

# Research on the Competitiveness of Chinese Circulating Enterprises

-Based on the Empirical Study of Listed Companies

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**Abstract**—It is significant to study the competitiveness of Chinese circulating enterprises quantitatively for the development of Chinese circulating industry. From the three dimensions of "scale factors", "growth factors" and "efficiency factors", this paper constructs an evaluation index system for competitiveness of circulating enterprises. The weight of the 14 indexes is calculated by AHP, and then the competitiveness index of listed Chinese circulating enterprises is calculated. Finally, variance analysis is used to analyze the difference of competitiveness among different types of circulating enterprises. The results show that under different "Internet plus", the competitiveness of entity enterprises is lower than that of other circulating enterprises. Secondly, under the different industry backgrounds, the competitiveness of retail enterprises is obviously higher than that of wholesale enterprises; the efficiency factors of retail enterprises are obviously higher than those of wholesale and logistics enterprises; the competitiveness of retail enterprises is obviously higher than that of logistics enterprises.

**Keywords**—Circulating enterprises; Competitiveness; AHP; Evaluation index system; Variance analysis

## I. INTRODUCTION

Circulating industry refers to various industries involved in the process of commodity circulation, including retail, wholesale and logistics. In 2017, the contribution rate of consumption to Chinese GDP has reached 58.8%. The circulating industry is very important in promoting consumption, booming market and expanding domestic demand. It is the basic industry for the development of national economy. The circulating enterprises is the microcosmic foundation of the development of the circulating industry. Circulating companies are the micro-foundations of the circulating industry. Quantitative research on the competitiveness of domestic circulating companies will help us to better analyze the development level of the domestic circulating industry and provide useful enlightenment for the development of circulating enterprises in China. The origin of circulating enterprises is rooted in the conflict between the separation of production and transaction. The conflict leads to the continuous increase of transaction costs. Circulating enterprises specialize in trading activities. They are producers/providers of specialization in trading. Their main economic function is to reduce transactions cost, improve exchange efficiency. The research objects include "the

wholesale and retail businesses" that undertake the business flow and the "transportation, warehousing and postal services" that undertake logistics.

## II. LITERATURE REVIEW

The competitiveness of an enterprise determines the future development of it. The environment, resources and capabilities it faces are the origins of building the enterprise's competitiveness. Domestic and foreign scholars have started to establish an evaluation index system for enterprise competitiveness from different angles, including qualitative analysis, quantitative analysis, and a combination of both. Porter (1980) is the first to study enterprise competitiveness from the perspective of industrial analysis [1]. With the in-depth study of the competitiveness of the enterprises, the study of its composition, the accurate measurement of its level and quantitative evaluation have gradually become one of the key research areas in this field.

Lots of scholars mainly focus on core competitiveness or key competitive advantage. Some researchers emphasized that certain capabilities or resources owned by circulating enterprises play an important role in their competitiveness. J.N. Wei found that the core competitiveness of the circulating enterprises is the efficiency of the circulation ability, that is to seek the ability to deliver the same product to the market demander faster than the competitor [2]. S.X. Xie and M. Hou think that the competitive advantage of logistics enterprises originates from their efficiency, which can be realized through cost leadership and service differentiation [3]. X.D. Wang and S.X. Wang regard circulation efficiency as the key to affecting the competitiveness of circulating enterprises, and use the operating efficiency of circulating enterprises to represent the circulation efficiency [4]. L. Lei found that the efficiency of the retail enterprises is related to the competitiveness of the enterprise, and uses the financial indicators to analyze the efficiency of the retail enterprises in different channels through the data envelopment analysis [5]. Some researchers start from the hypothesis of economies of scale and consider that the scale of enterprises is the main evaluation criteria of the competitiveness of circulating enterprises [6]. Z.J. Xie and Q.X. Wen research retail enterprises found that the most realistic choice to improve competitiveness is to achieve scale economy by expanding the business scale of the enterprise [7].

Y.B. Sun found that the large scale of operation is the guarantee of the development of retail enterprises and the promotion of competitiveness, only by expanding the scale, can the retail enterprises establish the good corporate image and obtain continuing resources [8].

Another kind of scholars set up the evaluation index system to measure the competitiveness of enterprises. The financial indicators of the company are used as an intuitive external representation of the competitiveness of the company, based on its characteristics that are easy to calculate and observe. B. Jin established the evaluation index system of enterprises competitiveness based on financial indicators, including scale factors, growth factors and efficiency factors [9]. The system has strong applicability and can be applied to the monitoring of cross-industry companies, compare the competitiveness of different companies, and improve year after year. Since then, many scholars based on the system, combining specific industry features such as publishing, manufacturing to evaluate the competitiveness of enterprises [10-11]. In addition, many scholars use financial indicators to construct the evaluation index system of the competitiveness of the circulating enterprises, such as logistics and retail. Among them, H.M. Xie and C. Fan both constructed explicit indicators from four aspects: profitability, operational ability, solvency and growth capacity [12-13]. Some scholars proposed to combine qualitative and quantitative indicators to evaluate the competitiveness of enterprises [14-15]. W. Hong and X.F. Wang based on the research results of the related third party logistics enterprise performance evaluation index system, constructs a qualitative and quantitative evaluation index system for the competitiveness of the third party logistics; firstly, the index is simplified based on the rough set theory, and then a blind number evaluation model is established to quantify the competitiveness of the enterprises; The index system includes 8 indexes, such as resource level, operation ability, information processing ability, management cost, management coordination ability, fund level, network coverage level and industry experience[16]. X.D. Wang and X.Y. Wan selected enterprise scale, financing ability, profitability, R & D ability and management ability as evaluation indexes and using principal component analysis to evaluate the core competitiveness of Chinese small or medium-sized foreign trade enterprises [17].

Through the review of the literatures, we can find that the domestic and foreign scholars' researches on the competitiveness of the circulating enterprises are mainly focused on the core competitiveness or key competitiveness of individual industries or specific enterprises, and the lack of the establishment and measurement of the overall competitiveness of the circulation system. Based on the above scholars' research, this paper constructs the evaluation index system of the competitiveness of the circulating enterprises based on the financial index, and uses AHP to quantify the index of the evaluation system to get the ranking of the competitiveness of the circulating enterprises in China.

### III. THE CONSTRUCTION OF THE EVALUATION INDEX SYSTEM OF CIRCULATING ENTERPRISES COMPETITIVENESS

#### A. *The design of the evaluation index system of Circulating Enterprises competitiveness*

##### 1) *Selection of evaluation system indicators*

In the process of constructing the competitiveness evaluation index system of circulating enterprises, the main criteria for selecting indicators are as follows: first, feasibility. Non-quantitative indicators such as resources and environment generally need to be evaluated through questionnaire survey and subjective evaluation. In order to ensure the feasibility of the research. The research data mainly comes from the financial index data of listed companies in China. Second, convenience. Although some qualitative indicators could be quantified, but it is difficult to obtain in public financial reports. This article comprehensively collates the available data and evaluates them. Third, objectivity. Avoid choosing indicators that rely on professional experience to judge, such as asset liability ratio and liquidity ratio. They should be in the middle position as a moderate indicator.

##### 2) *Establishment of evaluation index system*

This paper, based on the domestic and foreign scholars' studies, mainly are the enterprise competitiveness evaluation system constructed by B. Jin, combining the important influence of the circulation efficiency and the scale of enterprise to the competitiveness of the circulating enterprises in China, and constructs a set of standard system for evaluating the competitiveness of the circulating enterprises which are suitable for present situation of our country. The index system not only considers the general characteristics of circulation companies, but also considers its unique characteristics, adopts widely used indicators in various index systems, and appropriately increases certain indicators, including a total of: including a one-level index, three two-level index and fourteen three-level index. The evaluation index system of the circulating enterprise competitiveness is shown in Table 1. The following describes the content of the indicator in detail.

##### a) *Scale factors*

Sales revenue reflects the level of total output, net profit reflects the final results of business operations, total assets reflect capital input, net assets reflect the overall economic strength of the company, and employee numbers reflect labor input. Through the measurement of these five indicators, we can accurately reflect the level of scale competitiveness of Chinese circulating companies.

##### b) *Growth factors*

The growth rate of sales revenue in the past three years = (current sales revenue / sales revenue three years ago)<sup>1/3</sup>-1, which reflects the profitability and business structure of the company.

Net profit growth rate in the past three years = (net profit in the year/net profit three years ago)<sup>1/3</sup>-1, which reflects the growth of sales revenue, market share changes, and market expansion capabilities of enterprises in a certain period of time.

The total asset growth rate in the past three years = (total assets in the current year/total assets three years ago) <sup>1/3</sup>-1, which reflects the speed of business expansion.

Through the measurement of these three indicators, we can accurately reflect the level of growth competitiveness of Chinese circulating companies.

*c) Efficiency factors*

Return on net assets = net profit/average net assets, which reflects the combined results of the company's operating ability, solvency and profitability.

Current asset turnover = operating income/average current assets. This indicator reflects the operating efficiency of the company's current assets.

Per capita annual sales of business = sales revenue / number of employees, this indicator is used to measure the labor efficiency of circulating enterprises.

Inventory turnover ratio = operating income/average inventory. This indicator measures the balance of purchasing and sales efficiency of circulating companies, as well as the short-term debt repayment ability of companies, and the efficiency of marketing companies.

Total asset turnover = operating income/average total assets. This indicator reflects the company's operating efficiency and sales ability.

Average annual gross profit = (operating income - operating cost) / number of employees, this indicator reflects the company's technological level, management efficiency and other soft competitiveness.

Through the measurement of these six indicators, we can accurately reflect the level of growth competitiveness of Chinese circulating companies.

TABLE I EVALUATION INDEX SYSTEM FOR COMPETITIVENESS OF CIRCULATING ENTERPRISES

<i>One-Level Index</i>	<i>Two-Level Index</i>	<i>Three-Level Index</i>	
The competitiveness of circulating enterprise	Scale factors	Sales revenue	
		Net Profit	
		Total assets	
		Net asset	
		Number of Employees	
	Growth factors	Sales revenue growth rate in the last three years	
		Net profit growth rate for the last three years	
		Total asset growth rate in the last three years	
	Efficiency factors	ROE	
		Current Assets Turnover	
		Annual sales per capita	
		Inventory turnover ratio	
		Total Assets Turnover	
			Per capita gross profit

*B. Evaluation index weight assignment of circulating enterprise*

AHP is a practical quantitative multi-criterion decision method proposed by Professor Thomas L.Saaty in 1970s. This method quantifies the subjective judgment of the decision-maker, and applies to the complex and difficult quantized situation of the system. First, AHP decomposes the complex problem into several elements, and each element establishes an analytic hierarchy structure according to the correlation. Then, by distributing questionnaires to experts and combining the experience of experts, various weights are assigned to the indicators so that the evaluation indicators of circulating companies can be distinguished from other industry.

Based on the survey of industry experts, this paper uses AHP method to compare the hierarchical structure of the established evaluation index system and the relationship between the elements to establish a judgment matrix. The comparison of the judgment matrix mainly adopts 1-9 and its reciprocal as the scale [18]. In order to overcome the disadvantages of judging when the subjectivity is strong, the scores of the experts are averaged to obtain a more reasonable judgment value, and then the normalized processing is performed to determine the main feature vector and the characteristic value of each indicator in the lower layer of each indicator. Then calculate the weight of each index, and carry out consistency inspection, using AHP analysis software to obtain index weights. The specific weights are shown in Table 2:

**TABLE II THE WEIGHT VALUE OF EVALUATION INDEX OF CIRCULATING ENTERPRISE COMPETITIVENESS**

<i>One-Level index</i>	<i>Two-Level index</i>	<i>Three-Level index</i>	<i>Weight</i>
The competitiveness of circulating enterprises	Scale factors 0.5080	Sales revenue	0.1741
		Net profit	0.0722
		Total assets	0.0520
		Net asset	0.0480
		Number of Employees	0.0169
	Growth factors 0.2211	Sales revenue growth rate in the last 3 years	0.0752
		Net profit growth rate for the last 3 years	0.0513
		Total asset growth rate in the last 3 years	0.0522
	Efficiency factors 0.2709	ROE	0.1247
		Current Assets Turnover	0.0539
		Annual sales per capita	0.1013
		Inventory turnover ratio	0.0510
		Total Assets Turnover	0.0167
Per capita gross profit		0.0955	

As can be seen from table 2, the scale factors is the largest and the efficiency factors occupies the second place, and the growth factors is followed by it. The importance of each three level index is sales income, net asset yield, per capita annual sales of enterprises, annual gross profit of enterprise, net profit growth rate, net profit, total asset growth rate in nearly three years, total assets, net profit growth rate of nearly three years, inventory turnover rate, net assets, employee number, total asset week. Rate of transfer.

#### IV. AN EMPIRICAL ANALYSIS OF THE COMPETITIVENESS EVALUATION INDEX SYSTEM OF CIRCULATING ENTERPRISES

In order to further analyze the heterogeneity of the competitiveness of Chinese Circulating Enterprises, we used one-way ANOVA to compare the differences of the competitiveness of the Circulating Enterprises.

##### A. Sample selection and data sources

###### 1) Sample selection

In accordance with the industry classification standards of the China Securities Regulatory Commission in 2012, this paper selects the listed companies of the A-share of the Shanghai Stock Exchange and the Shenzhen Stock Exchange for 2014-2016 years as the original sample, and eliminate the following enterprises: (1) The data of companies that had been abnormally operated by ST stock companies; (2) the lack of data in the enterprises (such as inventory turnover) and after 2011 Listed companies (because they did not publish the annual report of 2011); (3) Excluding companies with poor operating conditions (such as negative net profit); (4) the classification of the circulating industry is based on the "Guidelines for Industry Classification of Listed Companies (Revised in 2012)", selecting wholesale and retail, transportation, warehousing and postal services. According to its main business income, enterprises that do not meet the

circulation industry restrictions are excluded. (5) Excluding business abnormality data (such as abnormal stock turnover rate).

###### 2) Data sources

The research data are mainly derived from the CSMAR and the Straight Flush. Some of the missing data are supplemented by the annual reports publicly disclosed by the Shanghai Stock Exchange's website and the Shenzhen Stock Exchange's website.

###### 3) Data processing flow

First, we took the natural logarithm of the index of the scale factors and some indexes of the efficiency factors (the annual sales per capita the annual gross profit).secondly, the paper compared the indexes of each year to the unified measurement standard. When the quasi finger is multiplied by weight, the standard value of the enterprise's annual competitive base data is obtained. Subsequently, the average value of the data for 2014-2016 years is calculated because the competitiveness is the long-term relative competitive advantage of the enterprise, and the average value is the competitiveness index. Finally, using analysis of variance, we thoroughly discussed the differences in the competitiveness of circulation companies in different contexts.

**B. Empirical results**

*1) Competitiveness ranking of Circulating Enterprises*

The following is the ranking of Chinese Circulating Enterprises. Due to the limited space, only the top 10

enterprises with competitive competitiveness are reported below.

**TABLE III THE TOP 10 OF THE COMPETITIVENESS OF THE CIRCULATING ENTERPRISES**

<i>Ran-king</i>	<i>Code</i>	<i>Scale Factors</i>	<i>Growth Factors</i>	<i>Efficiency Factors</i>	<i>Enterprise Competitiveness</i>
1	000626	0.2978	0.0716	1.1285	1.4978
2	600153	0.7464	-0.0026	0.3603	1.1041
3	600180	0.1291	0.1059	0.6866	0.9215
4	000963	0.2880	0.0176	0.6091	0.9147
6	600704	0.6247	0.1119	0.1772	0.9138
6	600755	0.5176	0.0020	0.3264	0.8461
7	002024	0.6844	0.0087	0.1246	0.8178
8	600335	0.4322	-0.0203	0.3838	0.7958
9	601607	0.7287	0.0024	0.0252	0.7563
10	002221	0.1787	0.1897	0.3228	0.6912

Data Source: the Author Finishing

In the top ten ranks of the competitiveness of the Circulating Enterprises, the retail enterprises occupies 7 seats, and only 3 of the wholesale enterprises are listed in the list. The logistics enterprises is not listed in the list, which can be explained to some extent that the competitiveness of the retail enterprises is stronger than the wholesale and logistics enterprises.

Judging from the score of the components of competitiveness, the first ten Circulating Enterprises are not in the absolute advantage in all aspects, and usually have a strong position in one certain aspect far beyond the other Circulating Enterprises. Therefore, for the Circulating Enterprises, the overall development is not as good as "each has its strong points".

*2) One-way ANOVA of circulating enterprise competitiveness*

One-way ANOVA is a statistical method used to test the significance of differences in the mean of two or more samples, or whether different levels of a variable cause significant differences and changes in an observed variable. In order to better observe the differences in the level of competitiveness of different types of circulating enterprises, we analyze the results of the competitiveness and competitiveness of different types of circulating enterprises by one-way ANOVA. Because the one-way ANOVA is not strictly required for normality, and the data basically satisfies independence, this paper mainly tested whether the homogeneity of variance is satisfied, and then analysis of variance is performed.

*a) Descriptive statistics*

A total of 133 data were collected from the Circulating Enterprises, and the distribution of specific industries and "Internet plus" levels are shown below.

**TABLE IV DESCRIPTIVE STATISTICS**

		<b>Rate</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Industry	Retail enterprises	54	40.6	40.6	40.6
	Wholesale enterprises	46	34.5	34.5	75.1
	Logistics enterprises	33	24.8	24.8	100
Internet plus	Entity	25	18.8	18.8	18.8
	Low-level	65	48.9	48.9	67.7
	High-level	43	32.3	32.3	100

From the above table you can find:

Firstly, from the distribution of the circulating industry, it can be found that retail companies account for about half of

Chinese listed circulating companies, and its number is the largest, which can also reflect the strong competitiveness of the retail industry from the side.

Secondly, from the "Internet plus" level, it can be seen that most of the circulating enterprises in China use Internet technology to expand their business, but most of them are using the technology of the enterprise at a low-level. They only use the Internet as a technological means and do not fully play the role of the Internet.

*b) "Internet plus" background, analysis of the competitiveness of Circulating Enterprises difference*

The development of information technology characterized by "Internet Plus" has greatly promoted the development of the circulation industry, including trading methods, industrial organizations, and commercial formats. The rapid development of "Internet Plus" technology has also caused

traditional distribution companies to face many challenges. According to the degree of "Internet Plus", the enterprises are divided into three categories: the first is the entity circulating enterprises, mainly refers to the traditional offline circulating enterprises; the second is the low-level "Internet+" enterprises, the third category It is the high-level "Internet+" enterprises, and the latter two types of circulating enterprises use "Internet+" to carry out marketing activities. This paper tests the homogeneity of overall variance for different levels of scale factors, growth factors, efficiency factors and company competitiveness. The results show that the concomitant probability values are 0.854, 0.086, 0.821, and 0.946, respectively, which are greater than the significance level of 0.05. Therefore, the variances of scale factors, growth factors, efficiency factors, and company competitiveness under the "Internet Plus" level all meet the homogeneity test of variance. Therefore, the LSD (L) method, which assumes homogeneity of variance, is selected for multiple comparison.

TABLE V MULTIPLE COMPARISON TABLE OF "INTERNET PLUS"

<i>Dependent Variable</i>	<i>(I) Internet Plus</i>	<i>(J) Internet Plus</i>	<i>(I-J)</i>	<i>S.E.</i>	<i>Sig.</i>
scale factors	Entity	Low- level	-0.2584	0.0680	<b>0.000</b>
		High-level	-0.2858	0.0747	<b>0.000</b>
Enterprise competitiveness	Entity	Low-level	-0.3378	0.1101	<b>0.003</b>
		High-level	-0.3706	0.1208	<b>0.003</b>

Note: Due to space reasons, only packet data with significant differences have been reported

From the results of data processing, it can be seen that there are significant differences between entity retail enterprises and "Internet +" circulation companies in terms of scale factors and enterprise competitiveness. The competitiveness of circulating enterprises is obviously lower than that of circulating companies that implement the "Internet plus".

*c) The difference of competitiveness of Circulating Enterprises under different industry backgrounds*

According to related studies, differences in the total factor productivity and performance among different industries in the circulating industry in China have been confirmed [19-20]. Therefore, more in-depth inspections are required before they can be accurate. To determine the gap in the competitiveness of different circulation industries. Firstly, the homogeneity test of variance was performed. The results showed that the concomitant probability values were 0.763, 0.281, 0.135, and 0.128, respectively, which were greater than the significance level of 0.05. Therefore, the variance of scale factors, growth factors, efficiency, and overall competitiveness under different industry types all meet the homogeneity test of variance. Therefore, the LSD (L) method, which assumes homogeneity of variance, is selected for multiple comparisons.

**TABLE VI** MULTIPLE COMPARISON TABLES FOR DIFFERENT INDUSTRIES

<i>Dependent Variable</i>	<i>(I) Industry</i>	<i>(J) Industry</i>	<i>(I-J)</i>	<i>Standard Error</i>	<i>Sig.</i>
Growth factors	Wholesale	Retail	-0.0367	0.0173	<b>0.035</b>
		Logistics	-0.0259	0.0190	0.174
Efficiency factors	Retail	Wholesale	0.1647	0.0452	<b>0.000</b>
		Logistics	0.2440	0.0514	<b>0.000</b>
Enterprise competitiveness	Retail	Wholesale	0.1931	0.9799	0.051
		Logistics	0.2805	0.1114	<b>0.013</b>

Note: Due to space reasons, only packet data with significant differences have been reported

From the above table, we can see that in terms of growth factors, the competitiveness of retail enterprises is significantly higher than that of wholesale enterprises; in terms of efficiency factors, the efficiency factors of retail enterprises is significantly higher than that of wholesale and logistics enterprises; the competitiveness of retail enterprises is obviously higher than that of logistics enterprises.

#### V. CONCLUSIONS AND DISCUSSIONS

Based on the characteristics of the circulating enterprises and the studies of the competitiveness of the companies by domestic and foreign scholars, this paper constructs an evaluation index system for the circulating enterprises competitiveness, and applies this system to analyze the competitiveness of the listed circulating enterprises in China. Through the analysis of the differences in the competitiveness of circulating enterprises under different industries and "Internet Plus" levels, the results of this study indicated that: first of all, from the results of data processing, it can be seen that there are significant differences between entity circulating enterprises and "Internet + circulating companies" in terms of scale factors and enterprise competitiveness. The competitiveness of entity circulating companies is significantly lower than that of "Internet + circulating enterprises." Secondly, in the context of different industries, the growth factors of retail enterprises is significantly higher than that of wholesale enterprises; the competitiveness of retail enterprises

is significantly higher than that of wholesale and logistics companies; overall, the competitiveness of retail enterprises is significantly higher than that of logistics enterprises. .

This article integrates a large number of scholars on the study of corporate competitiveness, and combines the relevant literatures on the competitive advantage of circulating companies to construct a circulating enterprise competitiveness evaluation index system. The evaluation index system can reflect the essence and characteristics of the circulating enterprises more comprehensively than the previous competitiveness index system constructed by other scholars.

Based on the above conclusions, this paper proposes: First, taking into account the consistency of retail, wholesale and logistics companies' competitiveness and the differences in their leading factors, when formulating corporate development plans, we should further coordinate and optimize the coordinated development of corporate competitiveness. Focus on optimizing and improving circulation efficiency to improve the competitiveness of enterprises. Retail enterprises and logistics companies are more focused on improving their growth factors to improve their competitiveness. Second, there is still much room for improvement in the use of Internet in Chinese enterprises. With the popularization and development of the Internet, Chinese circulating companies should seize the opportunity to use the "Internet Plus" business to continuously improve their competitiveness.

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