

Research on Supply Chain Risk Prevention and Control of Medical Products Enterprises

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Abstract: This paper firstly analyzes the mode, development background and development status of the medical products supply chain, and finds that the medical products market shows an expanding trend, which requires the prevention and control of supply chain risks. Secondly, this paper identifies the risk factors existing in its current development, mainly supply risk, logistics risk, demand risk, information risk and cooperation risk, and analyzes the five types of risk in detail, points out the risk factors existing in each risk, and enumerates the impacts of each risk on each link of the medical products supply chain. Again, this paper combines the relevant risk factors to propose specific supply chain management countermeasures from three aspects, namely: using innovative digital supply chain models, optimizing internal supply chain processes, and improving the standardized management of medical products production. Finally, the whole paper is summarized and relevant conclusions are drawn, aiming to provide some references for giving full play to the role of medical products supply chain.

Keywords: Medical Products Supply Chain; Supply Chain Risk; Risk Prevention and Control

1. Introduction

In recent years, with the growth of population and the enhancement of human health care awareness, the demand for medical products in China has been increasing, which requires the relevant medical products enterprises to further optimize the supply chain to meet the needs of domestic and foreign markets. In addition, the deepening of the reform of the national medical and health system and the further revision of the Code for Quality Management of Medical Device Business in

2023 to optimize the industry development norms have allowed medical products companies to face new opportunities and challenges. Almost every link in the supply chain of medical products, such as procurement, R&D, production, distribution, sales, etc., needs to make conceptual changes and strategic adjustments, and the medical products industry needs to comprehensively and clearly understand the risks of its supply chain, in order to effectively improve its own risk prevention and control capabilities, and to enhance the sustainable development of medical products companies.

2. Overview of the Medical Products Supply Chain

2.1 Medical Products Supply Chain

Medical products supply chain is a complex system composed of multiple subjects, including raw material suppliers, logistics, medical institutions, distributors and so on. With the development of the digital economy, medical products enterprises are actively creating a new type of digital supply chain, using the Internet platform to achieve diversification, scale, intensification, service-oriented business development. In recent years, medical products enterprises have improved the quality of basic business such as sales and distribution, and opened corresponding value-added services for medical institutions and distributors to actively undertake the functional spillover of medical products enterprises^[1]. As a result, the medical products market has further expanded, and its supply chain has been extended upstream and downstream in both directions to provide more targeted services for upstream and downstream customers.

2.2 Development Status of Medical Products Supply Chain

China's medical polymer products industry market size of 185.065 billion yuan in 2022, an increase of 9.43% year-on-year, it is expected that the market size of China's medical polymer products industry will exceed 200 billion yuan in 2023, the overall market size shows an upward trend. Driven by the national healthcare reform policy, the overall supply chain of medical products is simplified, and the requirements for risk prevention and control of the supply chain are higher, otherwise it is easy to break the chain due to the related risks. In addition, with the promotion of SPD supply chain services, ERP systems and other technologies, the medical products supply chain to intelligence, data, service, refinement of the development of the procurement to production to transportation to sales, each link can be controlled and supervised with the relevant systems, not only to effectively improve the efficiency of the supply chain, the transparency of the transportation system and deployment, personalization of services, logistics equipment intelligence, etc. to play a strengthened Help enterprises to reduce product costs, and promote the rapid growth of China's medical polymer materials industry market scale [2].

Therefore, in order to ensure that the production of medical products is sufficient for the current market share, and to allow enterprises to further maintain the market demand for products, to ensure the safety of operations, managers need to have a comprehensive and clear understanding of the risks in the process of its supply chain operations, in order to provide a basis for supply chain risk prevention and control, product quality and safety, and to promote the development of domestically produced medical products, to achieve sustainable development.

3. Identification and Analysis of Medical Product Supply Chain Risks

3.1 Supply Risk

Supply risk refers to the risk triggered by the uncertainty in the quality, quantity and time of product delivery in the upstream supply process [3]. Medical products supply chain supply risk, there is a supplier management risk, improper supplier selection may cause

high raw material procurement costs, raw material quality does not match expectations and other issues, affecting the enterprise's control of product price and quality. Medical products production process there is production risk, the production process management system, the level of production technology and the sealing of the product packaging and other product quality impact. With the medical products industry is gradually moving towards standardization, the importance of standardization and the value of more prominent, enterprises need to pay attention to the production of a unified code of practice, a unified coding system, etc., to prevent and control the production risk, to protect product quality. In addition, medical products development cycle is long, the scientific research personnel and capital investment, the development of technology and high capacity requirements, if the enterprise development process control is not standardized, it is easy to cause the development of reduced efficiency, the problem of insufficient income to meet expenditure, there is a certain development risk.

3.2 Logistics Risk

Logistics risk is the risk of enterprise logistics activities, including transportation, warehousing and inventory management and other aspects. Medical products have many categories, different specifications, the use and distribution of high requirements, management work is difficult and so on, compared with other supply chain facing logistics risk is more complex. Risk factors in logistics risk is mainly the risk of operation service, inventory management level, logistics delivery quantity, logistics loss, logistics standardization and logistics management level and other aspects of the uncertainty will easily affect the quality of operation service, thus leading to the risk of supply chain breakage^[4]. In addition, the level of logistics quality, personnel quality, warehouse storage conditions, turnover efficiency and emergency response capabilities will have an impact on the logistics quality of medical products enterprises, there is a certain logistics quality risk.

3.3 Demand Risk

Under the influence of collective purchasing

and "two-ticket system", the multi-level agency distribution model is gradually shrinking, the profit margin of medical products enterprises is compressed, the market scale has been affected, the product price is also a trend of reduction, if the enterprise can not respond to changes in the market environment in a timely manner, to improve the business model, it will be difficult to realize the business transformation. In addition, the control of medical products is more stringent, medical products enterprises need to directly interface with many medical institutions, and different regions of the medical institutions of the product requirements there are certain differences, for enterprises to carry out business needs to meet the relevant requirements of different medical institutions or customers, medical products enterprises are facing a certain demand risk^[5]. At the same time, the income level, price fluctuations and consumption preferences in different regions have differences, which will cause certain risks to the enterprise's demand quality and demand quantity.

3.4 Information Risk

Information flow is crucial in all aspects of the supply chain, and the process of information identification, transmission, and feedback reflects the business situation of the enterprise, and the operation of the supply chain depends on the upstream and downstream information flow^[6]. If the information system in the supply chain is not perfect enough, and the information recognition and feedback ability is insufficient, it is easy to cause information asymmetry, information transfer is not smooth, and aggravate the risk of information system. For market information, can not get timely and effective feedback, so that the medical products supply chain there is a large production blindness, there may be an imbalance between supply and demand, resulting in the sale of medical products in a passive state, is not conducive to the sustainable development of enterprises. At present there are still medical products enterprises can only through the picture, fax, EXCEL forms and other forms of transmission orders demand, timeliness and convenience greatly reduced. At the same time, there is also a technical risk in the information risk, the digital level of medical products enterprises,

data processing and analysis capabilities, etc. will have an impact on the technology of the medical products enterprise operations, resulting in technical risk.

3.5 Cooperation Risk

Supply chain cooperation risk refers to the combination of the probability and loss of the supply chain failing to achieve the expected results due to the individual differences of the node enterprises and the uncertainty factors of the supply chain in general^[7]. Medical products supply chain between the main body of the large size gap between the various medical institutions on medical products, product specifications, supply efficiency, order scheduling process have different requirements, medical products companies need to develop a personalized partnership for the requirements of each medical institution or distributor. Therefore, the diversification of the partnership between customers and medical products and the lack of uniformity in the concept of cooperation are factors that can cause cooperation risks in the operation of the supply chain. In addition, problems such as quality defects and delivery delays in the goods provided by suppliers will cause obstacles to the production and sales process, which will eventually evolve into the operational risks of the entire supply chain^[8]. If the withdrawal or increase of partners occurs in the cooperation process, adjusting the new supply chain requires a process, which may delay the opportunity of enterprise development, increase the operating cost of the supply chain, and cause the competitiveness of the supply chain to be reduced.

4. Risk Management Countermeasures of Medical Products Supply Chain

4.1 Using Innovative Digital Supply Chain Models

With the development of the information age, how to use advanced information technology and enterprise management status quo, eliminate the information silos between business departments, to create a flexible and efficient supply chain, is a necessary way for enterprises to achieve sustainable development.

In order to break the time domain restrictions between production and sales, and improve the

timeliness and accuracy of information transfer, medical products enterprises can develop SPD supply chain management model, start to expand the use of information technology, improve the technology of digital supply chain model, so as to reduce the risks on each node of the supply chain, and better adapt to the development of industrial reform and the protection of people's health needs. After the implementation of the digital supply chain [9], the relevant staff can upload order requirements through the platform, and the platform directly summarizes the orders of each sales region, simplifying the operation and improving the correct rate and efficiency of order completion. At the same time, using big data analysis technology, on the one hand, it calculates the optimal storage location and transportation path layout, gradually adjusts and improves the layout of the logistics network, establishes a more direct warehouse and distribution coverage model, and reduces the risk of logistics and transportation; on the other hand, it can analyze the multi-dimensional data of the suppliers, healthcare institutions, distributors, etc., and systematically evaluate the upstream and downstream supply chain, select the optimal solution, enhance the competitiveness of the supply chain and reduce the risk of cooperation [10].

4.2 Optimizing Internal Supply Chain Processes

Process sorting promotes the overall optimization of the internal supply chain and strengthens the upstream and downstream toughness of the supply chain. Medical products enterprises need to improve the process of order verification to sales shipments, to prevent the supply chain risks caused by the order collection channels are not uniform, and to promote the ERP system, MRP module, flush simulation, platform system, etc., in the production and sales of each other.

Due to the more fragmented specifications and batches of medical products sales orders, it is necessary to establish a multilevel logistics and distribution system that covers a wider range of customer types and a deeper network [11]. In order to prevent production risk and logistics risk, enterprises can try to change the internal push supply chain driven by front-end injection molding into an internal pull supply

chain driven by assembly and packaging, to improve the response speed of the internal supply chain, to prevent the mismatch between orders and production capacity, and poor order scheduling process. At the same time, in order to improve the efficiency of procurement and supply, reduce the workload of material demand calculation, improve the accuracy, medical products group can establish ERP system and MRP system, on the system to sort out the material demand plan, predict the order to improve the inventory, etc., can shorten the supply time of the product, and help to prevent the risk of supply and the risk of information [12]; but also can greatly simplify the workflow, to avoid the process of transferring information in information It can also greatly simplify the workflow, avoid information asymmetry in the information transfer process, and improve the accuracy of information transfer. Medical products enterprises should make full use of the accumulated medical industry resources for many years, good reputation, strong logistics and distribution capabilities and marketing capabilities, end-market demand-oriented, optimized internal supply chain processes, which not only reduces the error rate of managers in the product procurement process, but also effectively reduces the procurement cost of the product, to a certain extent, can reduce the pressure on the company's operating costs, and is conducive to enhancing the product bargaining space and the company's bargaining power. Bargaining space and the company's bargaining power [13].

4.3 Improving the Standardized Management of Medical Products Production

In view of the above risks, in order to enhance the upstream and downstream resilience of the supply chain of medical products, enterprises need to improve the standardized management of medical products production, which can start from the construction of the standardized system and supervision of the production process, strengthen the standard production system, and strengthen the standard supervision and implementation.

Medical products enterprises first need to determine the general principles and basic requirements for the construction of the standard system to scientific, technical

production basis, the layout of the standard system for a reasonable analysis and planning, the use of more advanced production equipment, from raw material processing, manufacturing, packaging and sealing of all aspects of the development of the production standard guidelines to carry out a comprehensive assessment of mandatory standards. Continuously optimize the mandatory standards for the production of medical products, so that the production process is more stringent, which helps enterprises to improve production quality and prevent production risks^[14]. At the same time, enterprises also need to strengthen the supervision of the production process. Each management department should include standard training in the personnel training program, strengthen the standard implementation mechanism for acceptance, verification, inventory management, etc., and unify the implementation standards of work to improve the quality of staff and managers, thus reducing the personnel risk in the operation of the supply chain.

5. Conclusion

In summary, after a comprehensive analysis of the supply chain risk of medical products, enterprises need to realize that any failure in any link may lead to serious consequences and improve the risk crisis awareness. From the procurement of raw materials to the sale of final products, each link in the supply chain is closely connected, coupled with the high quality and safety requirements of medical products, each link in the supply chain should have strict quality control and safety measures, which requires enterprises to optimize the technological innovation and supply chain to achieve real-time monitoring and predictive analysis of the supply chain to improve the efficiency and reliability of the supply chain, so as to Reduce supply chain risk.

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