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Based on the scientific innovation and technological upgrading coupling mode of servitization research in Liaoning high technology equipment manufacturing production

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ABSTRACT

Liaoning equipment manufacturing industry's transformation of servitization depends on scientific innovation's promoting effect. This paper is based on the perspective of postponement strategy combining of scientific innovation and technological upgrading coupling model. It is on the basis of literature review. Delay strategy is proposed to use in manufacturing enterprises in technological innovation and technological upgrading coupling's idea. Commission store program is established, which is used in high technology manufacturing products' servitization under the delay strategy. Suggestions and countermeasures of EMI are given to service transformation. This research results show that: Liaoning equipment manufacturing enterprises' high technology production are in the process of the development of service now. Not only 4S commission store can improve the efficiency of equipment manufacturing enterprises' service and optimize resource allocation, but also can make a new competitive advantage in high technology equipment manufacturing market.

KEYWORDS

Scientific innovation and technological upgrading coupling; Postponement strategy; Liaoning equipment manufacturing high technology products; Servitization.



INTRODUCTION

Liaoning province is a large province on the equipment manufacturing industry in China. The implementation level of servitization could indirectly affect the competitive power of our country industry. At present, the ways of the developed countries enhance its power, which improve and expand the equipment manufacturing industry through the level of servitization^[1-3]. The percentages of 56% top 500 companies in the world are service-oriented manufacturing enterprises. At the same time 20% of those enterprises' profit from the servitization account for half of its revenue. Many foreign equipment manufacturing enterprises had transformed service provider successfully, such as IBM, GE and Phillips. The key of these enterprises gained more profit are from service^[4,5]. However, we could find the phenomenon that strengthening service could not bring about much more profit to Liaoning equipment manufacturing enterprises from experience of the foreign manufacturing enterprises development. Therefore, the scholar of transformation of equipment manufacturing industry's servitization studies are mainly based on the macro security factors, such as, environmental effect and the process mechanism^[7-9]. But, it is fragmented or not system state to study the equipment manufacturing industry (EMI) of scientific innovation in business^[10]. As a result, in order to promote industrial production enterprises' transformation of servitization, and provide feasible strategies to managers. So, this paper is on the view of scientific innovation and technological upgrading (SI&TU) coupling, and raising a scheme of high-tech of equipment manufacturing product commission store. At last, it could point out a new direction to equipment manufacturing industry's service transformation.

THE APPLICATION OF POSTPONE STRATEGY IN SI&TU MODE OF LIAONING EMI'S SERITIZATION

Customers personalized needs are more and more differentiation as the development of our country industry. The development of equipment manufacturing productions' range diversified is promoted. But, this trend also gives trouble to the equipment manufacturing enterprises of mass customization production. Therefore, delay strategy has risen. Then, equipment manufacturing enterprises are in the process of customization. It usually uses SI&TU to design a process or production. Many equipment manufacturing products begin to delay. Meanwhile, delay strategy is putted between the stages of push and pull's demarcation point in SI&TU mode, which is called customer order decoupling point (CODP). It is turning the point in the test stage to meet customers' special requirements^[11]. Indirectly affect liaoning equipment production scale and the degree of the enterprise's transformation. The specific principle is shown in Figure 1.

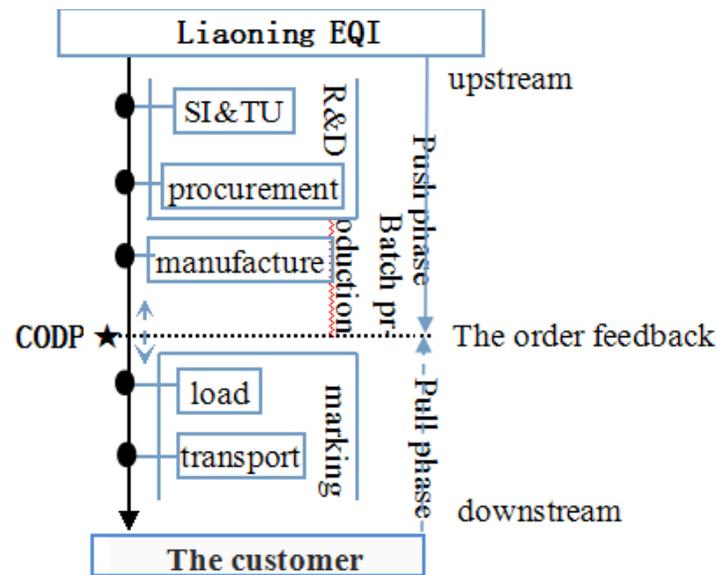


Figure 1 : Production operation pattern under the delay strategy

The push phase is stem from manufacturing production activities of liaoning equipment manufacturing enterprises. The pull phase is behind of load, which comes from the customer order requirements phase. Delay strategy's essence is to reset the high-tech equipment manufacturing production's technology structure or process in the SI&TU mode. It will make liaoning equipment manufacturing productions' CODP position to backward delayed. That could meet the needs of the majority of the market. We Can be seen from Figure 1 that: if the CODP of liaoning equipment manufacturing enterprises on the upstream location, then the generalized manufacturing enterprise production period will not be able to predict and generate corresponding economies scale in time. On the contrary, if CODP is located in the downstream position, manufacturing enterprises can't use customer demand differentiation customization. Hence, delaying tactics principle could be marked full use by SI&TU mode, which produced a certain scale standard general parts in research and development production stage. It also can maximize the benefits of enterprises. At the same time, when enterprises have customer orders, they can complete different productions with the fastest speed and delivery process. The product delivery cycle has been shorted. Then the size of the product customization process of inventory accumulation has been reduced.

EMI'S TRANSFORMATION PROJECT UNDER MODE OF SI&TU: LIAONING 4S COMMISSION STORE

In the development of high-tech servitization of liaoning EMI, there are several problems about transformation: First of all, in recent years, although liaoning develops science and technology innovation of EMI, the level of support in the high-tech equipment is weak, and the transformation needed by enterprise is large. The species of sophisticated technology products is so small that they can't develop key components and services by themselves that match with manufacture, many major equipment components still rely on imports, such as Dalian Shipyard, Shenyang Blower Company and other large equipment manufacturing enterprises. Secondly, the model of value creation is single and corporate services consciousness falls behind. Overall, Liaoning equipment manufacturing enterprises are lagging behind in the service of development. Most of the liaoning equipment manufacturing are rough matching and assembly products in the end of smile curve. Its value creation approach comes from the labor-intensive stages of simple production and processing, communication between the customer and business is little, what's worse, it is lack of agency to help manufacturing enterprises perform services development. Finally, we found liaoning equipment manufacturing market share at a

medium level from the proportion of the sales value. Thronging relevant information, we found the proportion of seven liaoning branch of industry sales in the value of china's total manufacturing equipment in 2012 as follows: Fabricated metal products accounted for 6.04%, general EMI accounted for 10.36%, accounting for special EMI ranked 6.78%, transportation EMI accounted for 5.27%, electrical machinery and EMI accounted for 3.55%, communications equipment, computers and other electronic EMI accounted for 1.48%, instrumentation and cultural office machinery EMI accounted for 2.52%. It could be seen that liaoning lacks of a representative branch of the leading domestic EMI.

In order to promote liaoning equipment manufacturers to quickly respond the market demand and service transformation process. This paper raise a media to conduct manufacturing that can reflect CODP position, and the needs of customers in 4S commission stores. 4S is the S&T (science and technology) production, satisfaction of customer demand, and service of brand, standard of SOM (service-oriented manufacturing) and represents four service standards in four areas. The effect in promoting of high-tech products 4S commission shop for manufacturing enterprises service transformation services, which includes following aspects: At first, 4S commission model can provide more comprehensive information programs about equipment manufacturing industry competitive proprietary for policy makers, timely feedback on the direction of customer orders demand, and improve the optimize efficiency and technological innovation of the enterprise. capacity allocation of resources; secondly, 4S commission shop is a communication bridge between manufacturing enterprise and customer, provides convenience for consumers to conduct custom cooperation and broadens the space for companies to realize the value; Finally, 4S shop commission mode enhances the feasibility of large-scale green manufacturing production, realizes sustainable development in service transformation process, and improves the environmental friendliness of EMI.

HIGH-TECH PRODUCTION OF 4S COMMISSION STORE “THREE STAGE” STRATEGY IN LIAONING EQI

Market needs and customer demands are the key to promote the development of Liaoning EMI. Therefore, this paper uses the experience of predecessors. It concludes the development of 4S commission store in liaoning equipment manufacturing high-tech products that its servitization includes sales value, inventory cost, total profit, main business cost and administration expense^[10]. This article is checking to relevant data to get the following data, which is shown in TABLE 1.

TABLE 1 : Liaoning province is located in the national EMI's competitive ranking under the financial view

| industry | Sales value | total profit | inventory cost | administration expense | main business cost |
|---|-------------|--------------|----------------|------------------------|--------------------|
| Metal EMI | 6 | 6 | 7 | 5 | 6 |
| General EMI | 3 | 4 | 6 | 5 | 3 |
| Special EMI | 5 | 5 | 7 | 2 | 4 |
| Transportation EMI | 9 | 7 | 3 | 9 | 6 |
| Electrical machinery EMI | 4 | 9 | 9 | 7 | 7 |
| Communication equipment, computers and other electronic EMI | 10 | 10 | 13 | 8 | 13 |
| Instrumentation and cultural office EMI | 10 | 10 | 12 | 10 | 10 |

Note: data from the China industrial economic statistical yearbook 2012

We can see from the graph of above that liaoning equipment manufacturing product market competition need to improve. At present, high-tech products meet 4S standards rarely in liaoning equipment manufacturing enterprises. Yet many manufacturing enterprises' production has already been the leading standard in domestic. But meet the standards of the 2S and 3S. It also can be shown in the booth of 4S commission store, and let clients learn its advantage. Therefore, “Three Stage” strategy of liaoning equipment manufacturing high-tech production in 4S commission store is proposed, which is shown in the figure below.

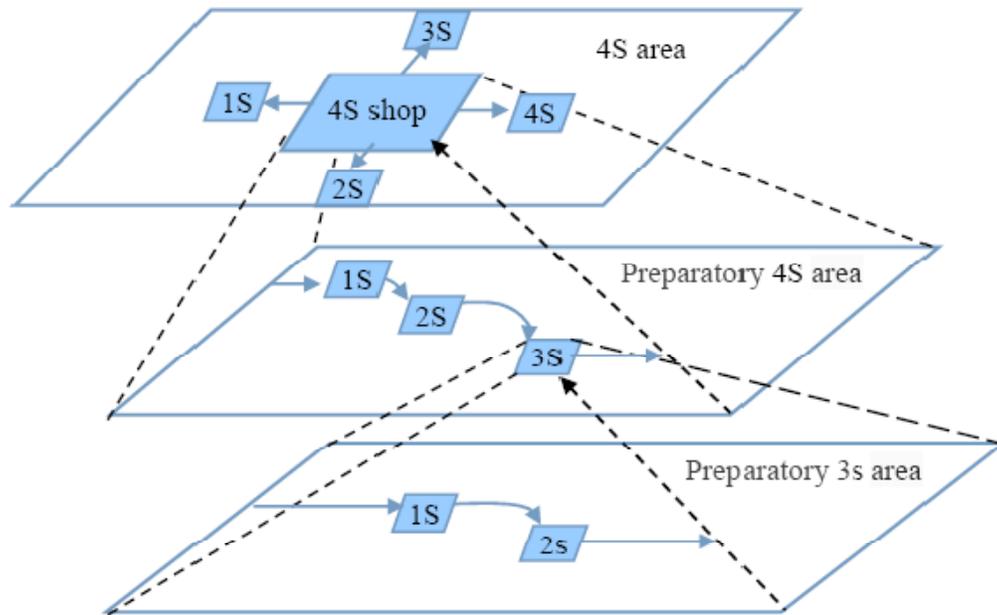


Figure 2 : Liaoning EMI “three Stage” strategy model of commission store

We can get conclusion of “three Stage” strategy from Figure 2. First of all, 4S commission store is divided into three exhibition service area at the early stage. It can put the 2S standard high-tech products into the 3s area. Let customers fully understand the product features and characteristics. The 4S commission store can collect customer demand information and feedback to manufacturing companies. It will prompt manufacturing enterprises to SI&TU and enhance dealing with the processing time of CODP. That will be Promoting the standard of 2S production to 3S and the pace of transformation. Secondly, 3S standard manufacturing enterprises could be lie in the area of preliminary 4S. Meanwhile, 3S manufacturing enterprises can learn 4S manufacturing enterprise product advantage and absorb its technical strengths. Then, the 3S standard manufacturing enterprises are Stimulated to implement SI&TU pace. It will give a direction for the research and development innovation. The 3S business’ confidence are improved to 4S standard. At last, the number of products in the 4S area may be limited. But under the dual function of the preliminary 4S and preliminary 3S area complement and the 4S commission store market information feedback, the implementation of liaoning SI&TU will be eventually Completed. Eventually, it will make the whole liaoning industries’ level in a qualitative leap.

COUNTERMEASURES AND SUGGESTIONS

Firstly, 4S commission store will become driving force of Liaoning equipment manufacturing enterprises climbing the value chain under the SI&TU mode. Liaoning EMI is faced with transformation and upgrading question under the requirement of synchronization of industrialization and servitization. Not only liaoning equipment manufacturing enterprises should strengthen the core technology innovation and service innovation, but also should consider system innovation and management innovation. Only this way will adapt to the development trend of global industry division of labor and integration.

Secondly, Delay strategy is a major method that 4S commission store has been achieved. We can see from the point of Liaoning EMI delay strategy implementation mechanism. The CODP upper stage expresses the service production, low production cost and high degree of neutralization of generic components or modules. But, customization service embodies the dominant trend of service production in the lower phase of the CODP. Meanwhile, it provides customized services to the customer in the situation of customer participation. To some extent, 4S shop can solve Liaoning high-tech equipment

manufacturing enterprises transformation problem of manufacturing and service under the delay strategy.

Lastly, Liaoning 4S commission store determines the industrial level of the EMI to a certain extent. Service is becoming more and more important in the production priority of Liaoning equipment manufacturing enterprises. No liaoning equipment manufacturing enterprises are the service from manufacturing to service industry in mode of SI&TU, but it should be pay attention to the mutual penetration and integration of manufacturing and service. Thronging service make our products value-added, SI&TU would provide powerful foundation and technical support for services. Finally, it would promote the harmonious of manufacturing and service of Liaoning EMI.

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REFERENCES

- [1] T.Garcia Mila, T.McGuire; A Note on the Shift to a Service-Based Economy and the Consequences for Regional Growth, *Journal of Regional Science*, **38(2)**, (1998).
- [2] V.Mathieu; Product Services, from a Service Supporting the Product to a Service Supporting the Client, *Journal of Business & Industrial Marketing*, **16(1)**, 39-58 (2001).
- [3] A.Davies; Life Cycle of a complex product system, *International Journal of Innovation Management*, **1(3)**, 229-2561 (1997).
- [4] M.Hobo, C.Watanabe, C.J.Chen; Double spiral trajectory between retail, manufacturing and customers leads a way to service oriented manufacturing, *Technovation*, **26(7)**, 873-890 (2006).
- [5] A.R.Tan, D.Matzen, T.C.McAloone et al; Strategies for designing and developing services for manufacturing firms, *CIRP Journal of Manufacturing Science and Technology*, **4(3)**, 285-292 (2010).
- [6] L.Araujo, M.Spring; Services, products, and the institutional structure of production, *Industrial Marketing Management*, **35(7)**, 797-805 (2006).
- [7] H.Jeff, Y.Yan, S.Willem et al; Postponement strategy from a supply chain perspective: Cases from China, *International Journal of Physical Distribution & Logistics Management*, **37(4)**, 331-356 (2007).
- [8] F.Jacob, W.Ulaga; The transition from product to service in business markets: An agenda for academic inquiry, *Industrial Marketing Management*, **37(3)**, 247-253 (2008).
- [9] Lin Lei, Wu Guisheng; The research:of services enhancing: Origins, Status and Development, *research management*, **2(1)**, 91-98 (2006).
- [10] Zhao Yong, Qi Ou ge, Cao Lin; The process and security service factor of equipment manufacturing-base on the Case Study of Shanxi Blower Group, *Science of Science and Management*, **12**, 108-117 (2012).
- [11] Luo Jian qiang, Zhao Yan ping, Cheng Fa xin; The research of transformation direction and realization model of Chinese manufacturing-base on the perspective of Delayed policy implementation, *Science of Science and Management*, **34(09)**, 55-62 (2013).