

Conference Paper

Research on the Competitive Intelligence Alliance of Medical Devices Based on Industrial-University-Hospital-Administration-Research

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Abstract

Analyze the general situation of the medical device industry and put forward the concept and characteristics of the innovative medical device industry competitive intelligence. This article discusses the significance of building the competitive intelligence alliance of medical devices based on Industrial-University-Hospital-Administration-Research, defines the connotation, proposes the operation mechanism, and puts forward some suggestions on the innovation of medical device industry in our country.

Keywords: competitive intelligence, industry-university-medical-administration-institute, medical instrumentation competitive intelligence

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1. Introduction

In May 2016, the “Outline of National Innovation-Driven Development Strategy” issued by the CPC Central Committee and the State Council pointed out that innovation has become the number one driver of development, innovation driven by national fate and innovation driven by the general trend of the world [1].

Medical devices are the most rapid high-tech industries that are characterized by technological innovation, are the industries that best embody the combination of science and technology with the economy, science and technology and people’s livelihood, and are highly strategic and growth-oriented. Original innovations in medical devices can benefit millions of patients worldwide in disease diagnosis and treatment [2]. Innovative medical equipment is an important foundation for the construction of a health insurance system, is also the main driving force for advancing medical treatment and technological progress, is the core engine for optimizing the supply of medical services, is the transformative force that leads to the transformation of

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medical models, has a high degree of strategies and initiative, is universally valued by all countries in the world and is an important symbol of a country's progress in science and technology and its ability to guarantee universal health. The development of innovative medical device products can give prominence to the problems of our country's medical device innovation ability and the industrial competitiveness, and enhance China's medical equipment level and medical and health service capabilities [3].

Since the 12th Five-Year Plan, China has included the field of medical devices in the strategic focus of China's scientific and technological development, successively formulated the "Special Plan for the Development of S & T Industry of Medical Devices (2011-2015)", the "Outline of National Medium- and Long-term Scientific and Technological Development Plan (2006-2020)", the "National S & T Innovation Plan of the 13th Five-year Plan", the "Health China 2030" Plan", "Made in China 2025" and on the promotion of the healthy development of the pharmaceutical industry guidance "and other related documents, set up a medical device industry technology innovation strategic alliance, deployed a number of innovative research projects, vigorously promote the collaborative innovation of research and production of medical products, medical device technology and financial integration development, establish and improve the medical equipment from technological innovation, product development, application evaluation to demonstrate the promotion of the entire system. Meanwhile, all departments actively promoted the policy optimization of innovative medical devices.

Although great progress has been made in innovative medical devices, on the whole, the innovation in the field of medical devices in our country is still based on tracking and imitation, related science and technology still need to be further strengthened, key technologies and important core components need to be further broken, interdisciplinary, cross-cutting and cross-industry technologies still need to be strengthened, the combination of "production-study-research-medical-examination", which is mainly composed of enterprises or schools, including the drug regulatory department, trade organizations, key enterprises and hospital groups, is not yet close enough, medical research co-innovation mechanism need to be perfect, new model needs further optimization.

The demand and content of competitive intelligence in the medical device industry under the background of innovation-driven development are changing [4]. The traditional competitive intelligence service model will not meet the demand of competitive intelligence in the context of innovation-driven development. Conform to the policy

of national policy and the increasingly fierce competition in the industry, summarize the characteristics of the medical device industry in the context of innovation-driven development, and establish an alliance of industry, education and medical research institutes that will innovate the competitive intelligence of medical devices will become the inevitable development trend.

2. Medical Device Industry Overview and Medical Device Competitive Intelligence

2.1. Market overview at home and abroad

EU Medical Devices Committee statistics show that the United States, the European Union, Japan together accounted for over 80% of the global medical device market share. According to Evaluate MedTech's statistics [5], the global sales volume of medical devices in 2015 was 390.03 billion U.S. dollars [6]. Global sales of medical equipment increased steadily during 2011-2015, the compound growth rate of 1.90%. The market is expected to grow to 475.5 billion U.S. dollars in 2020, and 4.1% CAGR in 2015-2020 [7].

In 2010, China has become the world's third largest medical device market after the United States and the EU [8]. The Blue Book of "2015 China Medical Device Industry Development" shows that the total market size of medical devices in 2015 is about 308 billion yuan, medical device market in 2010-2015 compound annual growth rate is 17.01%. The growth rate of domestic medical equipment market will be much higher than the global growth rate [9].

The future trend of the domestic medical device market is: Market potential is huge, demand will continue to grow; The demand of disposable equipment, conventional equipment continues to grow, the domestic market demand for large equipment will be flat or down; Import will continue to increase, the market competition will be more intense.

Although the domestic medical device market is expanding, the competitiveness of domestic medical device manufacturers is always worrying. Foreign investment and joint ventures have become the main force of the domestic medical device industry [10]. There are many problems in the medical device industry in our country, such as large quantity, small scale, low industry concentration, insufficient investment in scientific research and weak innovation ability.

2.2. Medical equipment industry innovation

Due to the incomplete innovation system, backward industrial facilities, the combination of production, study and research, the homogeneous competition among local enterprises and the monopoly of technology of multinational enterprises, the overall level of medical device technology in our country lags behind that of developed countries, seriously hindered the innovation and development of China's medical device industry. The following six points are particularly noteworthy:

2.2.1. Weak innovation system

The development of medical device industry in our country lacks the overall strategic planning. There is no supporting system for the production, study, research and use of products, and the technology and products cannot really meet the demand for clinical medical services. Innovation and intellectual property interests protection mechanism is not perfect [11].

2.2.2. Poor sense of initiative innovation

China's medical equipment follow the main research, with independent intellectual property rights of the few key technological achievements.

2.2.3. Continuous innovation ability is weak

The development of medical device products not only emphasizes innovation, but also emphasizes continuous innovation.

2.2.4. Medical equipment scientific research conversion rate is low

There is still a long way to go between a large number of scientific research achievements of medical devices and industrialization of products, and problems exist in the channels and mechanisms of transformation.

2.2.5. Management system and policy support need to be strengthened

At present, a batch of management systems and supporting policy support for innovative products of medical devices have been promulgated in our country. However, the support for the innovation chain of medical devices needs to be strengthened.

2.2.6. Innovative intelligence system construction and use of capacity

The domestic medical device industry is seriously less important to competitive intelligence.

In addition, under the influence of factors such as the scale of basic industries and medical equipment enterprises and intensified international competition, the innovation trend of our medical devices is not optimistic. Independent innovation and development of China's medical device industry meets the requirements of the national strategic emerging industries. Only independent innovation and development of high-end medical equipment, breakthroughs in core components and key technologies to enhance the technological competitiveness of products in order to break the market monopoly of foreign medical device products. This will help push forward the implementation of the new health care reform strategy in our country and simultaneously improve the technological level and industrial competitiveness of the related industries in China.

2.3. Innovative medical device competitive intelligence

Competitive intelligence in the medical device industry is the professional competitive intelligence that collects, collate, research and analyze information on medical device regulation, strategic decision-making, product research and development, and market operation. It focuses on the industry's external market and the development of environmental testing, to help companies grasp the medical equipment market environment, competitors, the development of various factors. In this way, we can make favorable decisions and occupy a favorable position in the fierce market competition.

The role of competitive intelligence in the medical device industry is mainly about: 1. Monitor the business environment and provide a basis for decision making; 2. Track advanced technology and promote scientific and technological innovation; 3. Grasp the market trend, improve business efficiency. Obviously, this is all from the corporate role and needs.

The development of medical device industry has new characteristics in the context of innovation-driven development, corresponding medical device competitive intelligence needs also have new features [12].

2.3.1. Competitive intelligence service level

It is necessary to serve enterprises in industrial clusters, but also to meet the intelligence needs of universities, research institutes and other scientific research institutions.

2.3.2. Competitive intelligence content level

It is necessary to pay attention to the medical equipment industry factors of production information, but also cannot ignore the intelligence of innovative elements.

2.3.3. Competitive intelligence concern level

It is necessary to pay attention to the competitive situation of enterprises in the medical device industry, but also pay attention to universities, scientific institutes, medical institutions and other institutions, and the target of concern cannot be confined to the traditional industrial object itself. Under the background of innovation-driven development, industrial innovation and development cannot be separated from the support of domestic scientific research institutes and universities. The linkage between industry, academia and research institutes strengthens, more emphasis is put on the need of collaborative innovation of industry.

2.3.4. Industrial chain development level

Under the background of innovation-driven development, the linkage between science, technology, industry and regulation is enhanced and the trend of in-depth integration. The development of medical device industry depends on the upstream of industrial activities - the support of scientific and technological innovation activities.

3. Connotation and Significance of the Competitive Intelligence Alliance

3.1. Connotation

Since the 1980s, "strategic alliances" have been the focus of academia and industry. Early strategic alliance exists mainly between enterprises, alliance and cooperation on research and development, technology transactions, equity investment and other parties to establish alliances. In recent years, strategic alliances have entered the field of higher education from the field of economic management, and the strategic alliances between school and enterprises have also been increasing [13]. Industry-university-research Alliance has become an important source of technological innovation in the country [14]. Innovation strategic alliances generally refers to enterprises, universities, research institutions or other organizations and institutions based on the needs of national innovation and development and the common interests of all parties, to enhance knowledge and technological innovation as the goal, the joint development of the formation of complementary advantages and sharing Risk, shared interests of the cooperative organization [14].

Medical Device School Enterprise Medical Research Multi-depth Integration System Mechanism (Alliance) refers to universities, medical device backbone enterprises, hospital groups, drug monitoring systems and medical device research and development institutions in personnel training, technological innovation, new product development and efficient Interactive operation of multiple cooperative bodies, division of labor and work to point their work to a common goal, the formation of government-led, industry guidance, cooperation between the five parties, the physical operation of the cooperation.

The medical device school medical research competition intelligence strategic alliances can be defined as: In today's complex and ever-changing dynamic innovation era of competition, knowledge-based big data, cloud computing era, to enhance China's medical device industry technological innovation as the goal, established by the universities, medical device backbone enterprises, medical institutions, drug monitoring systems and research institutes, integrated technology development, resource advantages, collaborative medical equipment competitive intelligence collection, processing, analysis, processing, application and feedback, achieve the advantages of resources complement for each other and win-win, promote the innovation and development of China's medical device industry.

3.2. Meaning of the establishment

It is of great realistic significance to set up a federation of competitive intelligence for medical device research institutes.

3.2.1. Promote the sharing of intelligence resources

Competitive intelligence sharing is the process by which a cooperative organization exchanges and shares, absorbs, integrates and applies its own proprietary intelligence resources with one or more organizations through cooperative channels to gain the complementary advantages of resources and capabilities and ultimately improve innovation performance. In the process of sharing, the main input and reception of cooperation partners are mainly unique intelligence resources [15]. To achieve resource integration and complementarity through alliances is the main purpose of building a competition intelligence alliance between production, education, medical supervision and research institutes, and to amplify and enhance the single function of the five parties of industry, medicine, medicine, supervision and research alliance Competitive advantage. To build up the competitive intelligence alliance, promoting the linkage among the five parties, refining valuable information, grasping the format and integrating the resources and advantages of all parties so as to achieve the goal of sharing resources and complementing each other's advantages, is an effective way to promote the transformation of scientific and technological achievements into real productive forces [16, 17].

3.2.2. Improve the efficiency of access to competitive intelligence

Different scales and different types of medical equipment enterprises have different ways of obtaining information, and all parties also have corresponding information release and dissemination needs.

The establishment of the competitive intelligence alliance coincides with the information symmetry of all parties in the Union, sharing the market pressure and cost of each party, improving the efficiency of intelligence acquisition and transmission, enabling all parties to make strategic decisions in a timely manner, guarantee its invincible position in the competition.

3.2.3. Improve the specialization of competitive intelligence

The collection, analysis, processing and service of the enterprise competitive intelligence work are systematic projects and must be completed by professionals and teams. The alliance can realize the division of labor and cooperation of all parties, give play to their respective advantages and specialties, reduce duplication of work on intelligence acquisition by all parties in the alliance, raise the accuracy of competitive intelligence and ensure the specialization of intelligence work.

4. Operation Mechanism of the Alliance

4.1. Functional positioning

4.1.1. Function positioning of universities

In the intelligence alliance, colleges and universities mainly assume the functions of intelligence and technical personnel training and intelligence analysis and research, and cooperate with other parties for basic research. Training high-quality applied intelligence technology talents, providing training for enterprise competitive intelligence personnel, and many other functions of information processing should be the specific functions of colleges and universities [18].

4.1.2. Functional positioning of enterprise

The main target of competitive intelligence service is the enterprise, therefore, the enterprise plays the main role in strengthening the strategic alliance with supervisory departments, universities, medical institutions and research institutes, undertakes most of the work in the formation of competitive intelligence and promotes the value of competitive intelligence. Achieve, the scientific research into innovative medical device products and achieve market value.

4.1.3. Functional positioning of medical institutions

Medical institutions in the medical device innovation products clinical trials and application of the base. The information released by the product in the circulation of medical institutions is a very important source of competitive intelligence for the Alliance for

Competitive Intelligence to obtain technical information on innovative products, post-use evaluation information and clinical trial information [19].

4.1.4. Functional positioning of Food and Drug Administration

The food and drug administrations at all levels shall formulate and supervise the implementation of all kinds of medical devices and regulations and shall be responsible for formulating and supervising the development, production, operation and use of medical devices, and shall be responsible for the registration of medical devices and supervision and inspection. Therefore, it is the formulation and guidance of the policy level. The provision of such information is necessary for the smooth development of competitive intelligence and provides reference for enterprises to formulate strategies. At the same time, enterprises can make use of the competitive intelligence obtained by the government to establish a channel for product output [19].

4.1.5. Functional positioning of research institutes

Scientific research institutes mainly undertake the technical guidance function in the process of incubation and transformation of scientific research achievements in the early stage, and the alliance of competitive intelligence can enlarge its function and reflect the market value of scientific research institutes. For research institutes, strategic alliances in the competition focused on the development of scientific research, research and development for the core competitiveness of products to help companies solve how to extract from the complex raw data valuable to the enterprise Competitive intelligence and research products.

4.2. The overall model of the competitive intelligence alliance's operational mechanism

The operation mechanism of the competition intelligence alliance mainly includes: the motivation mechanism, the control coordination mechanism, the intelligence sharing mechanism as well as supports the safeguard mechanism [20]. In the initial stage of the construction of competitive intelligence alliance, in order to mobilize the enthusiasm of alliance members, the emphasis is on the construction of dynamic mechanism, which is the basic mechanism of alliance operational mechanism and the precondition of alliance operational mechanism. In the process of initial establishment and operation

of the competition intelligence alliance, the emphasis is placed on the construction of the control coordination mechanism, which is the leading mechanism in the operation mechanism of the competition service alliance and can ensure the smooth and orderly operation of the coalition. In the mature period of the alliance construction, the focus is on the information sharing mechanism. The sharing mechanism is the basic idea of the alliance to achieve the development goals. The support and guarantee mechanism of the Alliance for Competitive Intelligence is the key mechanism running smoothly from the establishment to the alliance and is the material and environmental guarantee for the effective operation of the competition intelligence alliance. The overall model of Competitive Intelligence Alliance operation mechanism is shown in Figure 1 below.

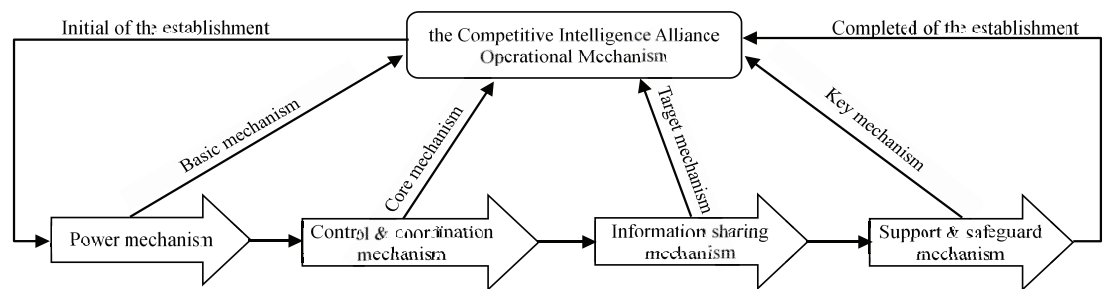


Figure 1: The Overall Model of Operational Mechanism of the Competitive Intelligence Alliance.

4.3. Management and operation mode

DCFO is an abbreviation of Decision, Coordination, Function and Operation, which reflects the organization and management structure and operation mode of the competition information union of school-based medical research institutes. The decision-making level is "Board of Supervisors of Institute of Enterprise Medical Surveillance Competitive Intelligence," the coordinating layer is "Office of League of Competitive Intelligence of School-Enterprise Medical Surveillance", and the executive floor is mainly the operational entity of competitive intelligence of school-enterprise medical supervision and research.

Five multi-member alliance signed a cooperation agreement, the specific content of cooperation and construction are innovative medical device development project as a carrier. Therefore, DCFO management mode of operation and management around the specific cooperative construction projects, the use of project management organization and cooperation to carry out the construction.

5. Suggestion

5.1. Proposals to make the league more efficient

The effective operation of the competitive intelligence alliance of medical devices based on Industrial-University-Hospital-Administration-Research cannot be achieved without the synergy of the stakeholders. Only under the guidance of the innovative medical device market and government guidance, the alliance's resource identification and allocation can be optimized and dynamic rights and responsibilities Peer-to-peer mechanism and fostering an open and innovative alliance culture can make the Alliance for Medical Device Competitive Intelligence play a greater role in the development of innovative medical devices.

5.2. Proposals on innovative medical devices

1. Strengthen the guidance of innovation and incentive
2. Improve financial and taxation financial support
3. Speed up industry cultivation and expansion
4. Promote the promotion of innovative products
5. Play a role of industry organizations
6. Strengthen the building of qualified personnel

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