

Research on the Influence of Big Data on the Business Model of High-End Equipment Manufacturing Industry

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Abstract. This paper expounds the influence of big data on the nine elements of business model, and then combines the first, middle and last three links of high-end equipment manufacturing industry to study the influence of big data on the business model of each link of high-end equipment manufacturing industry. Research shows that big data has the greatest impact on the front end and back end of high-end equipment manufacturing industry through innovative business models. Therefore, on the one hand, we should pay attention to the design and development of the front end of the manufacturing industry and break the monopoly of foreign developed countries in technology. On the other hand, we should adapt to the global market competition and further explore the domestic and foreign markets through business model innovation.

Keywords: Big data; Business model; High-end equipment manufacturing.

1. Introduction

High-end equipment manufacturing is one of the strategic emerging industries led by high and new technologies, including aviation equipment, satellite and application, rail transit equipment, marine engineering equipment and intelligent manufacturing equipment. High-end equipment industry is a strategic emerging industry led by high and new technology, which is at the top of the value chain and the core link of the industrial chain and determines the comprehensive competitiveness of the entire industrial chain. It is the backbone of the modern industrial system and the engine driving industrial transformation and upgrading. Big data is absolutely a key source of competitive advantage for all industries. Organizations that understand and excel at leveraging big data are likely to achieve continuous innovation, remain agile, and improve profitability over time. At present, globalization, operation, collaboration and service are the main trends of management reform of high-end equipment manufacturing industry, and big data will provide important supporting means for the transformation of high-end equipment manufacturing industry. Combined with the seven components of high-end equipment manufacturing industry, this paper focuses on analysing the influence of big data on the business model of each link.

2. Seven Components of High-end Equipment Manufacturing Industry

High-end equipment manufacturing and traditional manufacturing belong to the same manufacturing industry, so there are both differences and connections between the two. According to the "6+1" theory proposed by the famous Hong Kong scholar Lang xianping, the industrial chain of manufacturing industry can be divided into seven links, namely, raw material production, design and research, raw material procurement, warehousing and transportation, manufacturing, order processing, wholesale and retail.

The "1" in "6+1" refers to the raw material production link, and the "6" refers to the following six links. The previous link, which wastes resources, damages the environment, consumes labour and has low added value, is a low-end link. For a long time, however, China was in charge of the raw material production link. The latter six links are knowledge-intensive industries with high added value, which can absorb a large number of high-end talents for employment and further promote the improvement of product technology. They are high-end links. The significant difference between high-end equipment manufacturing and traditional manufacturing is that high-end equipment manufacturing should minimize or even get rid of low-end links in the manufacturing industry and occupy high-end links in the manufacturing industry as far as possible. For a long time, limited by technological level and economic strength, China's traditional manufacturing industry can only occupy the low-end link

of the manufacturing industry, while the high-end link is controlled by developed countries for a long time. Therefore, to promote China's manufacturing industry from low-end to high-end through innovation is the development direction of China's manufacturing industry transformation and upgrading.

Based on the theory of "6+1" and combining with the characteristics of high-end equipment manufacturing industry, this section summarizes raw material procurement, warehousing and transportation as logistics links, order processing, wholesale and retail as market links, and then summarizes high-end equipment manufacturing as design and development, logistics, manufacturing and market. The relationship between the components is shown in figure 1. Based on the influence of big data on the nine elements of business model of high-end equipment manufacturing industry mentioned above, it further quantifies the influence of big data on business model innovation and various links of high-end equipment manufacturing industry.

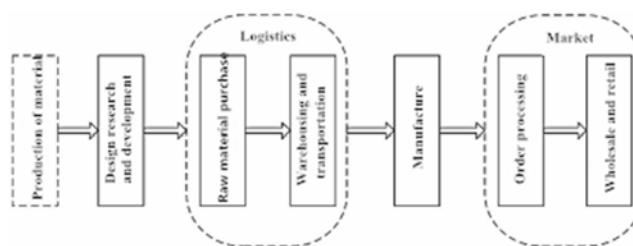


Figure 1. Seven links of high-end equipment manufacturing industry

3. Concepts and Components of the Business Model

The concept of business model comes from the concept of business, which includes an increasingly wide range, including the concept of product and service, supply chain, marketing, operation and market, thus forming a system containing market demand and resources. Morris (2005) summarized the definition of business model and proposed to analyze it from the perspectives of economy, operation and strategy. The latest understanding of the business model on the Internet is that: the enterprise meets the needs of consumers. This system organizes and manages various resources of the enterprise, and forms products and services that consumers cannot produce by themselves but must buy. Therefore, it has the characteristics that it can be copied by itself but not by others.

Viscio (2010) believed that the business model consists of five parts, namely the core view, business unit, service project, governance model and system connection. Osterwalder (2011) believed that the business model includes the four components, namely, enterprise's product, customer, finance and infrastructure management. Morris (2013) summarized six elements of the business model, namely, product and service portfolio, core competitiveness, market positioning, market scope, cost and income, and pricing investment model.

Although there are many researches on business model, there is no consensus on the components of business model in the academia. With the change of the environment, the business model is constantly changing. Therefore, the research on the business model of a certain time and an industry must proceed from reality and be targeted for analysis, and constantly innovate with the latest technology. This paper holds that the core elements of the business model include value proposition, customer segmentation, distribution channel, customer relations core resource and capability, key business, important partner, revenue source, and cost structure.

4. Influence of Big Data on Business Model of Various Links of High-End Equipment Manufacturing Industry

In this paper, the influence of big data on the nine core elements of the business model is firstly elaborated, and then the nine elements are summarized into the first, middle and last links of high-

end equipment manufacturing industry, and then the influence of big data on the business model of each link of high-end equipment manufacturing industry is studied.

4.1 Influence of Big Data on Various Elements of Business Model

4.1.1 Value Proposition

That is, the value that the enterprise can provide for customers, and the specific carrier of this value is the product or service. Under the influence of big data, manufacturing industry changes from product manufacturing to service delivery. From the standardized production of products to personalized customization, this innovation belongs to the innovation of the design and development of manufacturing industry.

4.1.2 Customer Segmentation

That is, the customer group that the enterprise locates according to its own value. It uses big data technology to establish customer segmentation based on customer needs, so that the division of customer groups is closer to the market attributes of people. This innovation will affect the design and development, and the wholesale and retail links.

4.1.3 Distribution Channel

That is, the way in which enterprise transfer value to target customer groups. With the development of the Internet, enterprise will shift their distribution channel from offline to online, which will be more conducive to data collection and sharing. This innovation will affect order processing and wholesale and retail links.

4.1.4 Customer Relationship

That is, the way to establish communication between enterprise and customer. It establishes customer information management system through big data, which can improve management efficiency, prevent customer loss, share customer data and avoid customer risk. This innovation will affect order processing and wholesale and retail links.

4.1.5 Core Resource and Capability

That is, the way the production, sales and operation link of enterprise rely on. Big data has become a core resource of enterprise, and the collection, sorting, mining and analysis of big data has become a core capability of enterprise. It uses big data to establish decision-making mechanism, and this innovation will affect the design and development, manufacturing, order processing and wholesale and retail links.

4.1.6 Key Business

That is, the arrangement of process and the allocation of resource in the operation of an enterprise. It uses big data to collect data in enterprise business processes, analyze hidden problems, and change passive problem solving to active prediction. This innovation will affect design and development, raw material procurement, warehousing and logistics, manufacturing, order processing and wholesale and retail links.

4.1.7 Important Partner

That is, the relationship network that can provide useful value for the survival of enterprise. By building a big data sharing platform, important partners will be more closely connected and efficient. This innovation will affect the design and development, raw material procurement, warehousing and logistics, order processing and wholesale and retail links.

4.1.8 Revenue Source

That is, how to establish cash flow to create wealth for enterprises. It analyzes customer behaviors through big data, so as to meet customer needs, explore potential customers and expand revenue source. This innovation will affect the design and development, order processing and wholesale and retail links.

4.1.9 Cost Structure

That is, enterprises need to create value at the cost of cost consumption. It uses big data to promote the servitization of manufacturing industry, and the transformation from providing products to providing service, which can effectively reduce operating costs. This innovation will affect the design and development, raw material procurement, manufacturing links.

4.2 The Influence of Business Model on Every Link of High-End Equipment Manufacturing Industry

Figure 2 shows that the link of high-end equipment manufacturing industry can be divided into three stages: front end, middle end and back end according to the production process. Big data exerts different degrees of influence on each link of high-end equipment manufacturing industry through innovation of business model, forming S-shaped curve in the figure. Among them, raw material manufacturing does not belong to high-end equipment manufacturing links. The front end and the back end are affected the most, that is, the front end and the back end belong to the high value-added area. Middle-end logistics and manufacturing links will be affected to some extent. Therefore, the future development direction of China's manufacturing industry can be analyzed. In the past 30 years since the reform and opening up, the rapid development of China's manufacturing industry has mainly relied on the advantages of resources and cheap labor. It has paid attention to the expansion of manufacturing capacity and occupied the middle-end manufacturing links in the global manufacturing industry. This mode of development has damaged the ecological environment, consumed natural resources and wasted human resources, and gradually brought China's manufacturing industry into a bottleneck. Over the past few decades, overcapacity caused by the rapid expansion of China's traditional manufacturing sector has become more pronounced. Based on the analysis of the influence of the innovative business model in various links of high-end equipment manufacturing in figure 2, it is not difficult to find that the transformation and upgrading of China's manufacturing industry is to change the development ideas and occupy the front end and back end of the manufacturing industry. After decades of development, China's manufacturing industry has acquired certain experience in production, management, marketing and other aspects, and has begun to take shape in modern manufacturing industry. China's manufacturing industry is on the road to high-end equipment manufacturing. On the one hand, we need to break the technological monopoly of foreign developed countries and shift the focus of development to the front-end of the manufacturing sector, such as design and development. On the other hand, we should adapt to the global market competition, improve China's soft power in the global market competition through information technology means, and further explore the domestic and foreign markets through business model innovation.

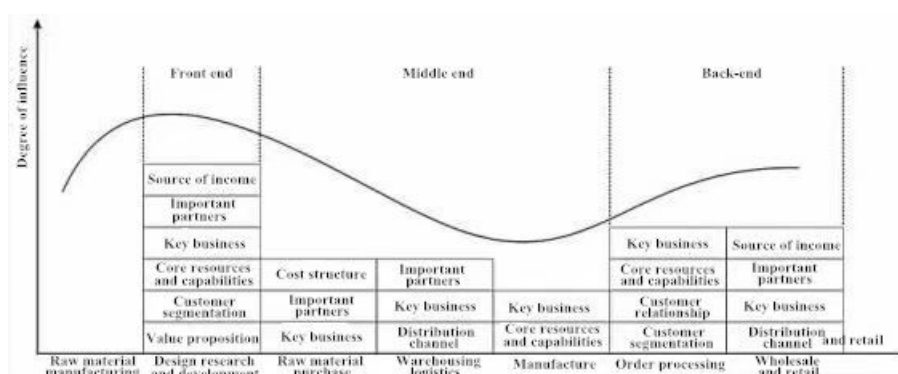


Figure 2. Influence degree of business model on each link of manufacturing industry

5. Conclusion and Enlightenment

5.1 Conclusion

There is no doubt that big data is changing the business models of all industries in unprecedented ways. The explosive growth of data will become an intangible strategic asset for enterprises in the future. It will collect, sort out and analyse data and apply it to the market selection, product design, commodity pricing, marketing and even internal management process of enterprises, which will bring revolutionary changes to the business model of enterprises. How an enterprise can better combine data with business model and thus exert influence on all links of manufacturing industry determines whether an enterprise can grasp the development opportunity in this era of reform and seize the initiative in the future market.

5.2 Enlightenment

5.2.1 High-end Manufacturing Industry Should Pay Special Attention to the Application of Big Data Technology in Front-end R&D

High-end equipment manufacturing front-end is the design and development, which has always been the most fierce global competition part. The front-end of high-end equipment manufacturing industry has long been controlled by developed countries. Through the influence of big data on the front end, it can be seen that the introduction of any advanced technology has the most profound impact on the front end. High-end equipment manufacturing enterprises should pay special attention to introducing big data technology into the design and development process.

5.2.2 Big Data Technology is an Effective Way to Break Through the Bottleneck of Mid-end Development

The middle end of high-end equipment manufacturing mainly refers to logistics and product manufacturing. Compared with raw material manufacturing, the middle part can generate more added value of products, which is also the main stage that China, as a major manufacturing country, has experienced since the 1970s. However, with the disappearance of China's demographic dividend and the rise of labor costs, the bottleneck of the development of the middle part is increasingly prominent. The introduction of big data technology can bring huge benefits in improving management efficiency and reducing production costs, and it is an effective method to break through the bottleneck of mid-end development.

5.2.3 The Introduction of Big Data Technology in the Back End can Make up for the Deficiencies of the Front End

The back-end of high-end equipment manufacturing industry, including order processing and wholesale and retail, is the easiest part to introduce big data to realize innovation. Under the background of fierce front-end competition in high-end equipment manufacturing industry, enterprises promote marketing and market development by introducing big data, and can effectively make up for the congenital deficiencies of the front-end through the innovation of the back-end part.

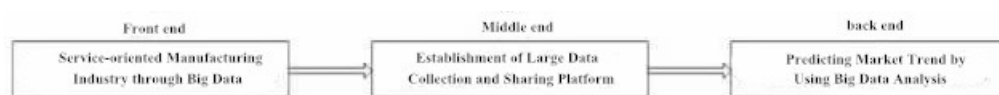


Figure 3. Relationship between each link of high-end equipment manufacturing industry and big data

Each link of high-end equipment manufacturing industry is divided into three parts: front end, middle end and back end. Accordingly, big data can be innovated in three parts of high-end equipment manufacturing industry, namely, servitization of manufacturing industry can be realized through big data, big data collection and sharing platform can be established, and market trend can be predicted by big data analysis. It can be seen that the innovation process of high-end equipment manufacturing industry based on big data can be realized through three links, and the corresponding relationship of

innovation links is shown in figure 3. For the front end of the design and development link, the traditional design and development based on product transfers to providing a complete set of solutions based on service. It establishes customer segmentation method based on customer demand and expands the source of income by taking the path of manufacturing servitization. In the middle logistics and manufacturing links, it establishes a big data collection and sharing platform. By applying the platform to the logistics link, the logistics link can be transferred from offline to online, thus improving the logistics efficiency. The application of the platform in the manufacturing process can reduce the manufacturing cost, improve the level of product testing and optimize the flow line operation. In the back-end market segment, big data analysis is used to predict the market trend, establish decision management mechanism based on big data, and predict problems in operation and management, which can effectively improve the ability of enterprises to cope with market changes.

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