

Research on the International Cross-Enterprise Cost Synergy Mechanism of Fujian Intelligent Manufacturing Industry Against “the Belt and Road Initiative”

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Abstract—At this stage, how to accelerate the revitalization and progress of the intelligent manufacturing industry has become an important research topic of our province's economic development and shaping the core area of "The Belt and Road Initiative". Based on the analysis of the international cross enterprise cost synergy mechanism of Fujian intelligent industry, this paper proposes that under the premise of building an international cross enterprise cost synergy network with "the Belt and Road Initiative" cooperation, we should create a transnational E-supply chain to improve the efficiency of cross enterprise cost coordination management. This paper discusses the cost control methods and risk control problems in the E-supply chain, and from the perspective of international cross enterprise cost management and control, puts forward specific strategies for enhancing the international competitiveness of Fujian based on the "The Belt and Road Initiative" framework.

Keywords: “The Belt and Road Initiative”, intelligent manufacturing industry, cross enterprise, cost synergy

I. INTRODUCTION

In March 2015, "the Belt and Road Initiative" programmatic document pointed out that Xinjiang and Fujian will be built into the "The Belt and Road Initiative" core area [1]. As the core area, how to promote the transformation and upgrading of industries and the export of dominant production capacity in Fujian province are very important. At present, Fujian province is actively integrating into "The Belt and Road Initiative" to cultivate the Economic Zone on the west side of the Straits, and proposes that the core of the economic zone is the economy, the support is the industry, the industrial main body is the manufacturing industry, and the manufacturing industry must upgrade to the "intelligent manufacturing industry" in the process of going out. Therefore, at this stage, how to accelerate the revitalization and progress of the intelligent manufacturing industry has become an important research topic for our province's economic development and shaping the core area.

II. THE NECESSITY OF UPGRADING FUJIAN MANUFACTURING TO INTELLIGENT MANUFACTURING

Fujian's manufacturing industry is facing the "double attack" of the leading technology in the manufacturing industry of developed countries such as Europe and the United States and the low-cost production in the manufacturing industry of late developing countries such as Southeast Asia. In the global manufacturing division system, Fujian's manufacturing industry has long stayed in the processing and assembly stage, with low added value. In terms of innovation ability, the proprietary intellectual property rate of key core technologies is low, and patents and standards are subject to others. The development model of high energy consumption, high pollution and high emission has not been fundamentally reversed. Facing the pressure of global economic integration brought by "the Belt and Road Initiative", we must take the way of internationalized cooperation and apply the advanced Internet and other information technology to carry out the multinational cross enterprise synergy management. If we want to avoid the disadvantage factors in the development, we should create "China's intelligence" in the short term, and get the advantage of technology, scale and efficiency. This is a fast and effective way to build competitive advantage.

III. THE INTERNATIONAL CROSS ENTERPRISE COST SYNERGY MECHANISM OF FUJIAN INTELLIGENT MANUFACTURING INDUSTRY UNDER "THE BELT AND ROAD INITIATIVE": CROSS ENTERPRISE COST COORDINATION NETWORK AND E-SUPPLY CHAIN

A. Building an international cross enterprise cost synergy network with countries along the belt and road

Enterprise network refers to a long-term cooperative organizational model composed of two or more independent enterprises through various formal contracts and informal contracts, which are interdependent and share risks (Yang Ruilong, 2003) [2]. The products of modern manufacturing

industry are complex. The design, manufacturing and service of products need to be completed by a group of business related enterprises under the leadership of a few core enterprises. There is a need for cooperation of related businesses. Under the initiative of "The Belt and Road Initiative", China's manufacturing industry has gone abroad, and has established a unified information exchange environment between core manufacturing plants, multi-stage parts manufacturers and multi-stage service enterprises. Enterprises can integrate business processes to implement agile global collaboration. Cross enterprise cost coordination network is a long-term cooperative relationship between enterprises and suppliers, customers, competitors and other organizations, which enables them to control their own resources and jointly determine the use of resources. There are three functions to build a transnational cooperative enterprise network:

1) Chinese enterprises dominate the cooperation of transnational industrial chain by becoming a core enterprise: The core enterprise is a special economic behavior subject in the cross enterprise network. The core enterprise should be located in the center of the supplier and customer network, play a leading role, have the ability to select and absorb excellent partners, have higher innovation ability, integrate various resources and occupy a leading market position in the industry. Chinese enterprises, through being a core company, drive and influence the development of other enterprises by leading a large number of transactions in different stages of the transnational value chain and a large number of transactions of the state enterprises. At the same time, we can absorb the excellent resources of other countries' enterprises, such as knowledge and experience, to improve our own industrial level, expand the international influence of our enterprises, and finally enhance the international influence of our country.

a) To promote the upgrading of relevant industries in China and enhance international competitiveness: By virtue of its control position in the whole cross enterprise collaborative network, the core enterprises in China can obtain part of the production profits of subcontractors in the value chain division system, thus accumulating enough "Schumpeter" monopoly profits for their technological innovation and industrial upgrading, which can enhance the capital strength of further research and development. So that the Chinese enterprises can get rid of the OEM of Europe and America, they are in the low-end position in the international industrial division of labor, relying on the low cost of labor and earning low-end profits. It enables our manufacturing industry to increase the intellectual property content of products and upgrade to a higher level of value chain through R&D and innovation. At the same time, the core enterprises of our country integrate the subcontractors by controlling the cross enterprise network, and require their supplier system to supply goods with zero time difference, continuously reduce the cost and upgrade the technology. Under the leadership of core enterprises, we will carry out

technological innovation and industrial upgrading together with supporting parts and supply subcontractors, so as to enhance the international competitiveness of China's industry.

2) To promote the international expansion strategy of Chinese enterprises by building a network of multinational enterprises: Under the initiative of "The Belt and Road Initiative", with the internationalization of Chinese enterprises and the expansion of cross enterprise networks, some famous enterprises, such as Lenovo, Haier, the Great Wall, Geely, have begun to organize their production networks through the brand or organize their production by their own businesses, and have gradually entered the core position of the manufacturing network, and have begun to decide the strategy of the network and grasp the key resources, and obtain rapid, low-cost resources, capabilities and knowledge complementary to the core competitiveness of the enterprise. Through the cross enterprise network to achieve expansion, Chinese enterprises can not only establish relations with foreign suppliers, other industrial enterprises, distributors, customers, etc., but also establish contacts with international competitors, intermediaries, foreign government departments, which can greatly reduce the resistance of the internationalization expansion of Chinese enterprises. By constructing the network of multinational enterprises, the global integration of network resources can be realized, and the deep embeddedness of marketing network and technical cooperation network can be realized.

B. To build a transnational e-supply chain and improve the efficiency of cross enterprise cost collaborative management

In the Internet environment, Ma (2000) pointed out that the supply chain is a network chain structure model, which is the integrated control of information flow, product flow and capital flow in the enterprise chain [3]. This model integrates raw material procurement, product manufacturing, sales and distribution, suppliers, manufacturers, distributors and customers into a network system model. This model integrates supply chain and Internet application into an integrated system, which we call e-supply chain. For Chinese manufacturing enterprises carrying out transnational cooperation, the fast and unimpeded supply chain is particularly important. Therefore, it is necessary to use information means to build e-supply chain with transnational cooperation. It closely links the upstream and downstream enterprises with customers, and each enterprise in the e-supply chain can consider how to coordinate the transnational cost cooperation management.

C. The e-cost control method in supply chain

1) Cost management for quick response to customer needs: Rapid response to multinational customers can make products enter the international market faster, and help Chinese enterprises to change product structure to meet the

needs of international customers, and increase profitability by reducing inventory costs. In the transnational e-supply chain, international customers participate in product design through the enterprise website, order personalized products according to specific needs, conduct online consultation or complaints on products, and receive real-time replies. This kind of transnational communication efficiency between manufacturers and customers will be much higher than the traditional international trade mode of telephone + fax in the past, in addition, they can participate in discussions in the Forum; On the other hand, enterprises can use computers to record the number of times customers browse a product, answer customer questions online, and use the real-time feedback information put forward by customers on the network to reflect and integrate these information into the supply chain quantitative cost index evaluation system (Murakami, 2011) [4]. Cost management of transnational e-supply chain can establish product design database model to serve product development and design.

2) *Cost control of manufacturing and design*: China's enterprises should use CAD, CAM and CIM to realize production automation, and introduce JIT production system to realize China's Intelligent Manufacturing. Through the JIT control in the production process, the production system can achieve the goal of zero inventory, and realize that all workers participate in the cost management.

3) *To establish the value flow database of transnational supply chain*: Integrate the production and product design database of suppliers into this database system, so that the cost management system of the enterprise can use the production, design and cost information of suppliers from the integrated database at any time; realize the real-time analysis of activity-based cost in the production department of the enterprise.

D. Cost cooperation advantages of e-supply chain

In the environment of "The Belt and Road Initiative" Transnational E-commerce, through the Internet technology, China's "intelligent manufacturing" enterprises should make full use of the e-supply chain to share advantageous resources, and achieve the following advantages:

1) *Reducing procurement costs*: Enterprises can quickly search the suitable raw materials and supplies from the home page of the cooperation national supplier's website, and analyze the information online based on the price and quality of raw materials and supplies. Enterprises can enrich useful information related to procurement decisions, improve negotiation ability of purchasing prices, and obtain lower raw materials and supplies under the corresponding quality assurance.

2) *Reducing the cost of product design*: Multinational e-supply chain can establish closer cooperation between buyers (manufacturers) and suppliers to develop and design products. Chinese manufacturers and international suppliers

analyze the manufacturing cost of products, design products together, and work together to meet the individual needs of customers, so that they can benefit from the differentiation advantages of products.

3) *Reducing costs through complementary resources*: Under the transnational strategic framework of "The Belt and Road Initiative", the relationship between Chinese enterprises and other enterprises is not simply a competition relationship. Under the guidance of transnational e-supply chain, enterprises analyze their own scarce resources and find cooperative enterprises with complementary resources. Enterprises in the e-supply chain can share their resource advantages so that they can have certain resources and practical advantages. To minimize costs and increase profits.

E. Risk dispersion of strategic cost management through e-supply chain

Transnational cooperation is a strategic issue of enterprises. To study the cost of long-term development of enterprises, we must consider the risks that may be encountered in strategic cost cooperation at any time. Enterprises usually use the following two methods to disperse risks: one is to analyze the effective portfolio scheme and choose an optimal portfolio; the other is to expand the enterprise to the previous node enterprise and the next node enterprise in the e-supply chain by means of M&A or cooperation, so that enterprises can complement each other in individual advantages and effectively disperse risks. Through the data and information accumulated in the e-supply chain, decision makers can evaluate, test and analyze those alternative investment and operational procedures, control risks, and achieve enterprise's investment and business plan in response to the "The Belt and Road Initiative".

F. Collaborative application of intellectual assets through e-supply chain

E-supply chain is not only a supply chain system, but also a decision support system (Jiang, 2015) [5]. It should provide relevant information about intellectual assets to meet the needs of decision makers, and then achieve the goal of transnational strategic cost management. In recent years, our country has achieved remarkable intellectual achievements. Enterprises have registered a large number of patents and developed a large number of intellectual property rights. Through cooperation and sharing with the intellectual assets of the countries along the way, we can maximize the mutual needs and enhance the international competitiveness.

IV. THE STRATEGY OF ENHANCING FUJIAN'S INTERNATIONAL COMPETITIVENESS UNDER THE FRAMEWORK OF "THE BELT AND ROAD INITIATIVE"

A. To build "lean enterprise" to improve cross enterprise collaboration efficiency

With the in-depth application of the Internet in the 21st century, the global economy is gradually transitioning from

the "old economy" to the "new economy". The "old economy" makes products standardized, so as to reduce costs, continue to pursue the expansion of market and organization scale, so as to achieve scale economy; the "new economy" in the network era is based on the management of digital and information industry, with closer ties between enterprises, frequent cooperation, enterprises focusing on core business, outsourcing noncore business, and enterprises becoming more and more streamlined. Organizational structure is the primary problem of manufacturing enterprises' intelligence. Enterprises should adjust the existing organizational structure, change the "pyramid" structure into a flat organizational structure, break the barriers between departments, remove the redundant intermediate level, promote horizontal cooperation among departments, shorten the market reaction time, improve the organizational execution, prevent the failure of decision information transmission and improve efficiency.

B. To improve the informatization level of enterprises in our province and build a transnational information technology cooperation platform

The transformation of manufacturing industry into "intelligent manufacturing industry", information technology is essential. At present, the level of information technology in our province is not high, the depth of integration with industry is not enough, and the level of information infrastructure construction and application is still lagging behind the developed countries. The construction of transnational information technology cooperation platform is an important basic condition for Fujian enterprises to carry out international cooperation and collaboration and reduce costs to face fierce global competition.

C. To use the link under "the belt and road initiative" to increase cooperation and exchange of talents between governments

The key equipment of our province's intelligent manufacturing industry, such as industrial robots, integrated circuit chip manufacturing equipment and other major engineering automation complete control system, largely depends on imports. The developed countries in the whole region are generally relatively well-developed, and have good experience in development. Through the strategic cooperation framework of "The Belt and Road Initiative", we should strengthen cooperation between the developed countries in China and Germany, and jointly set up research institutions to help develop our intellectual manufacturing industry through foreign technology and management experience. Fujian can actively deepen the industry. The association and the exchanges and cooperation between the two enterprises will explore the mode of talent exchange under "The Belt and Road Initiative" framework, invite foreign experts to be the advisor and guidance for the development of intelligent manufacturing industry in our province, and invite foreign high-end professionals to make professional training for talents in Fujian province.

D. To create a good industrial environment and increase policy support for technological innovation

The "wisdom" of intelligent manufacturing is not only to add information technology to improve production efficiency, but also to innovate technology and intellectual property rights. At present, our technological innovation related policies cannot meet the innovation needs of enterprises. The government should introduce more practical industrial policies and regulations to support the development of intelligent manufacturing industry, and cultivate an industrial environment conducive to stimulating technological innovation for China's intelligent manufacturing industry. At the same time, the government should give more preferential tax and financing to the domestic enterprises involved in the cooperation of all roads, and provide financing guarantee for the traditional manufacturing enterprises that transform and upgrade the intelligent manufacturing industry, so as to make the financing more convenient and lower cost, enhance the enterprise's application level of intelligent manufacturing equipment, and reduce the cost and risk of intelligent transformation of manufacturing enterprises.

V. CONCLUSION

This paper considers that the cross enterprise cost collaboration network based on e-supply chain is very suitable for Fujian manufacturing industry to carry out international cross enterprise cost cooperation. Based on the Internet platform, cross enterprise collaborative cost database can respond to customer needs quickly. By widely using CAD, cam and CIM, and cooperating with the introduction of JIT system, we can realize the efficient cost management of Intelligent Manufacturing in China. By integrating the production and product design database of suppliers into this database system, the cost management system of the enterprise can use the production, design and cost information of suppliers from the integrated database at any time, and realize the real-time analysis of activity-based cost in the production department of the enterprise. The current research lacks large sample research. Based on the case study of key enterprises, the future research can use big data to test the operation of cross enterprise cost collaboration system and promote its effect.

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