

# **SUPPLY CHAIN INTEGRATION STRATEGY'S EFFECT ON THE COMPETITIVENESS OF POLYURETHANE ENTERPRISES: A CASE STUDY OF HL NEW MATERIALS COMPANY**

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**Abstract** This research aimed: 1) To analyze whether upstream supply chain integration has an impact on enterprises; 2) To analyze whether supply chain integration whether has an impact on the downstream market. This study based on Resource-Based Theory & Transaction Cost Theory, adopted documentary research method by reviewed the SWOT, Porter's Five forces analysis theory, to analyze the impact of supply chain integration on enterprises. The results show that: 1) Upstream supply chain integration has a positive impact on enterprises; 2) Supply chain integration has a positive impact on downstream markets. The recommendations included: 1) The company showed that improve the supply chain integration and further develop the downstream market; 2) Strengthen school-enterprise cooperation and improve product technical barriers; 3) Expand marketing channels and carry out diversified marketing. Clear enterprise strategic development direction, the implementation of strategic planning, can improve the competitiveness of enterprises. This study discussed the corporate strategy of HL New Materials Company, aiming to analyze the impact of upstream raw material supply chain integration on HL New Materials Company and the impact of supply chain integration on downstream customers.

**Keywords:** Supply chain, Enterprise Strategy, Enterprise Competitiveness

## **Introduction**

Economic globalization makes the global resources rapidly integrate. Many product information is broken, and the development of polyurethane industry is in full swing. However, since 2011, China's polyurethane industry has experienced problems such as overcapacity, unstable product quality, serious product homogeneity, and fewer high-end products. The pandemic of 2019 put the economy on pause. In 2023, the world economy will struggle to recover under the impact of COVID-19, war and other negative factors, lack of momentum, unstable growth momentum, and the trend of widening polarization among countries is prominent. Facing the severe internal and external environment, the competition of enterprises is more intense, some enterprises with financial strength in order to survive in the cruel competition, evaluate the situation, adjust the strategy, and adopt the merger

and integration strategy.

As a manufacturer of polyurethane chain extender, HL polyurethane enterprise studied in this paper occupies an important position in the industry and market. With the pace of economic development slowing down, the polyurethane industry is in a buyer's market. The competition is fierce. Improving product quality, improving service, reducing raw material costs and shortening delivery cycle have become the pressure and problems that enterprises must face.

This study takes supply chain integration as the point of reference and studies HL New Materials Company's own business strategy.

### **Research Objectives**

In view of the two issues raised in this study, the objectives of this study are:

- 1) To analyze the impact of upstream supply chain integration on enterprises.
- 2) To analyze the impact of supply chain integration on downstream markets.

### **Literature Review**

#### *Resource-Based Theory*

Birger Wernerfelt (1984) held that the unique resources and capabilities of an enterprise are the sources of competitive advantage. Through supply chain integration, enterprises can better integrate and optimize internal and external resources, such as raw materials, technology, knowledge, and human resources, thereby forming a unique resource combination and enhancing competitiveness.

#### *Transaction Cost Theory*

Ronald (1937) emphasized that enterprises will generate transaction costs in market transactions. Supply chain integration can reduce transaction costs and improve efficiency by establishing long-term and stable cooperative relationships and optimizing business processes.

#### *Supply Chain*

The supply chain revolves around the core enterprise, and through the control of information flow, logistics and capital flow, it starts from the purchase of raw materials, makes intermediate products and final products, and then sends the products to consumers through the sales network, and finally connects suppliers, manufacturers, distributors, retailers and end users into an overall functional network chain structure.

Ding (2020) believed that in the production and circulation of products and services, different enterprises can complete the procurement of raw materials and primary products, the production of intermediate products and final products by controlling their own information flow, logistics and capital flow, and finally sell different forms of products or services to end users through the sales network. In the whole process, these activities will form an orderly network chain structure, and such a network

chain structure is called the supply chain.

In their research on building new supply chain development strategies under the Belt and Road Initiative, Xie and Zhang (2016) pointed out that in response to the national development strategy and constantly optimizing the innovation level and development level of the supply chain, the construction of new supply chain mechanisms includes: building information perfection system, resource integration system, talent introduction system and service evaluation system. Strategy indicates the direction of supply chain development, supply chain development services and strategy. Chen (2016) conducted a corresponding study on the strategic management innovation of supply chain enterprises and pointed out that in the face of fluctuating market economic environment, enterprises must adapt to the requirements of The Times, establish a supply chain management model, and improve the competitiveness of the industry through the implementation of strategic management innovation. From industry competition to supply chain competition, to maintain supply chain cooperation, improve the overall competitiveness of partners, so as to play the competitive potential of enterprises. This requires the implementation of enterprise strategic management.

Based on the background of national manufacturing strategy, Wang (2016) proposed that the strategic background of "Made in China 2025" should be combined to improve the management efficiency of supply chain and deeply integrate supply chain management with "Made in China 2025", with the latter promoting the development of the former and the former serving the construction of the latter. Cao et al. (2012), on the other hand, recognized the three-way relationship of supply chain and believed that supply chain integration included supplier integration, manufacturer integration and user integration, and that supply chain integration was the strategic cooperation between suppliers and other enterprises in the supply chain.

#### *Enterprise Strategy*

The word "strategy" was first proposed by Chandler, who designed the framework of strategic management. He believed that strategy is a series of strategies and actions to achieve a certain goal. With the continuous development of economy and society, the concept of "enterprise strategy" has been gradually put forward by scholars. Someone first put forward the concept "enterprise strategy", Strategy is defined as "the evaluation plan and solution that an enterprise develops to achieve profitability or improve its core competitiveness under the premise of determining its own long-term goals".

Neil (2014) pointed out that how to formulate a reasonable development strategy guidance system in the development of small and medium-sized high-tech enterprises has a direct relationship with the future development of enterprises. Therefore, when formulating development strategy, enterprises should have a deep understanding of the macro environment and internal environment of enterprises, especially for the development risk of enterprises should be comprehensively considered,

Take this as the basis to do a good risk prevention system. In this process, it is necessary to establish a sound development strategy system, constantly optimize the risk control system, achieve effective management of business risks, and help enterprises to achieve stable development.

Soetanto (2016) pointed out that with the development of science and technology, the market environment faced by high-tech enterprises has changed significantly, and the speed of technological change is very fast, which brings greater competitive pressure to the development of high-tech enterprises. Therefore, small and medium-sized high-tech enterprises should formulate a sound development strategy according to the development status, provide scientific guidance for the future development direction and management mode of enterprises, and make appropriate adjustments to the current development strategy. It can be said that the healthy development of small and medium-sized high-tech enterprises is directly related to the guidance of development strategy, and scientific development strategy lays a solid foundation for the long-term development of enterprises.

Wang (2016) pointed out that small and medium-sized high-tech enterprises can strengthen cooperation with colleges and universities to jointly carry out scientific and technological research and innovation and create mutually beneficial forms for each other, so as to improve the success rate of R&D of small and medium-sized high-tech enterprises. Li Bo (2016) pointed out that with the development of information technology, small and medium-sized enterprises must make full use of high and new technologies, combine their own development with Internet technology, and better analyze problems in enterprise development by means of big data platform and cloud computing

#### *Enterprise Competitiveness*

Under competitive market conditions, enterprises acquire external searchable resources by cultivating their own resources and capabilities, and make comprehensive use of them to realize their own value on the basis of creating value for customers; In a competitive market, an enterprise has the ability to provide products and services to the market more effectively than other enterprises, and gain profits and reputation.

Porter (2002) pointed out in National Competitive Advantage that enterprise competitiveness refers to the ability of enterprises to compete in the international market with a global strategy. Porter especially emphasizes that enterprises should participate in international competition with global strategy, and strategy is the key to the success of enterprise competition. Kotler (2001) described the competitiveness of enterprises as follows: the competitiveness of enterprises is to meet the needs of consumers more effectively and efficiently than competitors. Chinese scholar Jin Bei (2003) believes that enterprise competitiveness refers to the comprehensive quality of an enterprise that can continuously provide products or services to the market more effectively than other enterprises, and obtain profits and own development in a competitive market. Enterprise competitiveness is determined by four types of factors, they are environment, resources, ability and knowledge.

### *HL New Materials Company profile*

HL New Materials Company is located in Shantou City, one of the five special economic zones, civilized and hygienic city, adjacent to the Yuepu Expressway entrance, only 30 minutes' drive from Jieyang Chaoshan International Airport, the transportation is very convenient. The main production and sales of Diethyltoluenediamine /DETDA(E-100), Dimethyltoluenediamine /DMTDA(E-300); Sales: ethylene, aluminum trichloride (anhydrous), aluminum powder, zinc powder, chemical additives (except dangerous chemicals) import and export of goods, technology import and export, etc.

### **Methodology**

This study adopts the literature research method. It is mainly to collect, organize, analyze and interpret the existing literature. First of all, the author consulted a large number of authoritative academic website papers, and summarized the theoretical achievements of supply chain integration and merger through the authoritative research and analysis of former scholars. Secondly, combined with the data analysis of the status of the international polyurethane industry and China's polyurethane industry from 2000 to 2023, taking HL New Materials Company as an example, SWOT analysis method and J Porter's five forces analysis method are adopted to analyze the operating environment and current situation of HL New Materials Company. This paper explores the influence of supply chain integration on upstream enterprises and the influence of supply chain vertical integration on downstream enterprises.

### **Results**

HL New Materials Company, which has a leading position in the market in China, has a relatively obvious competitive advantage, and HL New Materials Company has made a lot of efforts to improve its competitiveness. On the other hand, under the overall slow development trend of today's international polyurethane industry, the sudden emergence of the Chinese market and fierce competition also bring certain opportunities and threats to enterprises. This paper uses SWOT analysis method to analyze the operating environment and current situation of HL New Materials Company.

#### *S (strength)*

(1) HL New Materials Company has been committed to the pursuit of higher than the cost of capital for many years to obtain profits, with strong financial strength, HL New Materials company's high-quality products have accumulated a good brand image and market visibility.

(2) HL New Materials company attaches great importance to product environmental protection and research and development, employing advanced Taiwan core technical personnel as guidance research, has rich experience and efficient research and development capabilities of the R & D team to make the product in performance and quality can meet the needs of the market and development, at the

same time, the supporting technical equipment is relatively perfect.

(3) HL New Materials company's new factory is located in the polyurethane industrial park, concentrated customer groups, save a large amount of logistics and transportation costs, raw material ethylene park pipeline supply, convenient storage, reduce costs. Through many integration adjustments, HL New Materials Company has a rich and complete product line compared with other competitors, which is also one of its core competitiveness.

(4) HL New Materials company has a global sales network and channels, and is relatively mature in the maintenance and management of major customers.

(5) HL New Materials Company has accumulated rich operational experience in the polyurethane industry.

*W (weakness)*

(1) HL new Materials company in the pursuit of quality and research and development at the same time, the high cost has become its primary disadvantage.

(2) HL New Materials Company focuses on the research and development of E-100 and E-300, which has a side effect of single product types and poor market pressure resistance.

(3) TDA is the raw material of TDI. Affected by TDI, the supply quantity of main raw material MTDA is unstable.

(4) MTDA raw material manufacturers have few choices. International is South Korea's HANWHA Hanwha, Germany's COVESTRO AG, China is BAIYIN.

(5) Although there is a lot of investment in the development of colorless E-100, so far the research and development and update speed of new products is still relatively slow, anti-yellowing and anti-UV although it has achieved China's leading position, but there is still a gap with the United States Albemarle.

*O (opportunity)*

(1) With the improvement of people's environmental awareness and attention to environmental quality in recent years, MOCA is prohibited in polyurethane plastic runway and court materials. Due to the molecular structure of MOCA containing chlorine elements and the instability of amino o-hydrogen, many literatures believe that it has a certain carcinogenic risk, especially the European Union also prohibits the use of MOCA in children's toy products. Therefore, as an alternative to MOCA, the eco-friendly product E-300 has been chosen by more customers.

(2) In terms of automobiles and industrial coatings, with the sustained and rapid development of China's macro-economy and the improvement of national income level, automobile consumption has a continued strong growth trend.

(3) HL New Materials company's localized production in the supply of advantages to make the company more competitive in the market.

(4) Due to the outbreak of the Russian-Ukrainian war, there is a large demand for explosion-proof helmets for downstream products. As a polyurethane raw material, the demand for E-100 increased.

*T (threat)*

(1) LBR is located in an industrial park with ethylene plants and low pipeline transportation costs. And have the central enterprises as the backing. HL New materials company developed colorless E-100, breaking LBR's long-standing monopoly position. LBR prices are reduced by 35%, resulting in lower prices across the industry. The profit margins have become very small.

(2) Although there are fewer raw material manufacturers in the industry, with the increasing maturity of technology, the quality of products produced by various enterprises is also constantly improving, so more and more customers who do not have high demand for product performance will be more inclined to low-price products.

(3) Affected by the macroeconomic, the demand for the entire polyurethane market is slowing down and even has negative growth in most countries, supply chain mergers and acquisitions, into the chemical park has become a general trend. This requires HL new materials company on the one hand to control costs, on the other hand to improve customer satisfaction in order to maintain the long-term development of the enterprise.

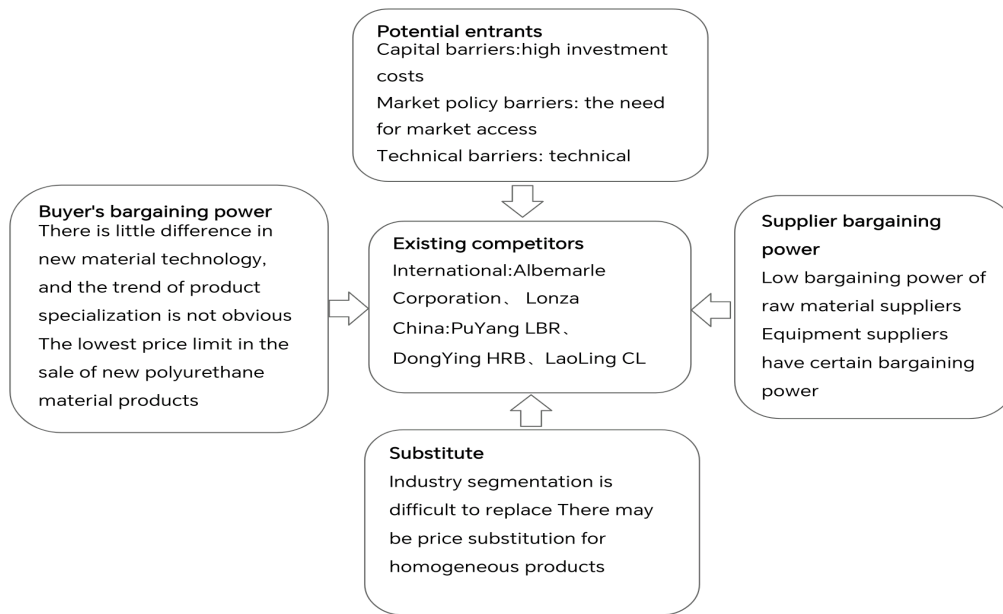
(4) Successful cases in the same industry, in 2023, HRB and CH and HT jointly funded the construction of a new company, increasing product types and increasing pressure resistance. Exports increased at the end of 2023.

Through the SWOT analysis of HL New Materials Company, the main strategy adopted by HL New Materials Company is to simplify supply chain management, product diversification, production localization, and key customer marketing strategy. Supply chain integration is an important means for enterprises to quickly realize product diversification and production localization.

Although the development of China's polyurethane industry is relatively slow, E-100 and E-300 still maintain a high market demand. Because polyurethane new liquid chain extender has relatively strong functionality in aerospace, automotive, armaments and other industrial fields, and other fields, such as adhesives and other markets are still to be developed, there is a huge potential consumer market. This section adopts Porter's five forces analysis method to analyze the competitive environment of HL New Materials Company from five aspects, namely, existing competitors, potential entrants, substitutes, suppliers and bargaining power. Specific analysis is shown in the figure below.

The competition among existing enterprises is more intense; HL New Materials Company has a general bargaining power on the upstream of the industrial chain; The bargaining power of the downstream of the industrial chain is poor; The threat of potential entrants in the industry is general; Alternatives are less threatening.





**Figure 1:** HL New Materials Company's Michael Porter's five forces model

## Discussion

Research on supply chain integration in the polyurethane industry may have the following limitations:

(1) Limited data: Due to the involvement of trade secrets, some key financial and operational data may be difficult to obtain, which may affect the accurate assessment of the effect of mergers and acquisitions.

(2) The particularity of individual cases: Each integration case has its own unique background and circumstances, which may be affected by specific strategies, management capabilities, market environment and other factors. As a result, the results of individual case studies may be difficult to generalize to the industry as a whole.

(3) Uncertainty about short - and long-term effects: the effects of supply chain integration may be seen in the short term or may require long-term observation. However, studies are often subject to time constraints that make it difficult to accurately assess long-term effects.

(4) Interference of external factors: external factors such as macroeconomic environment, industry competition pattern and changes in laws and regulations will also have an impact on integration and acquisition, but these factors may be beyond the scope of the study.

(5) Subjectivity of value assessment: The value assessment of mergers and acquisitions may involve subjective judgments and assumptions, and different researchers may have different viewpoints and methods, which may lead to differences in evaluation results.



## Conclusions

In this study, HL New Materials Company's MTDA integration of upstream raw materials in the supply chain is selected as a case study. Based on the background of the polyurethane market environment, the internal and external competitive environment of HL New Materials Company is deeply analyzed by searching relevant literature, field research, SWOT, Porter's five forces analysis and other methods. The advantages, disadvantages, opportunities and threats of the enterprise are fully analyzed. Impact on enterprises through upstream supply chain integration; The impact of supply chain integration on the downstream market is analyzed and the following conclusions are drawn. First, upstream supply chain integration has a positive impact on enterprises. Second, supply chain integration has a positive impact on downstream markets.

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