Study on the Construction of Big Data Platform for Medical Supply Chain

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Abstract
Firstly, in order to improve the technical level of China’s medical supply chain information management; secondly, to promote the coordinated development of the upstream and downstream enterprises in the supply chain; thirdly, to promote the innovation of business model of main body of supply chain participants; lastly, to spur the continuous development of the medical and related industries. With the cooperative methods of “government+enterprise”, integration of medical supply chain flow, logistics, capital flow, information flow, to jointly build a big data platform of medical supply chain. Through the construction of big data platform for medical supply chain, the integration of drug manufacturers, drug logistics service providers, hospitals or drug retail stores and user information resources, to achieve the services function of medical e-commerce transactions, medical logistics transactions, medical data application.

Keywords: Supply chain, big data platform, medicine

1. INTRODUCTION

In recent years, with the advancement of medical and health system reform, China's pharmaceutical industry has developed rapidly; the pharmaceutical supply chain has become the focus of attention. The application of the cloud computing, mobile internet, big data and other information technology and so on, providing the conditions for optimizing business processes, integrating operating network, sharing information, tracking product quality, innovating business model and others for pharmaceutical companies in the supply chain management, further promoting the profound changes of the drug circulation service model and management model. The State Council promulgated the 13th Five-Year Plan to deepen the medical and health system reform (Guo Fa [2016] No. 78), the plan clearly pointed out that the application of large circulation data; expand the depth and breadth of value-added services to guide the development of industry. Facing the new opportunities and challenges, scholars based on the development of medical supply chain status and characteristics, analyzed the impact of big data will take to the pharmaceutical business model, market competition and other aspects, and putted forward on the establishment of drug information sharing platform, the development of medicine O2O and others. With the formation and improvement of pharmaceutical big data, to rely on big data applications to create a new supply chain model for the industry to bring greater business value, it is necessary to integrate participants’ information resources of drug supply chain, construct the data management information platform, that is to say, to construct big data platform for medical supply chain.

2. THE MAIN PROBLEMS EXISTING IN MEDICINE SUPPLY CHAIN

2.1. The complication of the chain structure
Traditional medicine supply chain always adapts the multi-selling structure. After the medicine production, the customers can get the medicine through at least one middleman, which will lead several questions, including long time, information and transportation obstacles, quality out of control and unstable product price and so on.

2.2. The lack of information infusion
The Chinese medicine market embodies three main characteristics: multiple, small and scattered. The first one is the scattered basic data and information. The information of the government and relevant enterprises cannot be applied totally and the information sharing cannot be realized. Because of the lack of information infusion, the member enterprises cannot understand the real-time information of the medicine product, the medicine data and the medicine logistics, having lower sensibility to the markets.

2.3. The primary stage of information processing
With the wide application of systems such as ERP, WMS and POS, data in medicine production and transformation has been basically formed. Relevant programs have experiences gradual promotion, so has the application of big data. But from the general point of view, big data in medicine production is still in the phase of achieving and generalizing. The participant enterprise is still not very satisfied with the analysis and
application of big data. Such as multi-data mining, analysis methods deepening, taking actions are in the initial pilot phase.

3. THE BIG DATA PLATFORM CONSTRUCTION OF MEDICINE SUPPLY CHAIN

The construction of big data platform is aimed at improving the technical level of information management, promoting the coordinated development of upstream and downstream enterprises in supply chain, promoting the innovation of business model of supply chain, and promoting the continuous development of medicine and related industries. Under the cooperation between government and enterprises, the platform can integrate the logistics, capital flow, information flow of medical supply chain.

![Figure 1. The design of big data platform for medical supply chain](image)

The medical data supply chain is based on the basic structure of the supply chain, covering drug manufacturers, drug logistics service providers, hospitals / drug retail stores and users, while docking government-led drug monitoring system and health insurance system, the use of Internet, big data and other information technology, The construction of medical public trading platform and medical data application platform. Through the comprehensive collection and sorting of drug production, drug trading, drug distribution, drug regulation, patient medication, payment and reimbursement and other data information, the establishment of a unified standard coding data system; gradually form and improve the data resource sharing mechanism to achieve enterprise information systems and platforms High degree of integration; to create drug trading platform and distribution services to the fourth party logistics platform to optimize the full flow of drugs through the process; to provide different levels of data applications for the government, enterprises, consumers and other different levels of information to provide customized services. In the "government + enterprise" mode of cooperation, the government-led the establishment of relevant data standards and norms, enterprises, including system docking, data processing, model analysis, business collaboration and other content of big data platform construction, to achieve different suppliers in the supply chain Between the transmission and sharing of information.

3.1. The drug manufacturers

At the beginning of the medicine supply chain, the producers undertake the mission of research and production. On the platform, the producers, on the one hand, can have a good mastery of logistical service information. Through scientific evaluation and option, they can pick the service business to share their own logistical service, letting the enterprise concentrate on the creation of the new product and the mastery of the market, to enhance the core competitiveness of the product. On the other hand, based on the information sharing, producers can make the production more reasonable according to the demand from hospitals, retailers and
users to solve the high cost problems.

3.2. The drug logistics facilitator

Facilitators are the core members of the supply chain, made up of the third part logistical enterprise. Through the platform, the third part facilitators can generalize multi-level logistical business online, increase the efficiency of enterprise resource and lessen the cost. In addition to it, medicine supply facilitator can provide professional tailored and high efficient solving-problem plans as one of the strategic orientation of future business expansion.

3.3. The hospitals or drug retailers

Hospitals and retailers are the main medium and the main objectives of generalization. Based on the platform, hospitals and retailers realize the direct exchange of medicine with producers, which will make the old pattern of supply chain disappear, concise the provision level, lessen the middle processing and decrease the purchase cost. To hospitals, they can even realize the purchase mission through the platform, collecting and analyzing the price, amount, distributing time and so on. To the retailers, the platform can help the enterprise gain deeper understanding of the customers’ demand, strengthen the service and proficiency and provide tailored service mode.

3.4. The users

Users are the end of the chain, final users of the medicine product. The platform not only realize the traditional medicine purchase, but also realize the communication with hospitals, retailers and medical staff on line. The medical staff can accomplish the distant-diagnosis, the online diagnosis according to the detailed understanding of the users’ syndrome, give the reasonable medicine-taking suggestions and establishing personnel medicine documents of users. In addition, the supervision of the platform can provide the wide-spread medicine counseling service and realize information sharing, medicine function and medicine supervision, enhancing the safety of users.

3.5. The drug supervision system

Government-oriented supervision is the objective of the platform. The platform can provide medicine counseling, medicine safety and special application to the government and relevant departments, which is good for the government to establish the risk mechanism and safety supervision. It is the main route of medicine supervision. At the same time, the platform can help medicine industry to create the coding covering the whole area, standardize the information and solving the confusing, to built a solid foundation to the management of the supply chain.

2.6. The medicare system

The government-oriented health-care system is the medium and long objective of the platform, consummating the function of payment in electronic exchange. Recently, in the medical selling terminal, 80% medicine are sold by hospital pharmacy; 20%, by chain pharmacy and self-owned pharmacy. Among this 20%, 90% pay for the medicine by health-care; only 10, by their own cash. In this way, the establishment of online purchase can promote the expansion of medicine online service. Though this can not be achieved in a short time, it can make preparation to the medium and long development of the platform.

4. THE CORE FUNCTION OF THE BIG DATA PLATFORM

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<th>The big data storage platform for medical supply chain</th>
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<td>The transaction service platform</td>
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<td>B2B service</td>
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Figure 2. the core functions of the medical supply chain based on the big data platform

4.1. The transaction service function

Based on the platform, the medical e-commerce exchange and logistics transactions can be realized. Medicine is a kind of high-standard product, one of the industry fit for e-commerce. In medicine e-commerce, three kinds of exchange service, B2B, B2C and O2O can be achieved. B2B can make the online exchange between producers, retailers and enterprises come true. Because of the interference of relevant departments, the platform can be treated as the main channel of government gathering purchase and help the
public hospitals and medicine producers to realize. Up to now, according to the supervision demand, after the online pharmacy get the internet exchange license, the product is in the area of OTC and medicine machinery. Through efficient promotion, the exchange amount can be increased. When the selling limit is erased, the scale of the online pharmacy can be enlarged. O2O can realize online distribution and make good use of advantage of the platform to achieve the individuality of producers, hospitals, retailers and users.

In the pharmaceutical logistics, drug logistics service providers with their own transport speed, business outlets and logistics processing capacity and other advantages, the establishment of transparent information disclosure and transaction convenience, information flow, check the centralized logistics service model of drug quality control. Room temperature / temperature control transport, professional packaging, process monitoring and customization of products and services for the pharmaceutical industry to provide professional, customized and efficient pharmaceutical logistics solutions.

4.2. The data service function

Based on the platform, the free data service and rechargeable data service can be realized. From the perspective of free data service, medicine exchange transportation and supervision is embodied. Through the analysis of purchasing data, the producer can understand and master the markets demand information, adjust the demand for the product scale and supply chain amount, lessen the stock amount and increase the economic profit of the whole chain. The enterprise participating in this chain can get the data, and discover the potential profit space through analyzing them. In payment service, the tailored service is embodied. Based on the basic information of the platform, combining with the demand of enterprise management development, the payment service provide the deep data application service, discover the data value and form the analysis report about medical industry and information to better serve medicine reasonable selling and distribution and provide the guidance to medicine safety.

5. THE TECHNICAL SUPPORT OF BIG DATA PLATFORM FOR MEDICAL SUPPLY CHAIN

To the platform, data gathering, information safety and data analysis all need technical support. Among them, information technology, such as data analysis and java plays an indispensable role in data gathering, saving and analyzing.

5.1. Standard technology

In order to achieve the business cooperation between different parts in just one platform, the standard and regulations are needed in medicine supply chain.

5.2. Information sharing technology

The information system of enterprise is the main part of the data platform. Because of relatively individuality, how to persuade producers, providers and retailers to let their information resource go into the platform need information sharing mechanism in the supply chain. Through the technical measures, such as gradual open to the outside and so on, the fully application of data sharing and the elimination of the data isolated island will be realized to promote the common development of medicine supply chain.

5.3. Logistical information technology

Logistical information technology can provide the medicine resource to the supply chain and search for the very beginning of the supply chain. It is one of the solution to guarantee the safety of the chain. In this way, the medicine logistics can be seriously supervised and managed by information technology such as GPS and so on. Even if there is a medical safety problem, we can search for its root and locate it to control the aftermath brought by medicine quality. The application of the internet in platform can get the obvious result in facilitating the function and improving the efficiency.

6. CONCLUSION

As the main part of the medical problem, the supply chain is the heated topic in recent years. This article deeply considers the generalization of all participant based on the development opportunity brought by information technology such as internet and big data to accomplish the platform construction. The construction can provide the market supervision, the product promotion and decision-making support to government, producers hospitals, retailers and facilitators. The platform realize the common decision making, common participation and common development through the cooperation between enterprises in every point. This is very meaningful to improve the management of the supply chain.
References


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