



Research on the Impact Factors of Cross-Border Cooperation of Logistics Enterprises

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Abstract: This paper centers on the different impact factors of cross-border cooperation of logistics enterprises, Internet brings a new development strategy for logistics enterprise. At the same time, products and industry boundaries begin to blur between enterprises. However, it has not yet meet the needs of the market which traditionally focus on a single field strategy. Therefore, it is necessary to attract the attention of logistics enterprises because of cross-boundary integration and horizontal progress. Cross-border can bring new value to consumers and help enterprises to diversify risk advantage, setting up a new business model to optimize the structure of the industry, so it is necessary to research on the impact factors of cross-border cooperation of logistics enterprises under the Internet.

Keywords: Logistics Enterprises, Cross-Border, Impact Factors

1. Introduction

There are many factors to develop cross-border cooperation of logistics enterprises, which are mutual restraint and mutual influence. According to enterprise growth theory, reform theory and diversification theory, we summed up the main factors that affecting trans-boundary operating of logistics enterprises. The quantitative comparison cannot be distinguished between these factors. Then we have an obligation to transfer semi-qualitative and semi-quantitative problems to the arithmetical calculation. We use the AHP method to deal with complex hierarchical decision system and compare the related factors layer by layer, in order to analyze and provide a quantitative decision basis finally.

The problem of Logistics enterprises facing to be solved is to quickly enhance the level, which is a clear sign that can use the standard to measure mutation. It is a progressive, fast evolution. The cross-border is the most critical environment change that the logistics enterprises must face [1]. Why the cross-border is necessary for logistics enterprises? This paper answered the question from three aspects shown as follows:

Integrating logistics resources to meet the needs of individual customers. Customer demand begins to become

fragmented under Internet plus, it can be said that every customer is a niche market, logistics enterprises not only should meet more personalized customer needs, but also should control the costs within reasonable limits. Logistics enterprises need to integrate resources to promote the extension of the development in order to achieve a new balance cost and a high level of logistics services. With the deepening development of the Internet, the demand for logistics has distinct requirements. There are diversities and hierarchies, basics and value-added demands. Services provided by logistics enterprises not only contain customary transportation and warehousing, but also require more comprehensive value-added service. For example, timely delivery and feedback logistics information, door to door service, full tracking logistics information, cash on delivery, the provision of logistics related to electronic device applications, online product line, experience and other services, which enhance the value of consumer determination for commodities. Logistics enterprises must have a pattern that can rapidly raise the level under transboundary environmental [2]. So we implemented cross-border management for logistics enterprises to meet customer individualized demand under Internet plus environment.

Logistics should decentralize enterprise risks by cross-border cooperation in order to enhance the right to speak. In the Internet environment, the amount of single distribution is increasing gradually so that logistics companies have to distribute more human and material resources. Once the e-commerce business coming off-season, the logistics business before delivery manpower and logistics will be idle, which also contributes to the process that logistics companies operating cross-border to spread risk. Characteristics of the Internet age are continually cross-bordering of companies and integrating resources. Logistics enterprises functions are changing, in the past, they had only simple logistics and distribution functions and has no right to speak. Logistics enterprises need to be decision-makers and make full use of existing resources in order to reduce costs and expand profit margins, such as using big data to guide the production and even establishing their own supply chain. This time, logistics should integrate and optimize resources on an industry platform and between enterprises. Logistics enterprises should acquire the right to make a statement about how to change the future development of enterprises and what the development trends of enterprise supply chain will be in the future. Therefore, logistics companies try to compete for the position in the supply chain by the cross-border operation.

Improving logistics enterprises brand awareness to take participate in international competition. When it comes to logistics companies, it's usually refers to FedEx, UPS, DHL and other well-known international logistics enterprises, these logistics companies acquire strong international competitiveness and have rich experience of programs to provide customers with value-added logistics services and integrated solutions. Meanwhile, there are a lot of small and medium-sized logistics enterprises in China, the development model is still relatively difficult to provide integrated supply chain management services. The level of consumer satisfaction for logistics services still relatively low, there is a serious mismatch between demand and supply resulting in a low brand awareness. Thus, logistics enterprises began to extent services, cooperating with e-commerce companies to build brand, market plans, promotional activities, and re-packaging design for commodity price tag or barcode printing, also including some specialized services specific goods, such as provide cold storage services for food and pharmaceutical customers. Logistics enterprises should carry out diversification based on related the core business [3]. At the same time, enhancing the professional logistics supply capabilities to meet a large number of consumers demand and individual needs, not only can pull involved in the field of new product sales, but also promote sales of original products, enriching the connotation of corporate brand, enhancing the vitality of the brand, and snatching market with the international logistics giants.

2. Materials and Methods

2.1. *The Purpose and Nature of Logistics Enterprises Cross-Border Management*

A lot of influencing elements of Cross-border cooperation are irrelevant and even incompatible to get connected to generate value [4]. Cross-border operations can achieve the follow purposes: (1) Spreading risk and improving the safety level of operational. The ups and downs of the business cycle, changes in market conditions and the evolution of the competitive situation have a direct impact on the survival and development. (2) Helping the enterprises to transfer good prospects to the emerging industry. Because of the impact of the new technological revolution, which has produced a number of high-techs and emerging industries. Diversified business enterprises should try to expand new industries based on the original one, because on the one hand, it can reduce competitive pressures of the primary market, and on the other hand, industry sector can gradually transfer from slowing the growth rate of income to improving rate of income. (3) Promoting the development of the original enterprise business. Many industries have the mutually reinforcing effect. Through diversification and extension, services always up to promote the development of the original business. Developing cross-border of logistics business is a daunting project that calls for open ideas, awareness, overall planning, and should be conducted step by step [5].

Cross-border business should fall within the scope of enterprise diversification [6]. The essence of the cross-border is plurality of requirements. The only standard is that whether it has attained the purpose of enhance the company's core competencies for the range of cross-border [7]. Cross-border business is not a standard concept in economics, and academia currently do not have much relevant literatures, but this does not prevent us from its research and discussion. Chen Yongmin constructed a mathematical model, and draw conclusion that diversification is an effective way to convey its competitive signal to competitors [8].

The essence of key cross-border business success depends on whether it can effectively integrate resources to choose the right people at the right cost, establish a rational system and create a good culture. In addition, it is necessary to strengthen the speed and execute decisions. It can be summarized that the key cross-border business to success are solid financial strength, efficient decision-making team and right people. Logistics enterprises should sum up the successful experience to talk steps forward, I suggest that a small logistics companies should pursuit of specialization, medium and large logistics should cross-border on the basis of specialization [9].

2.2. *Construction Evaluation System Based on Analytic Hierarchy Process (AHP)*

After consulting experts, as well as summarizing the characteristics of logistics enterprises and the data condition,

we finally chose 14 indicators to establish the indicator system. Moreover, we adopt AHP method to learn the evaluation indicators weight and standardize the indicators data.

2.2.1. The Establishment of a Hierarchical Structure Model

According to the factors of trans-boundary operations of logistics, the Indicators 'System shown as follows:

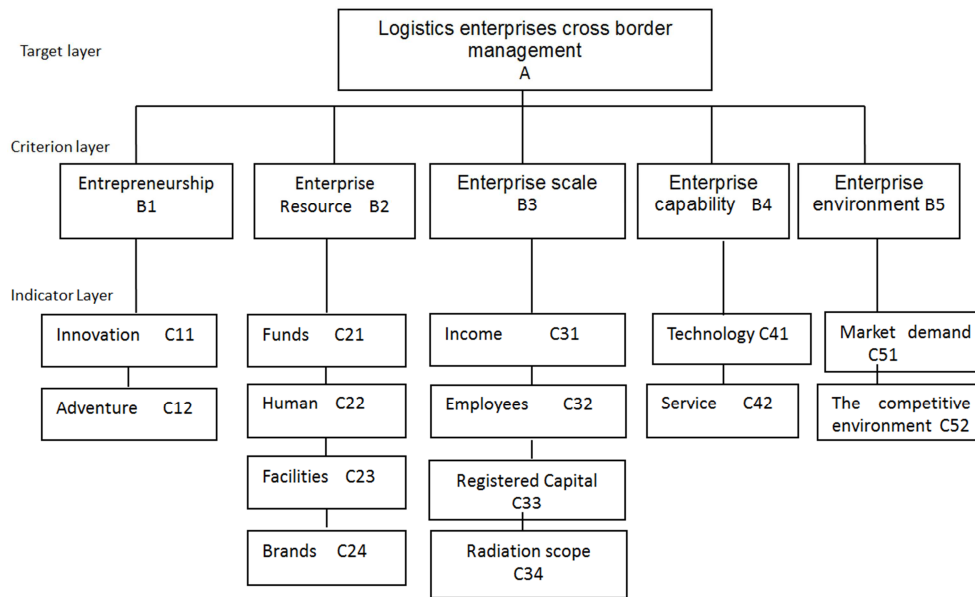


Figure 1. Indicators System of Logistics Cross-border.

2.2.2. Depending on the Analytic Hierarchy Process (AHP) of Qualitative Indicators

In order to evaluate the database, the indicators scores have been set to nine grades, each index score given only 1, 3, 5, 7, 9 five grade standards. The corresponding 2, 4, 6, 8 grades are between the two Indicators. Corresponding to the definition are shown in table 1.

Table 1. The Indicators Scale and Meaning.

Scale	meaning
1	equal importance
3	one factor is slightly more important than the other one
5	one factor is important than the other one.
7	one factor is significantly more important than the other one
9	one factor is extremely more important than the other
2, 4, 6, 8	the above is worth the middle scale for the need to reach a compromise occasion

Although we can see the same direction between indicators and the ability to extend, there are the relative indexes and average index numbers, the result shows that the dimensions of targets are inconsistent, the magnitude of disparity is also great. We will not be satisfied with the results if we use such an indicator value directly to the subsequent calculation. In order to solve this problem, this paper intends to use the basic method to standardize the indicators for eliminating the gap between the dimension levels.

2.2.3. Constructing the Judgment Matrix

First, we calculate the maximum eigenvalue, corresponding eigenvector, coincidence indicator, and random consistency indicators. The judgment matrix indicates the importance of the relevant factors on the upper

level of a certain element. Its value counter reflects people's understanding of the importance of various factors. This paper constructs the matrix as follows:

Target layer- Criterion layer

$$B=[B_1, B_2, B_3]$$

Criteria layer -Measure layer

$$C=[C_{11}, C_{12}, C_{13}; C_{21}, C_{22}, C_{23}; C_{31}, C_{32}, C_{33}]$$

Construction judgment matrix is an elementary work, because the weight of the index should have relative stability and the scope of adaptation, and should take the importance of these indicators into consideration as objectively as possible. So we can invite an experienced expert to assess.

2.2.4. Single Hierarchical Arrangement

Based on the judgment matrix for the upper layer of an element, the right of this level in the order of importance of the elements weight can be transferred to the problem of calculating the characteristic vector of the judgment matrix. That is to judge the matrix B calculation to meet:

$$(B - \lambda_{max} E)X = 0$$

λ as a characteristic value of B, the corresponding non-zero solution vector X is called the characteristic vector of the characteristic value.

The numerical of judgment matrix is given according to the comprehensive understanding of expert opinion and analysis data. Therefore, it has certain fuzziness and subjective, randomness. So the results of sorting need to verify the consistency. Consistency test index: $CI = \frac{\lambda_{max} - n}{n - 1}$, means random consistency index RI, as shown in table 2. When random consistency ratio $CR = CI/RI \leq 0.1$, judgment matrix is basically in accordance with the random

consistency index; $CR=CI/RI>0.1$, the judgment matrix does not conform to the random consistency index and should readjust the judgment matrix.

Table 2. Average random consistency index.

Order	1	2	3	4	5	6	7	8	9
RI	0	0	0.52	0.89	1.12	1.26	1.36	1.41	1.46

2.2.5. Total Taxes of Hierarchy

We calculated all the factors of the relative importance weights order for the highest level of the hierarchy according to the same level. This process from the highest level to the lowest level based on the layer by layer. In this example, the layer B includes m elements $B_1, B_2 \dots B_m$, it is assumed that the total level of ordering have weights of $b_1, b_2 \dots b_m$, corresponding to the next level C comprises n factors $C_1, C_2, \dots C_n$, which for factor B, weights order of single hierarchical arrangement were $C_{1j}, C_{2j} \dots C_{nj}$. Finally, we obtained a total level sort, which shown in Table 3.

Table 3. Total taxes of hierarchy.

B	B_1	B_2	B_m	Total ranking of levels
C	b_1	b_1	b_{1m}	
C_1	C_{11}	C_{12}	C_{1m}	$\sum_{i=1}^m bi C_{1j}$
C_2	C_{21}	C_{22}	C_{2m}	$\sum_{j=1}^m bi C_{2j}$
C_n	C_{n1}	C_{n2}	C_{nm}	$\sum_{j=1}^m bi C_{3j}$

3. Results and Discussion

3.1. Comprehensive Calculation Formula

We can get the comprehensive index of various factors from the above weights, the index value, and the size of contribution rate of each factor.

From the comprehensive point of view, diversified is really not a simple addition of each factor, but the consequences of their mutual coordination and interaction. The implementation of diversification strategy will not means give up the case of the product line in the new product at any time, but these new products and existing products will be very different in the production and marketing [10]. An evaluation of the diversity index is the pursuit of the overall best, not just one aspect of the neglect of other aspects. Diversification is a strategy, the essence of the new areas of expansion and extension are developing the ability of new and strengthen capacity of existing [11]. Because there is interdependence and mutual restraint relationship between the factors, if other aspects have not been corresponding increased, or a factor increase quickly, it is impossible to establish a solid core to the whole of unexpected contention force.

Based on above analysis. We can concluded that this paper used the method of index average to calculate the inclusive index of diversified operation. The weighted arithmetic

average method was utilized to calculate the composite index of the elementary factors. At the same time, some indexes are complementary, and the weighted arithmetic average method can better reflect the inclusive level of the factors.

$$\text{Composite index: } A = \prod_{i=1}^5 X_i B_i$$

$$\text{Entrepreneur's spirit index: } B_1 = \sum_{j=1}^2 X_{1j} C_{1j}$$

$$\text{Enterprise resource index: } B_2 = \sum_{j=1}^4 X_{2j} C_{2j}$$

$$\text{Enterprise scale index: } B_3 = \sum_{j=1}^4 X_{3j} C_{3j}$$

$$\text{Enterprise capability index: } B_4 = \sum_{j=1}^2 X_{4j} C_{4j}$$

$$\text{Enterprise environment index: } B_5 = \sum_{j=1}^2 X_{5j} C_{5j}$$

3.2. Calculating the Influence of Various Factors

The influence of various factors on the comprehensive level of diversified development

Revealing the diversification of logistics enterprises, as well as the cause of the problem, we need to further calculate the factors and effects of indicators on diversification development level and diversification rate.

The influence of various factors on the comprehensive level of diversified development:

$$b_i = \frac{X_i B_i}{\sum_{i=1}^5 X_i B_i}$$

The function of each index to the basic factors and its effect on the comprehensive level of the core competence:

$$C'_{ij} = \frac{X_{ij} C_{ij}}{B_i}$$

$$C''_{ij} = \frac{X_j C_{ij}}{\sum X_i B_i}$$

Thus, Operating cross-border of logistics is not a bad thing, it is the meaning of the depth of promotion of the logistics and more conducive to optimize their business [12]. We are not only able to measure the level of development of cross-border integration and various business fundamentals overall level by the above formulas, but also to measure their dynamic trends and to reveal the different factors on the size of core competitiveness, so as to point out the directions and ways for logistics enterprise.

3.3. Achievements and Shortcomings

The cross-border cooperation of logistics enterprises is a form of enterprise reform. During this process, the internet technology development within the internet environment

brings unprecedented impact as well as more opportunities. This paper analyzed the influencing factors of logistics enterprises cross-border management, which aimed at realizing the rebalance of logistics enterprise organization and improving the competitiveness.

This paper points out the achievements and shortcomings which leads the next direction. The achievements of this paper is to sort out the ideas of cross-border of logistics enterprises, summarize the impact of cross-border cooperation of logistics based on previous research, such as reform theory, diversification theory. Analyze which is the main factor of cross-border cooperation of logistics enterprises, provide theoretical basis for choose the direction of cross-border cooperation of logistics enterprises. The shortcomings of this paper is due to involves many uncertain factors, as well as quantitative and qualitative information. Because of restricts in scope of investigation, as well as my ability, this article only lists the key factors without getting into the details of indicators under three level. Regarding the above deficiency, will continue research thoroughly to explore and the solution in the later.

4. Conclusion

Trans-boundary management has pros and cons, from the perspective of achieving diversification, the logistics cross-border operations can decentralize business risks, cause a synergistic effect between the traditional logistics business and cross-border business. But cross-border operations may also bring excessive expansion of risk, the logistics cross-border operations boundary is a dynamic adjustment process, the logistics enterprises should adjust themselves according to their own situation, blind crossover operation may lead to a reduction in the overall operating efficiency of the logistics business. That is to say, logistics companies need to understand their own strengths, which are the main factors determining cross-border operations, making full use of existing production factors, playing good economies of scale in the field of new business, and improving the overall level of profitability by reducing the transaction cost.

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