

Analysis of Transaction Cost and Entry Barrier between High and Low Technology Manufacturing in China

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Abstract: Based on the theory of enterprise organization, transaction cost, product differentiation and entry barriers, this paper shows that different enterprises often have different characters, then leading to comparative analysis of the two industries of high and low technology manufacturing. High-tech manufacturing products have long production cycles, high product value, slow response to order changes and difficult to adjust, resulting in high transaction costs, high barriers to entry, and large product differentiation, while low-tech manufacturing is on the contrary. Then select the enterprises in these two industries, YUTO Technology and JANUS Intelligence, to analyse the case study and conclude that these two companies can also reflect the contrast between the two industries. In this regard, it is suggested that high-tech manufacturing can adopt vertical integration measures to reduce transaction costs and order risks to some extent, and for these enterprises in China, the government should also take certain measures to support their development.

1. Introduction

The theory of enterprise organization can be traced back to Adam Smith's "The Wealth of Nations"[1], but in classical theory enterprises were only a vague economic entity, so in the true sense it began with neoclassical theory. In neoclassical economics, companies were studied from the perspective of production functions and neoclassical economists believe that the market mechanism is the most effective way to allocate resources, however, they fail to make a reasonable explanation for the problems of enterprise boundaries, enterprise scale and internal transactions, so the modern enterprise theory has been produced.

The representative work of modern enterprise theory is "The Nature of Enterprise" published by Ronald Coase in 1937[2], in which he believes that enterprises are an alternative to the market. Enterprises replace the transaction cost with the internal organizational and coordination cost, which

separates the enterprise from the market and form two institutional structures that can be substituted for each other[3]. Coase believes that the market operation has a cost and firstly introduced the concept of transaction cost. When the market transaction cost is larger than the internal cost of the enterprise, the resource allocation will tend to be completed by the enterprise instead of the market. Companies generate high transaction cost is mainly for the following two reasons:

First, the specificity of asset. Asset specificity refers to the extent that asset can be used for different purposes without sacrificing the value. If the buyer has only one supplier or in turn, then one of the parties will lose a lot of money and form a “knock-and-roll” phenomenon when one of them defaults. Therefore, the stronger the asset specificity, the greater the transaction cost.

Second, uncertainty in market conditions. It includes information asymmetry, contract incompleteness and so on. Due to the unpredictability in the future, a sudden situation may cause losses on both sides of the transaction. The greater the uncertainty, the higher the transaction cost.

In addition, Williamson further developed Coase's theory and proposed a "comparative analysis" method to estimate transaction cost through institutional comparison[4]. He compares the contract types of different companies, and believes that the transaction cost has a dependency relationship with the contract type, and the transaction cost that is more inclined to fully integrate will be higher[5].

What's more, product differentiation and entry barriers are also core issues in industrial organization theory. Product differentiation refers to the difference in quality and style among similar products of different enterprises in the same industry, which means products cannot be completely substituted. It also has an impact on the market structure. First, it will affect market concentration. Enterprises with high market share will maintain or increase their size by expanding product differentiation. Second, market barriers will be formed. Stigler (1946) believes that entry barriers are the higher part of the production cost above existing enterprises when new companies seek to enter an industry. The higher the degree of product differentiation, the brand awareness and customer loyalty that the original enterprise has established will cause greater difficulties for the entry of new enterprises. It is difficult for new enterprises to obtain the customers of the original enterprises in a short period of time, that is, the higher the barriers to entry. So the higher the degree of market differentiation, the higher the barriers for new companies to enter the market.

According to the degree of product differentiation, the industry can be divided into four categories: highly differentiated, moderately differentiated, slightly differentiated, and negligible. The high-tech manufacturing analyzed in this paper belongs to the medium-highly differentiated industry, while the low-tech industry belongs to the slightly differentiated industry.

Those theories above are all important contents in enterprise organization theory and institutional economics, and they have been tested by time and recognized by public. Based on those theories, we find the different characteristics of the two industries. By analyzing, we can make countermeasures and suggestions for the actual situation, which can not only reflect the importance of the theory, but also apply the theory to reality and explore a more suitable path for the industrial development.

2. Comparative Analysis

2.1 High Technology Manufacturing Industry

High-tech manufacturing, such as electronics and communications equipment manufacturing, computer and office equipment manufacturing, aerospace and equipment manufacturing, etc. [6], generally have the characteristics of customized production, and the downstream market has many different types of products. Take the electronic equipment manufacturing as an example, the downstream is the mobile phone industry. Different customers have different series of products, which differs in appearance, color, texture and so on. Therefore, upstream production enterprises are required to take the customer product features as the core to do customized design production, so it is a customer-oriented industry.

Most of the companies in this industry establish long-term cooperation relationships with customers. During the cooperation period, the technical research and development of the production needs to be compatible with the customer's requirements. Although the production process among competitor companies is roughly the same, there are differences technical barriers that are based on their own customer needs, so entry barrier in this industry is high.

The industry has a profit model centered on serving customers which main marketing strategy is to obtain orders from large customers. Once they become qualified suppliers of large customers, sufficient order can ensure the normal operation of production, increase equipment utilization rate and reduce the production cost per unit of product and then improve the company's profit. But once a large customer defaults, it is difficult for the company to change the production plan in time, which will cause a large loss. Due to the existence of such risks, there is a large transaction cost in this industry with its upstream and downstream industries. In conclusion, this industry has high transaction cost and high barriers to entry.

2.2 Low Technology Manufacturing Industry

Low-tech manufacturing, is mainly labor-intensive and processing-oriented industries[7], most are typical mid-stream industries, and the downstream areas are very extensive. The products of this industry generally have the characteristics of universalization, which means the products produced for different customers in the downstream market are basically the same, so the special orders are few. Moreover, the products have low technical requirements, the production cycle is short, and the production cost is low. New enterprises entering the market do not require a large amount of capital investment and technical requirements, which makes the entry barriers lower. Similarly, in the example of the paper packaging company whose downstream is mobile phone industry, although the products of different phone brands and different series may have differences in performance, size and appearance, the packaging boxes are almost the same. Therefore, the production can be carried out in large quantities because it can respond sensitively to changes in orders. Under the premise of the expansion of the downstream industry, orders reduced by one downstream manufacturer will inevitably be accompanied by orders increasing from another manufacturer, so the companies only need to make simple adjustments according to the changes of new orders. Therefore, this industry has low transaction costs and low barriers to entry.

2.3 Comparison Results

Through analysis, it can be seen that the high-tech manufacturing has the problems of high transaction cost and high barriers to entry. To solve this problem, vertical acquisition can be adopted to form vertical integration. Vertical integration refers to the enterprise entering the production or sales stage through vertical mergers and acquisitions. The comparative analysis of the above two manufacturing industries is shown as Table 1.

Table 1: Industry Comparative Analysis

Industry	High-tech manufacturing	Low-tech manufacturing
Production Cycle	Long	Short
Product Value	High	Low
Production Technical Requirement	High	Low
Production Difference Level	High	Low
Relevance to Downstream Companies	High	Low
Reaction to Unforeseen Order Changes	Slow, difficult to adjust	Sensitive, rapid to adjustment
Transaction Cost	High	Low
Entry Barrier	High	Low

When the market transaction cost is greater than the internal administrative management cost, converting the market transaction relationship into the internal cooperation relationship can reduce transaction cost, improve the control ability, position and bargaining power in the supply chain. If the downstream enterprises have successfully done vertical mergers and acquisitions of the high-tech manufacturing industry, the vertical integration will make the high-tech manufacturing industry have the reduction of default losses of large customers. The cost of order change conversion is also reduced, that is, the transaction cost is reduced.

In addition, vertical mergers also enable downstream companies to form economies of scale, thereby further reducing production costs. The integration of the upstream and downstream industrial, on the one hand can make the company's after-sales services, financial services and other activities obtain more comprehensive and real customer feedback, thus can do more targeted research and development[8]; On the other hand, Downstream companies can turn potential customer needs into reality through customer associations. However, it should be noted that due to the integration of industrial chains, it is necessary to simultaneously carry out production inputs in the upstream and downstream industries. Therefore, the capability of the management is really important and the operational risks are relatively high.

3. Case Study

Case studies refer to “the way in which a set of pre-defined procedures and procedures are followed to study an empirical and empirical subject” (Robert, 2004)[9]. Through specific cases, in this paper we select JANUS Intelligence, which belongs to high-tech manufacturing industry, and YUTO Technology, which belongs to low-tech manufacturing, to analyze. Both of them have downstream industries which are consumer electronics industries, and industries themselves are precision structural parts manufacturing and paper printing and packaging industries.

3.1 YUTO Technology

Shenzhen YUTO Packaging Technology Co., Ltd., established in 2002, is a leading provider of high-end brand packaging for the design, production and sales. While focusing on paper packaging of consumer electronics products, the company is actively diversifying and expanding its business in high-end tobacco and alcohol, cosmetics and high-end luxury goods. The downstream industries of the company are consumer electronics industry, tobacco and alcohol manufacturing, cosmetics industry, luxury goods industry and pharmaceutical industry.

According to the company's annual report[10], in recent years, through the transformation of corporate positioning, adjustment of business strategy and the innovation of business model, the company's profits and the market shares have continued rising and the prospect is good. With the continuous expansion and the increase in the number of customers, its customer concentration has remained above 50%. Its important customers are mainly Foxconn, Samsung, Lenovo, Huawei, etc., and the absolute value of the income of major customers has always increased, which also reflects YUTO technology's growth of sales.

For its packaging products, it is generally universal and can be mass-produced so it can be served both for Samsung and Foxconn, as well as Huawei and Lenovo. It is less affected by the change of orders from large customers, and its market capacity is large, so its transaction cost is low, the degree of product differentiation is small, and relatively, the barriers to entry are also small, and the competitive pressure is relatively large.

3.2 JANUS Intelligence

Dongguan JANUS Precision Components Co., Ltd. is a leading supplier of precision structural parts and services for consumer electronics in China, mainly engaged in R&D, design, production and sales of precision molds and precision machine components. The main production are plastic hardware molds, precision die, precision cavity molds, etc. And product service objects are mainly mobile phones, 3G data network cards, MP3/MP4 and so on.

By analyzing the company annual report of 2012-2017[11], the company's operation was good from 2012 to 2014, however, in 2015, the company suffered "Waterloo" which means its operating income and net profit dropped sharply. After that, the company's indicators rebounded until 2016 and 2017, and the operating conditions recovered.

To look for the reasons, we found that its main customers gradually shifted from Samsung to domestic big brands "OPPO" and "Huawei". Since 2015, Samsung's orders have decreased sharply. From 2013, due to the rapid development of domestic brands, the low-end market of Samsung mobile phones has been replaced, and Samsung's development has become more and more difficult in the Chinese market. In 2016, its mobile phone market share was facing a freezing point and was less than 1% in 2018. During the period from 2016 to 2017, the company was actively seeking to establish relationships with new and high-quality customers.

As a company with high transaction costs and high product differentiation, the reduction of transactions by downstream companies has had a huge negative impact on the company.

3.3 Analysis Results

Through the analysis it can be seen that as a high-tech manufacturing industry, JANUS Intelligence does reflect the negative impact of its product differentiation and high transaction costs in the annual report, that is, their profits have a greater correlation with their large customer orders, while the low-tech manufacturing, YUTO Technology, its scale and performance are constantly improving, and the company is also constantly making technological innovations. There is indeed a significant difference between the two companies. Therefore, the recommendations for the high-tech manufacturing in the second part are equally applicable to JANUS Intelligence.

4. Conclusion and Suggestion

Based on the transaction cost theory of Coase, industrial organization theory, besides the discussion of specific industries and case study, it can be concluded that different industries have different transaction costs, barriers to entry, etc. Therefore, the recommendations are as follows:

For low-tech manufacturing, although there are lower transaction costs and lower operation risks, they will be relatively competitive because the low barriers to entry. Therefore, such enterprises still need to actively carry out technological innovation, and continue to develop to meet the customer's demand. On the other hand, for high-tech manufacturing, according to the first two parts, the proposal given in this paper is to carry out vertical integration, which can solve the risk of high transaction costs, high barriers to entry to some extent. But due to high technology manufacturing mostly belongs to the midstream markets, the formation of vertical integration means that they will be merged with the downstream enterprises, that is, they will lose their autonomy somehow. The contrast between the two industries is not only reflected in the high and low technology manufacturing, for many industries, this kind of trait may exist. If the industries with these opposite characteristics can be summed up, analyzing the advantages of each industry and carrying out the strategic policy to do some adjustment, it can achieve a win-win situation in various industries.

In view of the current events, the trade dispute between China and the United States will be continuing, and most of China's industries restricted by U.S. are high-tech manufacturing. Facing this unknown political event, these industries may be affected unexpectedly. In addition to adopting the above-mentioned strategy, it also needs the government to formulate certain policies in the national level to support and assist these industries so that they can tide over the difficulties.

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