.9576	-
FIYTA	0.7131	0.7143	0.9983	-
M&G	1	1	1	-
Yuyue Medical	0.7881	0.9671	0.8149	drs
S.F.	0.8269	1	0.8269	drs
Ave	0.8660	0.9418	0.9201	

further improved. Super-CCR model of DEA was used to measure the 7 DEA effective DMUs in 2018, and the corporate efficiency values of DEA were classified and sorted. Through the comparison of efficiency values, the enterprises with the best performance were obtained. Specific measurement values are shown in Table 3.

Table 3. Results of Super-CCR in 2018

DMU	Super-CCR	Rank
Focus Technology	0.8647	9
Huicong	0.7740	12
NanJi E-Commerce	12.6833	1
Yujiahui	1.3379	4
Baozun	1.1130	6
Three Squirrels	1.2830	5
Zhidemai	1.9833	2
Vipshop	1.3625	3
Eurasia Group	0.5993	16
Joyoung	0.8768	8
Rainbow Store	0.7739	13
AoKang	0.6388	15
FIYTA	0.7131	14
M&G	1.0342	7
Yuyue Medical	0.7881	11
S.F.	0.8269	10

As can be seen from Table 3, the top four enterprises in efficiency value are Nanji E-Commerce, Zhidemai, Vipshop and Yujiahui. As an enterprise transforming from a real economy enterprise to an e-commerce enterprise, Nanji E-Commerce is a typical representative of the transformation enterprise in terms of asset scale and domestic influence. Its high efficiency value indicates that resource input and output have reached a good allocation. Although the total asset size and profit are relatively low in these enterprises, they show high comprehensive technical efficiency. The main business of Vipshop is professional, so its revenue level is high, technology and management are synchronized, and the final comprehensive technical efficiency reaches its best level. At present, as a new representative of online retail, Yujiahui also realizes DEA efficiency from various indicators and the final efficiency value, which is higher than the comprehensive efficiency of the remaining 12 companies. The next four are Eurasia Group, AoKang, FIYTA and Rainbow Store. What is more special is that Eurasia Group has a large scale and a very high net profit every year. However,

according to DEA calculation, its comprehensive efficiency is only 0.5993. In 2018, the return on scale of the enterprise decreases, which indicates that its scale is too large rather than too small, and its technical innovation and management level have not kept pace with the pace of scale expansion. DEA model calculation based on 2018 annual data can only reflect the DMU efficiency level of each enterprise in that year, but it does not mean that the company is basically stable at this efficiency level every year, nor can it reflect the efficiency changes of each company in terms of scale and technology. In addition to the longitudinal analysis, but also need to carry on the dynamic measure, the efficiency value in each of the evaluation of time must be introduced to the DEA model, converting the static evaluation to dynamic evaluation, in order to achieve horizontal contrast[13], therefore, in this paper, based on the data of 16 enterprises in the three years from 2016 to 2018, input-oriented CCR model and BCC model were used to calculate each efficiency value, such as Table 4. Observe and analyze the change of enterprise efficiency. According to the data in Table 4, the efficiency values of Nanji E-Commerce,

Table 4. Measurement comparison of DEA efficiency 2016~2018

DMU	TE			PTE				SE			
	2016	2017	2018	2016	2017	2018	Ave	2016	2017	2018	Ave
Focus Technology	0.4991	0.5661	0.8647	0.6991	0.6573	1	0.7855	0.7138	0.8613	0.8647	0.8132
Huicong	0.5758	0.5549	0.7740	1	0.7629	0.8300	0.8643	0.5758	0.7273	0.9326	0.7452
Nanji E-Commerce	1	1	1	1	1	1	1	1	1	1	1
Yujiahui	1	1	1	1	1	1	1	1	1	1	1
Baozun	0.8424	0.8594	1	1	1	1	1	0.8424	0.8594	1	0.9006
Three Squirrels	1	1	1	1	1	1	1	1	1	1	1
Zhidemai	1	1	1	1	1	1	1	1	1	1	1
Vipshop	1	0.9400	1	1	1	1	1	1	0.9400	1	0.9800
Eurasia Group	0.7584	0.5614	0.5993	0.9357	0.9311	0.9179	0.9283	0.8105	0.6030	0.6529	0.6888
Joyoung	0.9455	0.7120	0.8768	1	1	0.9877	0.9959	0.9455	0.7120	0.8877	0.8484
Rainbow Store	0.6708	0.6329	0.7739	0.9789	0.9937	0.9844	0.9857	0.6853	0.6369	0.7862	0.7028
AoKang	0.6182	0.5836	0.6388	0.9376	0.7665	0.6671	0.7904	0.6593	0.7615	0.9576	0.7928
FIYTA	0.6263	0.6144	0.7131	0.8926	0.7672	0.7143	0.7914	0.7016	0.8008	0.9983	0.8336
M&G	1	0.7623	1	1	1	1	1	1	0.7623	1	0.9208
Yuyue Medical	0.6342	0.6387	0.7881	1	1	0.9671	0.9890	0.6342	0.6387	0.8149	0.6959
S.F.	0.8374	0.6019	0.8269	1	1	1	1	0.8374	0.6019	0.8269	0.7554

Yujiahui, Three Squirrels and Zhidemai were all 1 from 2016 to 2018, all reaching the effective level of DEA, indicating the stable development and good operation of several enterprises, and their comprehensive technical level has been stable in the best state. The technical efficiency of Vipshop and M&G only failed to reach 1 in 2017, while the efficiency value of the other two years was 1. Therefore, Vipshop and M&G are equivalent to the stable realization of DEA efficiency in these three years. The technical efficiency value of Baozun in 2018 is 1, which indicates that the technical efficiency value of the two years shows a trend of growth, indicating that Baozun has achieved great breakthroughs in technology in the three years, which is consistent with the actual situation. In the first two years, Joyoung and Yuyue Medical achieved pure technical efficiency and effectiveness. In the next two years, due to the business adjustment, there were technical changes, and the coordination of resource allocation and business model innovation still needed to be strengthened. After excluding the above 9 companies and observing the technical efficiency of the remaining 7 companies, it is found that the pure technical efficiency value of S.F. for three years is the best, which may be caused by unreasonable investment factor combination. From 2016 to 2018, 16 e-commerce enterprises realized effective technologies of 6, 4 and 7 respectively. The sample data of three years were calculated by using the Super-CCR model from the perspective of investment, and the competitiveness was ranked, as shown in Table 5. As can be seen from Table 5, the enterprises with strong competitiveness mainly include NanJi E-Commerce, Zhidemai, Yujiahui, and Three Squirrels. This is a relative competitiveness measured, but the performance of these enterprises is indeed better than other enterprises. And Vipshop also shows very strong competition ability. These three years comprehensive efficiency value, the most stable and able to show the competitiveness of enterprises

only electricity at NanJi E-Commerce and Zhidemai. It can be seen that, while reaching the optimal economic scale, NanJi E-Commerce and Zhidemai have realized the synchronous innovation of business models and the improvement of management level, and successfully developed the e-commerce business. As a result, they have shown such high and stable competitiveness and unique competitive advantages in the industry.

Table 5. Change of Super-CCR 2016~2018

DMU	Super-CCR			Rank		
	2016	2017	2018	2016	2017	2018
Focus Technology	0.4991	0.5661	0.8647	16	14	9
Huicong	0.5758	0.5549	0.7740	15	16	12
NanJi E-Commerce	10.6606	8.8461	12.6833	1	1	1
Yujiahui	1.3761	1.7801	1.3379	3	3	4
Baozun	0.8424	0.8594	1.1130	8	6	6
Three Squirrels	1.0936	1.3260	1.2830	6	4	5
Zhidemai	1.8822	2.4112	1.9833	2	2	2
Vipshop	1.2835	0.9400	1.3625	4	5	3
Eurasia Group	0.7584	0.5614	0.5993	10	15	16
Joyoung	0.9455	0.7120	0.8768	7	8	8
Rainbow Store	0.6708	0.6329	0.7739	11	10	13
AoKang	0.6181	0.5836	0.6388	14	13	15
FIYTA	0.6263	0.6144	0.7131	13	11	14
M&G	1.1080	0.7623	1.0342	5	7	7
Yuyue Medical	0.6342	0.6387	0.7881	12	9	11
S.F.	0.8374	0.6019	0.8269	9	12	10

4.3 Conclusion

From 2016 to 2018, the overall efficiency value of e-commerce demonstration enterprises has been steadily improved, which indicates that the applied technology in this industry is constantly improving, the business scale is also expanding, and the business capacity and business scale are gradually trying to adapt to each other. However, there are also considerable differences between the efficiency values of e-commerce demonstration enterprises. Some enterprises cannot realize the effectiveness of scale efficiency and pure technical efficiency, so they need to carry out different degrees of improvement and improvement

according to their respective operating characteristics. Based on the efficiency analysis results of the above e-commerce demonstration enterprises, enterprises should focus on promoting technological and business model innovation, appropriately expand the scale of e-commerce enterprises, so as to achieve the purpose of improving scale efficiency and pure technical efficiency, and improve the operating efficiency of enterprises.

5. Revelation

According to the needs of industrial development, enterprise scale should be adjusted reasonably: for enterprises in the stage of diminishing returns to scale, it is necessary to raise the balance point of return to scale and make their scale reach the economic level, which is conducive to the long-term development of enterprises. For enterprises with increasing returns to scale, it is necessary to further expand the scale of their resource input and achieve the balance between resources and technology, so that the enterprise will be in the long-term stage of constant return to scale, and then promote the enterprise to reach the optimal state of comprehensive efficiency and improve its comprehensive competitiveness. Increase the intensity of business model innovation, build enterprise core competitive ability, high pure technical efficiency in empirical research, mainly in the electronic commerce enterprise driven by business model innovation, and the data envelopment analysis results show that the e-commerce business model innovation contribution to the comprehensive efficiency also has the very big development space, should according to the development of the enterprise increase the intensity of e-commerce business model innovation, build the core competitiveness, keep competitive advantage in the fierce market competition. Type according to the similar enterprises to implement management demonstration:

e-commerce enterprises to improve business efficiency and competitiveness, choosing and its strength, size, scope of business is relatively close to the enterprise as its demonstration enterprise, constitute a mutual learning and mutual competition, the relationship between learning demonstration enterprise strengths to offset their own deficiencies, so as to improve the comprehensive competitiveness of enterprise. It is necessary to further improve the indicator system in future studies, select some indicators that better reflect the characteristics of e-commerce industry, and obtain more convincing efficiency analysis results through horizontal and vertical analysis. To deepen the study of the strategy of e-commerce enterprise operating efficiency, more in-depth practice.

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고 람(Lan Gao)

[정회원]



- 2003년 6월 : 중국 장춘공업대학교 컴퓨터과학과기술학과(공학사)
- 2008년 12월 : 길림대학교 컴퓨터기술학과(엔지니어링석사)
- 2018년 5월 ~ 현재 : 세한대학교 경영학과(박사과정)
- 2003년 6월 ~ 현재 : 길림공정기술사법학원 경제무역학부 교수
- 관심분야 : 국제전자상거래, 네트워크마케팅, 소프트웨어공학
- E-Mail : 272173689@qq.com

김 귀 정(Gui-Jung Kim)

[정회원]



- 1994년 2월 : 한남대학교 전자계산공학과 (공학사)
- 1996년 2월 : 한남대학교 전자계산공학과 (공학석사)
- 2003년 2월 : 경희대학교 전자계산공학과(공학박사)
- 2017년 3월 ~ 현재 : 백석대학교 ICT학부 교수
- 관심분야 : CRM, 정보보호, 전자상거래
- E-Mail : gjkim@bu.ac.kr

김 형 호(Hyung-Ho Kim)

[정회원]



- 1989년 2월 : 경희대학교 전자계산공학과(공학사)
- 1992년 8월 : 경희대학교 전자계산공학과(공학석사)
- 2018년 2월 : 인천대학교 동북아물류대학원(물류학박사)
- 1998년 3월 ~ 현재 : 세한대학교 항공교통물류학과 교수
- 관심분야 : 신경회로망, 항공운송, System Dynamics
- E-Mail : hhkim@sehan.ac.kr