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REVIEW ARTICLE

Strategic choices for high-quality development of intelligent wearable sporting goods industry in the new era

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ABSTRACT

Use research methods such as survey research methods and literature data methods, and use strategic management theory to analyze the strategic development environment of the smart wearable sporting goods industry. On this basis, the strategic goal of high-quality development of the smart wearable sporting goods industry is clarified. It establishes a strategic policy of people-oriented, focuses on research and development, and scientific management, and proposes a strategic development path for cultivating leading enterprises, developing industrial clusters, and promoting research and development innovation. In order to promote the high-quality development of the smart wearable sporting goods industry in the new era, specific strategic safeguard measures are putted forward in terms of providing talent support for industrial development and improving the legal system for the development of the smart wearable sporting goods industry to achieve high-quality development.

Keywords: wearable sporting goods industry; high-quality development; strategy

1. Introduction

Since 2013, with the upgrading of mobile Internet technology and smart hardware devices, smart wearable sporting goods have become popular all over the world. "The golden key to connect the human body and smart devices" is the most vivid description of smart wearable sporting goods[1]. In the era of mobile intelligent network, a large number of wearable devices such as smart bracelets, smart running shoes, smart clothing, smart wristbands, and smart glasses[2] have appeared in the sports consumer market to better meet people's dual needs for scientific exercise and personalized health services. This also indicates that the smart sports equipment consumption industry that is close to people's lives in the future will be a high-tech innovation industry based on massive data collection and precise calculation and analysis. Today, China's industrial upgrading is accelerating, and the industrial focus is shifting to the tertiary industry. The development of the mobile Internet economy has significantly increased the frequency of people's use of mobile terminals and the time spent on mobile terminals. The collision between

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the healthy sports industry and the mobile Internet makes a variety of smart wearable sporting goods one of the fastest growing product categories in the world's electronic products[3]. It is estimated that from 2020 to 2025, the compound growth rate of the market size will reach 20%. By 2025, the market size of China's smart wearable products is expected to exceed 1,500 yuan. At the same time, smart wearable products have begun to develop in the direction of remote diagnosis and treatment, data cloudification, product verticalization, functional specialization, and diversification of profit models, showing broad development prospects for smart wearable products[4]. In order to better control the development status of the smart wearable sporting goods industry, analyze the achievements and shortcomings in the development process so as to better promote the sustainable and high-quality development of the smart wearable sporting goods industry in the new era, the research starts with the strategic development factors of promoting the smart wearable sporting goods industry, and focuses on the analysis of the strategic environment, strategic policy, strategic goals, strategic choices, and strategic guarantees for the development of the wearable sporting goods industry which are of great significance for the healthy development of the smart wearable sporting goods industry.

2. Analysis of the strategic environment for the development of China's smart wearable sporting goods industry

2.1. Analysis of the policy environment

Since the country proposed the innovation-driven development strategy in 2012, smart wearable sporting goods have been included in the scope of key development of China's high-tech industry, and the annual growth rate of its R&D (research and development) investment has been maintained at 20% above[5]. As early as 2013, the General Office of the National Development and Reform Commission also listed wearable smart products as a key support project in the "Notice on Organizing and Implementing the Special 2013 Industrialization of Mobile Internet and Fourth Generation Mobile Communications (TD-LTE)". In 2015, the state proposed the "Made in China 2025 Strategy", which brought a rare development opportunity to the high-tech smart wearable sports goods manufacturing industry. In the same year, the State Council issued the "Several Opinions on Accelerating the Development of the Sports Industry and Promoting Sports Consumption", which brought huge consumption space to the wearable smart sporting goods market. In 2019, the government work report of the State Council proposed to accelerate the transformation and upgrading of the manufacturing industry to an intelligent, green, and service-oriented manufacturing industry. Among them, the smart wearable products industry was mentioned in the focus areas of benefiting people's livelihood and promoting consumption[6]. In September of the same year, the General Office of the State Council issued the "Notice on the Outline of Building a Powerful Sports Country", clearly proposing to further promote the deep integration of the Internet, big data, artificial intelligence and the sports real economy. It has effectively promoted the R & D, manufacturing and industrial transformation and upgrading of the wearable sports and sports goods manufacturing industry, improved the supply capacity of smart wearable sports goods, and accelerated the quality and efficiency of sports goods services. On September 20, the General Office of the State Council once again issued a document to promote the high-quality development of China's sports industry, encourage financial institutions to support the construction of the sports industry, and make the sports industry truly a pillar industry of the national economy. To sum up, the state has given great policy attention and support to the development of the wearable sports industry in terms of promoting the development of sports, motivating national fitness, improving the development of high-tech and sports industries, and stimulating the consumption economy[7].

2.2. Analysis of technical environment

The full application and market promotion of artificial intelligence technology, 5G technology and Internet of Things technology in the real economy has provided a good technical environment and high-tech technical support for the development of the smart wearable sporting goods industry. Specifically, in: (1) 5G technology provides basic support for smart wearable products, and promotes the iteration and progress of the technical environment. The technical manufacturing of smart wearable sporting goods involves three aspects: Application software, device hardware and artificial intelligence. Smart wearable sporting goods possess powerful information processing functions, and have many high-tech features such as wearability and human-computer intelligent interaction, and need to be supported by chip technology, sensor technology, intelligent interaction technology and battery technology[8]. (2) Chip technology provides high-efficiency digital signal core technical support for wearable sporting goods, and its technical content plays a vital role in improving the hardware platform of smart wearable sporting goods and promoting the development of the entire industry chain. (3) Sensor technology provides physiological sign construction support for smart wearable sporting goods in terms of biosensors, inertial sensors, environmental sensors, etc., and provides direction recognition, positioning and navigation, altitude calculation, speed frequency, etc. for individuals, which can solve the problems related to the user's own activities. The problem of data acquisition can provide users with external environmental information and suggestions in real time[9]. (4) Flexible electronic components provide indispensable sensing technology for the sensitivity of smart wearable sporting goods. (5) Artificial intelligence interaction technology provides voice recognition, eye control and mind muscle feedback control technology for smart wearable sporting goods. (6) Battery technology provides flexible battery life technical support for the chip processor of smart wearable sporting goods. In addition, the development of Internet big data and cloud computing, as well as the development of Internet of Things technology are the technical support environment for the innovation of wearable sporting goods.

2.3. Social Environment Analysis

During the "Thirteenth Five-Year Plan" period, the number of netizens in China increased from 688 million to 989 million, an increase of 43.7% in five years. The overall scale of netizens in China has accounted for about 1/5 of the global netizens. The scale of mobile netizens in China is 986 million, an increase of 88.85 million mobile netizens compared with March 2020, and the proportion of netizens using mobile phones to access the Internet is 99.7%, Among them, the proportion of netizens under 20 years old is 17.1% higher than that of this group; the proportion of netizens over 60 years old is 11.0% higher than that of this group, It is enough to see that the potential consumer group of smart wearable sporting goods in the future will be very large. According to data released by the National Bureau of Statistics in July 2020, in 2020, China's smart wearables shipments will be 107 million units, accounting for about 1/4 of the global smart wearables shipments, a year-on-year increase of 8.1%, it is predicted that in the next five years, the compound growth rate of China's smart wearable products shipments will be 20%. In 2025, China's smart wearable product shipments will reach 266 million units. Products exist to meet the needs of consumers. When wearable sporting goods enter the market as an emerging product, consumers always have a certain time to accept them and put forward reasonable suggestions for improvement. To this end, the author conducts an online questionnaire survey in the online sports community with 3 million users, and summarizes the functional requirements of sports enthusiasts for wearable sporting goods by analyzing 36,800 valid questionnaires (**Table 1**)

Table 1. Sports enthusiasts' functional requirements for sports wearables

Functional requirements of sports enthusiasts for wearable sporting goods	The proportion/%
Wearable sporting goods do not rely solely on time or distance to judge the exercise level or physical condition of sports participants, but must be built into smart wristbands, smart helmets, smart bracelets, smart watches, smart vests, and smart running shoes. Micro-sensors record physical data during exercise, such as heart rate, calories, blood pressure, etc., to quantify the exercise effect of sports participants.	93.3
Wearable sporting goods should pay attention to personal health information in daily life, including sleep, daily activities, etc., and network with professional physical examination centers or health care institutions to become health stewards for healthy exercisers and sick exercisers.	82.6
Manufacturers of wearable sporting goods should invite sports professionals, professional athletes and fitness coaches to join, and through the sharing and interaction of these professional users, meet the needs of many sports participants for scientific fitness.	64.8

Figure 1 shows the trend of users' attention to smart wearable sporting goods at different price points from 2016 to 2020. Among them, the proportion of products priced above 2,000 yuan has dropped significantly, while the proportion of products priced below 1,500 yuan has shown a continuous upward trend, and the attention of products around 500 yuan has basically fluctuated slightly.

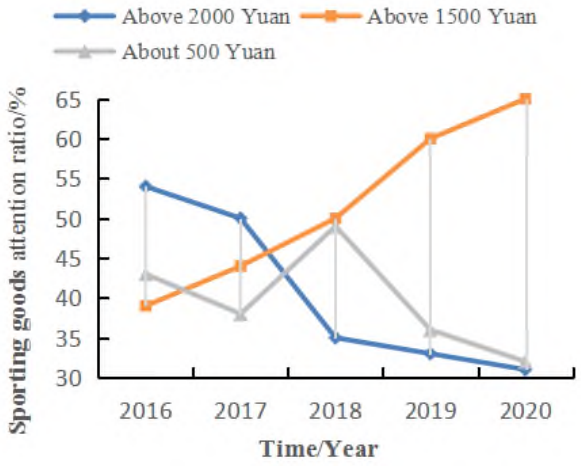

Figure 1. The trend of attention to smart sports wearables at different prices from 2016 to 2020.

In addition, the social network trust of smart wearable sporting goods is an important guarantee for the realization of its own value. According to a survey by iResearch, 36.2% of consumers are relatively optimistic about the use of smart wearable sporting goods, 2% of consumers take a wait-and-see neutral attitude, and 12.6% say they will not use smart wearable sporting goods (**Figure 2**).

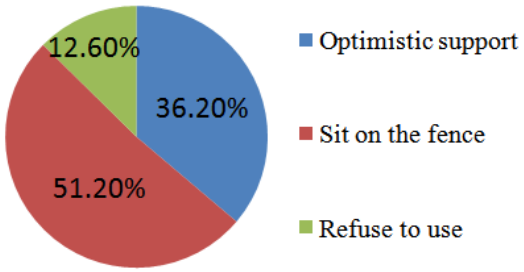

Figure 2. Social trust for smart sports wearables.

The main reason for consumers' lack of trust in smart wearable sporting goods is not only the fear of possible leakage of personal privacy information, but also consumers' concerns about the many uncertainties in the new products themselves. Therefore, how to establish the initial trust of potential consumer groups in smart wearable sporting goods is very important for product manufacturers and distributors. Only by paying attention to the health care and fitness monitoring functions of smart wearable sporting goods, to consumer experience, and increasing publicity, can more and more consumers recognize and accept smart wearable sporting goods.

2.4. Industry environment analysis

The development trend of the smart wearable sporting goods industry

(1) The production scale of the industry is expanding year by year, and the industry activity is rapidly increasing. According to Wearable's "2019

Best Fitness Tracker Buying Guide", fitness data trackers alone hit a $5.4 billion market in 2019. In the future, it is expected to become a new growth point of the global information technology industry after smartphones and tablet computers.

(2) The overall development trend of multinational companies rushing to deploy smart wearable products manufacturing and domestic well-known enterprises accelerating their follow-up has not changed. Google Glass, Samsung Apple smart watch, Intel's wearable processor, FITBIT's health bracelet, SPROUTLING smart anklet, etc. have all achieved rapid industrial entry in the fields of sports, health care and other products. Chinese electronics companies have also increased their investment in capital and technology research and development in the industrial strategic layout of wearable products. Products such as Guoke Electronics GEAK watches, Umicom Omate watches, Yingqu Technology inWatch, and Zhiji Electronics ZWatch have been launched one after another. In terms of smart bracelets, Xiaomi bracelets, Baidu Gudong bracelets, TenghaiShiyangti memory bracelets, ZTE GrandWatch, Huawei Talk Band bracelets, etc. quickly seized market share.

(3) China's smart wearable sporting goods, as an emerging field of electronic consumption, the overall development trend of the industry is good, but the product concept is popular and the market response is relatively bleak. In the industry chain, upstream chip manufacturing, radio frequency technology, and sensor manufacturers have responded positively, but downstream enterprises, due to cost control considerations, have weak investment in brand technology research and development and new product development, resulting in serious product homogeneity and affecting technology upgrades and development. Coupled with the lack of large-scale leading enterprises to drive the integration of the industry chain, the technical strength and brand appeal of smart wearable sporting goods have certain development bottlenecks[10].

Research on the production and sales of smart wearable sporting goods

The innovation of the smart wearable sporting goods industry lies in intelligence, which requires extremely high scientific and technological research and development technology. Under the background of well-known foreign sports giants such as Nike, Under Armour, and Adidas, which have stagnated in the research and development of wearable body hardware products due to production costs and technological investment, domestic enterprises such as Li Ning and 361° have joined the field of sports smart wear in large numbers. According to statistics from the International Data Corporation IDC, in 2019, the shipment of smart wearable sporting goods in China has reached 13.2 million units, a year-on-year increase of 27.8%, and the production output value has reached 14.9 billion yuan. From the perspective of the production and sales rate of sporting goods, the production and sales rate of Huami Technology and Gudong's smart running shoes and smart clothing, and Xiaomi smart sportswear exceeded 90%; the production and sales rate of smart basketball and smart football of Jianji Technology, as well as smart basketball of Yundong Technology and Wanshi Sports Smart Technology is over 92% (**Table 2**). It can be seen that smart wearable products perceive various physiological indicators of exercisers through chips and sensors to help users obtain better training effects, and it is foreseeable that they have a lot of room for growth.

Application of smart wearable sports goods

A total of 1,854 questionnaires were collected through the questionnaire survey on the Questionnaire Star Online, and 62 invalid questionnaires were excluded. Finally, 1,792 valid questionnaires were sorted out and analyzed:

(1) Smart wearable sporting goods are well known and favored by the public. 95.2% of people know and know about smart wearable sports goods, and 65.4% of them have purchased smart wearable sports goods, especially male consumers are more enthusiastic about smart wearable sports goods. This shows that smart wearable sporting goods are popular and favored by the public.

Table 2. Production and sales of domestic smart sports wearable manufacturers in 2019

Supplier	Products	2019 output/10,000 units	2019 sales/10,000 units	Production and sales rate %
Xiaomi	Xiaomi bracelet	171.4	133.5	77.8
Apple	smart watch, smart bracelet	554.3	467.2	84.2
Life sense	smart watch, smart bracelet	19.5	12.7	64.7
BBK Electronics	smart watch	137.6	99.6	72.5
Huawei	smart watch	121.8	107	88.4
mobvoi	smart watch	11.4	8.7	79.2
Erock Sports Smart Technology	smart basketball	12.8	11.9	92.9
Zepp Health	Smart running shoes, smart clothing	167.4	149	90.2
GenGee	Smart football, smart basketball	14.6	13. 6	93.8
CloudFighting	smart basketball	13.8	12.7	92
Codoon Information Technology	Smart running shoes, smart clothing	129.7	118.4	91.4
Beijing Hongqi Shengli Technology	HIPLAY smart basketball bracelet	13.3	11.1	87.4
Li Ning	smart pedometer shoes	9.8	7.4	80.2
Shuangchi	smart pedometer shoes	6.7	5.1	81.3
361°	smart positioning shoes	10.6	7.9	77.3
clouds	smart positioning shoes	7.2	6.2	84.4
Huan Cheng	smart positioning shoes	3.4	2.5	81.3
Foshan Libao Sports Technology Co., Ltd.	smart sportswear	3.8	3.2	84.2
XiaoMi	smart sportswear	5.2	4.7	90.3
body memory	smart bracelet, sportswear	7.5	6.3	84.35

(2) The audience of smart wearable sporting goods tends to be younger. 20–29-year-olds accounted for 35.21%; 30–39-year-olds accounted for 58.45%; 20–39-year-olds accounted for more than 90%, indicating that the younger generation is paying more attention to the current smart wearable sporting goods. usage trends. Due to the advanced consumption awareness of young groups in this age group and their emotional preference for smart wearable sporting goods, the people who pay attention to wearable goods are generally younger.

(3) Sports bracelets and smart watches have become the most popular products in the market. Consumers are more inclined towards sports bracelets and smart watches, with the proportion of the two being 78% and 67%, followed by health trackers, smart earphones, and smart running shoes. On the one hand, smart bracelets and smart watches are light and convenient, with many functions, which can bring consumers more convenience in life and exercise; on the other hand, these two smart devices are closer to people's lives and have strong practicability.

(4) Health monitoring and data recording func-

tions are the core functions of smart wearable devices. 92.24% of consumers think that they are most concerned about health monitoring and data recording functions, and only 7.76% of consumers attach importance to the fashion brand.

(5) Professionalism, cost performance and comfort are the starting points of purchase. Professionalism, cost performance and comfort are the three most important factors, all of which account for more than 50%. In addition, data compatibility and brand awareness accounted for less than 20%, indicating that consumers pay more attention to the function when purchasing intelligent wearable products.

(6) The level of education largely affects the attention of smart wearable sporting goods. Bachelor degree or above accounted for 68%, junior college degree accounted for 18%, and high school and below degree accounted for 14%. It can be seen that the higher the education level, the higher the awareness and acceptance of smart wearable sporting goods.

Through the questionnaire analysis of smart wearable sporting goods, it fully shows that smart wearable sporting goods are loved by the public, especially the advanced consumption awareness of the youth group makes them favored and admired. It can be seen from the survey that the public has a process from cognition to consumption development of smart wearable products, that is, preliminary cognition (low-level stage)-very concerned (intermediate stage)-purchase and consumption (advanced stage). The public understands and is familiar with smart wearable sporting goods from the perspective of health and fashion, and perceives their intelligence and convenience. In addition, the audience with higher education level has higher awareness and acceptance of smart wearable sporting goods, and vice versa. This provides more reference for the technology research and development, fashion comfort and health training of smart wearable sporting goods in the future, which has a broad space for product research and development and sales growth.

3. Strategic goals for the development of the smart wearable sporting goods industry

3.1. Industrial development goals

In 2015, the State Council issued the "Several Opinions on Accelerating the Development of the Sports Industry and Promoting Sports Consumption" clearly stated that, by 2025, the total scale of China's sports industry development will exceed 5 trillion yuan, focusing on the development of sports products with independent intellectual property rights, improving the scientific and technological added value of sports goods, and enhancing the market competitiveness of brand enterprises. In addition, according to the "14th Five-Year Plan Outline and 2035 Vision Outline", during the "14th Five-Year Plan" period, in order to carry out national construction campaigns and build a sports powerhouse, China will expand sports consumption and develop sports industry such as fitness and leisure, outdoor sports, etc. As an important port for accessing national fitness in the future mobile Internet era, the smart wearable sporting goods industry is still in the initial stage of industrial development and the period of infant industry development. In this sense, the smart wearable sporting goods industry has broad prospects for development. (1) From the perspective of its industrial development cycle, the cycle from scientific and technological progress to enterprise investment in research and development, and then to the large-scale development of the industry is about 2 to 3 years. This means that the industry can still experience two rounds of rapid industrial development and expansion by 2025. (2) From the perspective of its sales scale, according to the statistics of the International Data Corporation IDC, by 2025, China's wearable sporting goods industry sales strategy development target shipments are positioned at about 38 million units, and its industry sales will exceed 100 billion yuan. (3) From the perspective of industrial concentration areas, the strategic development planning target area of China's smart wearable sporting

goods industry cluster should be established around the Pearl River Delta, Yangtze River Delta, Bohai Rim and Sichuan-Shaanxi regions where the electronic information industry is relatively developed. Today, Shenzhen, Guangzhou, Beijing, Tianjin, Shanghai, Suzhou, Chengdu, Chongqing, Xi'an and other cities have gathered a group of enterprises engaged in the research and development, production and marketing of smart wearable sporting goods, forming large-scale industrial clusters. Only the Pearl River Delta in Shenzhen, as an important production base of China's intelligent wearable sports goods, has produced intelligent wearable products accounting for about 80% of global shipments. It has a complete industrial chain from intelligent chips, sensors, flexible components, terminal equipment to human-computer interaction solution design, product design and marketing in the upstream and downstream of industrial development. It has formed a number of leading enterprises engaged in the production of intelligent wearable intelligent sports goods represented by Huawei and ZTE.

3.2. Technological innovation goals

In formulating the technological innovation and development goals of smart wearable sporting goods, China, it mainly solves the problems of product power consumption and data accuracy in the integration of smart wearable products with 5G and high-tech such as the Internet of Things, and improves the experience of smart wearable sports products by accelerating the special research and development of personal data products.

(1) With the advent of 5G communication technology and the era of the Internet of Everything, the consumer electronics industry, which is dominated by smart wearable sports goods, ushered in new development opportunities. The development of the smart wearable goods industry under the 5G concept can promote glass exterior parts, sapphire and In-depth development of market demand for hardware appearance materials such as ceramics. With the popularization of smart wearable sporting goods, it will become an important port and application terminal of the Internet of Things. It can be seen that 5G interconnection technology has effectively promoted the upgrading and development of smart wearable sporting goods technology, and its impact is huge and far-reaching.

(2) The technological innovation of enterprises should develop in the direction of solving the problems of product power consumption and data accuracy. In reality, many smart wearable sporting goods have problems such as excessive power consumption, weak charging and battery life, low accuracy of exercise reports, and low professionalism. For this reason, the portable demand of smart wearable sporting goods determines that it is necessary to strengthen investment in scientific research and development, rely on new battery technology and flexible materials to reduce the overall power consumption of the system, prolong the charging cycle, and achieve large-scale commercial use.

(3) Accelerate the special research and development of personal data products. Enterprises should create a personalized human digital ecosystem for each user. Under the condition of ensuring data security and confidentiality, the collection, aggregation and analysis of personal exercise and health data will give birth to a larger-scale data industry.

(4) The technological innovation goal of smart wearable sporting goods is to improve the user experience and avoid product homogeneity and popularization. For this reason, enterprises should focus on the research and development and application of core technologies, strengthen the functional optimization design of smart wearable products, and use the Internet to make NFC, Bluetooth and smart terminals seamlessly connected. Voice and somatosensory control are used in the interface of human-computer interaction, and muscle awareness sensing is more used in sensor technology. In short, smart wearable sporting goods must not only make technological innovations on hardware devices, but also achieve powerful functions through software support, big data interaction, and cloud interaction, and create an industrial intelligence core technology system.

4. Strategic policy formulation for the development of smart wearable sporting goods industry

4.1. People-oriented, to meet the growing diverse sports needs of the people

The development of China's smart wearable sporting goods industry must be based on enhancing people's physique and improving the health of the people, and pay attention to meeting the growing needs of the people for the development of diversified sports and fitness.

(1) With the promotion and implementation of national fitness activities, China's mass physical exercise population is on a linear upward trend[11], providing opportunities for the development of the smart wearable sporting goods industry. The survey data shows that 87.5% of the elderly consumer groups pay more attention to the health monitoring function of smart wearable sporting goods; 70.5% of young consumers believe that the biggest functional requirement of smart wearable sporting goods lies in the monitoring of individual sports signs. For 90% of sports health care providers, through smart wearable sports equipment, it will be very important to know one's own exercise environment, exercise calorie consumption, monitor one's full range of physical signs and health data in real time, and provide information services for the physical and mental health care of living individuals.

(2) The development of the smart wearable sporting goods industry can meet the growing demands of the masses for "sports and social interaction". Find fitness and sports partners on social networks and circles of friends through mobile smart wearables, making people's lifestyles richer and more interesting. To this end, sporting goods manufacturers should strengthen the product research and development of smart wearable sporting goods, taking wearable sports products as the starting point, taking advantage of its specialization and individualization, it gradually integrates into mass fitness activities, competitive sports and school sports, and strives to expand the efficient supply of smart wearable sports products and services[12], so as to make sports consumption interactive, sharing, rational and cross-border, which can better reflects the development direction of the sports industry in serving the people.

4.2. Focus on research and development to promote the high quality development of wearable sporting goods industry

In recent years, the structure of China's sports industry has been continuously optimized, the technological content has been continuously improved, and the added value of the sports industry has maintained rapid growth. In 2019, the General Office of the State Council issued the "Opinions on Promoting National Fitness and Sports Consumption to Promote the High-quality Development of the Sports Industry", which has a clear strategic positioning for the development of the sports industry, that is, to promote national fitness and guide sports consumption. The sports industry has become a pillar industry of the national economy. This not only emphasizes that the added value of the sports industry should reach a certain scale in the future proportion of the national economy, but also realize the integrated development of the sports goods industry and other industries, and take the road of high-quality and international development. As a high-tech manufacturing industry, China's smart wearable sports goods are an important part of the high-quality development of the sports industry. At present, China's smart wearable sports products industry has experienced a rapid development period from 2013 to 2015. During this period, there are low-level primary processing stages of imitation, counterfeiting, international brand OEM and OEM production. Development problems such as small operation, fragmentation, low technology content, poor independent innovation ability, serious product homogeneity, extremely low brand premium ability, weak brand equity, and low international influence[13]. In the future, smart wearable sporting goods should focus on R & D investment, enter the golden period of industrial transformation and upgrading as soon as possible, strive to become bigger

and stronger, and enhance the market competitiveness of China's smart wearable sporting goods industry.

4.3. Scientific management, standardize the market order of wearable sporting goods industry

It is necessary to adhere to scientific management according to law, establish and improve relevant laws and regulations, improve the supervision and management mechanism, and standardize the market order of wearable sports goods.

(1) Through the formulation and improvement of policies and systems, strengthen the industrial guidance of the smart wearable sporting goods industry, increase the support of technological transformation and scientific and technological funds to the production enterprises of smart wearable sporting goods, guide enterprises to increase investment in industrial research and development, enhance their independent innovation capabilities, and strictly control the risks of homogeneous competition and overcapacity of similar products.

(2) Strengthen the responsibilities of the main body of supervision and the scope of management functions, determine the rights and obligations of various market players, standardize the main behavior of the producers of smart wearable sporting goods, and severely crack down the intellectual property infringement and intellectual property rights in the production of smart wearable sporting goods through laws and regulations. The act of producing and selling counterfeit and shoddy electronic products effectively maintains the market order of the development of the high-tech sports industry.

(3) The government management department should promote the production standardization and quality certification of smart wearable sporting goods, formulate sound national and industrial standards for smart wearable sporting goods, strengthen normalized supervision and inspection and product quality inspection strengthen scientific supervision and standardization in terms of quality.

5. Strategic choice for the development of smart wearable sporting goods industry

5.1. Cultivate leading enterprises and build industry brands

At present, there are many domestic manufacturers of smart wearable sporting goods, and their shipments are also very large. Smart wearable sporting goods represented by Xiaomi bracelet can measure steps, pulse, time, etc. Smart wearable sporting goods represented by Li-Ning sneakers and smart sports vests can measure the stride frequency, gait, heart rate and changing temperature of athletes. However, in the process of industrial development, there are still relatively few leading companies that can lead the research and development and manufacture of wearable sports smart devices. Most of the manufacturing enterprises in the industry are small and micro enterprises, and the phenomenon of OEM and copycat manufacturing is still relatively prominent.

To this end, wearable sports product research and development enterprises must establish a smart wearable sports goods industry chain that conforms to the characteristics of China's sports culture environment. Leading enterprises can drive and incubate a large number of small and micro start-ups through innovation and become a new force in the development of the smart wearable sporting goods industry. Considering that China's smart wearable sporting goods manufacturers are mainly located in Shenzhen, Beijing, Shanghai, Chengdu and other places where the electronic information industry is relatively developed[14], the government needs to guide enterprises to optimize the technological innovation and product structure layout of products. Upgrade and expand, form a leading enterprise of smart wearable sporting goods, form core competitiveness, and build a well-known brand in the industry. For example, Shenzhen-based companies such as Huawei, ZTE, Coolpad, Yingqu Technology, Xiberry Technology, and Yunmi Technology have all stepped up their efforts in the research and de-

velopment of new smart wearable products. After years of development, a smart wearable sporting goods manufacturing echelon consists of large listed companies, small and micro enterprises and maker teams has gradually formed. The agglomeration effect of industry brands is gradually increasing, and it is becoming an important base for the wearable device industry in China and even the world. Leading enterprises of smart wearable sporting goods must aim at the high-end links of the product value chain. Independently develop and design products, determine effective solutions, provide professional commercial after-sales service, develop new smart wearable products with independent intellectual property rights, continuously improve the usability and stickiness of products, and create a brand effect in the smart wearable sporting goods industry.

5.2. Develop industrial clusters and expand industrial scale

As a new high-tech manufacturing field in China, the smart wearable sporting goods industry has an overall good development trend and broad development prospects[15].

(1) Chinese enterprises engaged in the production of smart wearable sporting goods should achieve vertical integration in the product manufacturing industry chain, that is, they should be able to achieve technological innovation and production supply of production parts such as chips, sensors, and flexible components, and coordinate products downward. The commercial promotion, expansion of sales channels and logistics guarantee has laid a good foundation for consolidating and improving the industrial chain of its own brand.

(2) Enterprises should innovate business models in the design, production and sales of smart wearable sporting goods, improve the core competitiveness of the company's brand, increase innovation and application in the functional experience of products, and enhance the brand technology content of smart wearable sporting goods. In order to guide enterprises in the industry to form core competitiveness as soon as possible, it is necessary to focus on the development model of "new project-industrial chain-industrial base-industrial cluster", build a complete supporting industry cluster, and continuously improve the development level and agglomeration level of the smart wearable industry. Promoting the leading enterprises with significant cluster effect in the region to adjust the production structure, expand the scale of industrial production, form a grape bunch effect, improve the industrial benefits of smart wearable sporting goods, and support qualified large-scale brand enterprises to go out and merge or take shares in foreign smart wearable sporting goods manufacturing enterprises, develop overseas sales markets, and enhance the international competitiveness of the brand. By 2025, a number of enterprises with sales revenue of over 10 billion smart wearable products will be cultivated in Shenzhen, Beijing, Shanghai, Chengdu and other places, and the formation of industrial clusters will be promoted.

5.3. Promote R & D innovation and highlight intelligent technology

Innovation is the lifeblood and driving force of industrial enterprises. Smart wearable sporting goods enterprises should strengthen R & D innovation, increase R & D innovation, and demonstrate the application charm of smart technology.

(1) Realize biometric authentication for smart wearable sporting goods. Sensors based on fingerprint authentication have been widely used in smartphones and laptops. As a personal smart device that provides personalized services, smart wearable sporting goods should provide biometric authentication identities that are more advanced and difficult to tamper with fingerprint recognition, such as sound waves. Recognition and iris recognition, etc., better support the mobile payment function of smart wearable sporting goods, and realize mobile smart payment for users without mobile phones.

(2) Enhance the sports health monitoring function of smart wearable sporting goods. Smart wearable sporting goods must collect and monitor the user's movement data and physiological signs in an all-round way. For example, the athlete's smart vest

can accurately measure various data generated by the user during exercise, such as oxygen consumption, stride frequency, stride length, heart rate, respiration, sweat composition, etc., expanding the breadth and depth of application of smart wearable sporting goods in professional sports. It is necessary to monitor the user's blood pressure, blood sugar and other physiological indicators in real time from the perspective of medical care, the data is uploaded to the mobile cloud service application or the doctor of the medical institution for analysis and feedback, which is used to monitor and improve the medical care of athletes and patients, and to remind the health and safety risks faced by the athletes. Especially in response to the outbreak of the Coronavirus disease in 2020, if smart wearable sporting goods can give full play to expand their physiological sign monitoring functions and big data artificial intelligence, it can not only help users detect infectious diseases in advance, but also assist medical and health care. The agency conducts real-time monitoring and analysis of the dynamic development of the epidemic. In addition, smart wearables can enable telemedicine care, and enjoy timely mobile health monitoring functions for chronically ill patients, which is a new profit growth point for smart wearable medical consulting services in the future.

(3) Make smart wearable sports equipment serves as smart coach. Smart coach is a newly developed function of smart wearable fitness products. Smart wearable sports products give different feedbacks and switch between different types of sports through the collection of exercise data and physiological sign data such as the user's exercise habits, exercise volume, exercise posture, etc. For a period of time, it can formulate scientific exercise plans for users or put forward various suggestions to users based on data to meet the individual fitness needs of users. While improving athletes' sports performance, it can prolong the sports career of athletes and enhance the influence of smart wearable sports on the public to develop scientific sports concepts and healthy lifestyles.

(4) Smart wearable sporting goods should enhance the technological functions of virtual reality and augmented reality. Compared with the traditional human-machine interface interaction, the application of VR and AR technology on smart wearable sports goods can enhance the user's immersive experience and help users better engage in scientific fitness sports.

(5) Add the function of virtual personal assistant for smart wearable sports goods. According to the user's feelings and emotional changes, it provides sports health care guidance, schedule management, and message optimization notification.

(6) Smart wearable sporting goods need to achieve more accurate motion recognition. With the help of various motion sensors such as gyroscopes, accelerometers and magnetometers inside the smart wearable, users can recognize motion accurately in teach and learn health sports and manage health data. The sensors with higher complexity and accuracy reduce user motion calculation errors to within 1%.

(7) Enterprises should deeply implement the integrated application development of smart wearable sporting goods with new technologies such as big data, cloud computing, and artificial intelligence, and improve the innovation capabilities of the equipment itself in the source of key common technologies such as smart chips, precise sensing, and human-computer interaction, design independent operating system for smart wearable sporting goods, etc.[16]

6. Strategic safeguard measures for the development of smart wearable sporting goods industry

6.1. Improve policies to support the development of the smart wearable industry.

In order to better promote the development of the smart wearable sporting goods industry and make it a pillar industry for the development of the national economy.

(1) Governments at all levels need to organize relevant departments to lead the establishment of a

leading group to coordinate the development of the smart wearable device industry in the region. Scientifically formulate the development plan of the smart wearable industry cluster in the region based on the actual conditions, integrate high-tech resources, formulate policies and measures to support the development of the industry in detail, encourage enterprises to strengthen technology research and development, and improve the layout and construction of the industrial chain, make all brand enterprises in the industrial cluster reach a consensus on industrial chain support and regional division of labor, and rationally arrange major application demonstrations and industrialization projects on smart wearable device manufacturing.

(2) Governments at all levels should actively implement the preferential fiscal and taxation policies and industrial support policies of relevant national ministries and commissions to support the development of the smart wearable industry, and actively explore diversified support policies that are suitable for the development of the region and to create an industrial chain and industrial cluster of smart wearable products. Specifically, it is necessary to actively strive for national-level and provincial-level scientific and technological innovation, industrial strong foundation and other special financial support for brand enterprises and science and technology enterprises, and provide corresponding financial support. At the same time, the government should increase efforts to guide financial capital to establish high-tech industry funds, increase financing and support for the smart wearable device industry, expand the scale of industrial development, and enhance the international competitiveness of the industry.

(3) The government should encourage enterprises to increase their independent R & D and innovation efforts. It is necessary to promote enterprises in the industry to focus on innovating research on key common technologies such as smart chips for smart wearable devices, high-performance sensors, human-machine intelligent interaction, and flexible components, and encourage industry backbone enterprises and scientific research institutions to actively integrate into global industrial technologies In the formulation of standards and technical specifications, master the right to speak in the development of the smart wearable device industry. It is necessary to cooperate with enterprises to establish a technical information research center for the development of the smart wearable device industry, give full play to the scientific research, match the cooperation between enterprises and scientific research units, improve the cooperation mechanism of production, education and research, accelerate the transformation efficiency of industrial technology, and promote the high-quality development of the smart wearable device industry.

6.2. Provide talent support for the development of smart wearable industry

As a high-tech industry, the smart wearable industry is a typical knowledge and technology-intensive industry, which determines that the development status and trend of the smart wearable industry is not mainly measured by the large-scale investment of physical capital, but by the real possession and potential of human capital. Without strong human capital as the backing support for industrial development, and without a strong professional talent team, the smart wearable device industry will never be on the right track of high-quality and high-speed development. To this end, the government and enterprises need to do the following work:

(1) The government should attach great importance to the cultivation of intelligent wearable sports equipment professionals, and make overall planning and deployment in terms of scientific research, types of skilled personnel, quantity, and funding. Actively carry out school-enterprise cooperation, create a smart wearable technology innovation laboratory, and cultivate professionals with solid theoretical foundations and outstanding application capabilities; Colleges and universities should add relevant majors, optimize the structure and education model of higher education and vocational education, and cultivate multi-level talents re-

quired by various links in the development chain of the smart wearable industry. Encourage high-tech enterprises and universities to jointly run schools, combine production, learning and research to train backbones and academic leaders for the development of the smart wearable industry; in addition, industrial innovation incentives should be implemented to mobilize people's enthusiasm, and a system and guarantee mechanism for respecting talents and making good use of talents should be formed.

(2) Enterprises should make good use of global resources, introduce technology entrepreneurial talents from overseas who can promote the development of related industries, and promote technological innovation and management innovation in the smart wearable industry chain. To this end, enterprises and related organizations should cooperate to set up special institutions, create overseas professional talent databases, collect information and recruit talents. The government departments should increase funding for overseas returning scientific and technological talents, including the establishment of special funds to attract smart wearable product research and development talents to return to work in China, and to attract more overseas students to return to China for development.

(3) Do a good job in supporting services for talents, adopt more flexible and special policies in the fields of technology, management, skilled talents' work treatment, settlement, and children's enrollment, etc. to promote industrial development, and improve the employment environment and life of talents in related industries environment, in order to promote the flow of talents.

(4) The development of the smart wearable device industry requires not only an excellent scientific research team and skilled team, but also a team of entrepreneurs who dare to innovate and are good at innovation. To this end, the government should select and train a group of enterprise leaders with excellent decision-making, organization, and coordination skills among smart wearable industry manufacturing enterprises, so that they can lead the entire industry to develop in a high-quality direction.

6.3. Improve the legal system for the development of the smart wearable industry

From a domestic point of view, the imperfection of industry standardization regulations is the main reason for the chaos in the smart wearable sporting goods market, which requires strict regulation and refinement of industry standards. China Wearable Alliance officially launched the first smart wearable industry standard system in China in March 2015, which stipulates the safety certification and intelligence standards of smart wearable devices, hoping to guide industry manufacturers to produce products that meet industry standards. Let consumers choose safe and high-quality smart wearable sporting goods, and promote the healthy and sustainable development of the industry. In addition, the use of smart wearable sporting goods involves the privacy protection of personal exercise physiology and health medical data, and the government needs to speed up the formulation and improvement of relevant laws. It is necessary to establish and improve information security supervision regulations to support the development of the smart wearable device industry, strengthen the formulation of industrial control system security standards for information protection, and ensure the network operation security of basic information systems. It is also necessary to ensure the security of user data assets, guide enterprises to standardize the design of the safe use mode of user data, and provide legal protection for the data assets of smart wearable sporting goods. Specifically, the behavior of various stakeholders can be regulated from the data collection, data transmission, data analysis, data preservation and result display of smart wearable devices. Focusing on restricting the behavior of device data acquisition and utilization, obtaining authorization from users and data sources, and do not disclose and violate the user's personal privacy. In terms of data transmission and analysis, it puts forward data protection requirements for communication operators and big data cloud computing service providers, focuses on preventing and punishing malicious acts

such as unauthorized data backup, and quickly establishes a benign market order based on the law.

7. Conclusions

With the rapid development of the smart wearable goods industry at home and abroad, it has become an urgent strategic task to actively promote the high-quality development of the smart wearable sports goods industry in the new era. The author obtained first-hand market data through market research, questionnaire survey, etc., and fully understand the development of the entire smart wearable sporting goods industry, and deeply grasp the market acceptance, audience, functional requirements and other aspects of smart wearable sporting goods, and from a strategic perspective, the implementation strategy to promote the prosperity and progress of the smart wearable products industry is proposed, and strive to fundamentally realize the high-quality development of the smart wearable sports products industry. However, compared with developed countries abroad, China's smart wearable sporting goods industry has a late start, a low starting point, insufficient technology research and development, and irregular market order. These problems objectively restrict the development of China's smart wearable sporting goods industry. To completely reverse this situation, we need the joint efforts of the government, enterprises, individuals and other parties.

Conflict of interest

The authors declare no conflict of interest.

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