

# Systematic Research on Supporting the Development of Information Technology Sports Industry Based on Big Data

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**Abstract.** Today's rapid development of computer information technology has driven the progress of its related technologies and industries. In order to develop the sports industry more conveniently, make it more intelligent and better serve mankind, people have gradually increased their attention to the development of the sports industry. The report of the Nineteenth National Congress of the Communist Party of China pointed out that in the future, the strategy of "Healthy China" will be implemented. As an important part of the consumption of "Healthy China" and modern life, the sports industry will benefit from many aspects such as national policies, market demand and industrial restructuring. However, with the rapid economic and social development and the overall progress of people's lives, the demands in all aspects are constantly improving. The purpose of this article is to study the system that supports the development of the information technology sports industry based on big data. This paper discusses the concept, structure, function, elements and characteristics of the development system of our country's sports industry based on the theory of system science. Based on the theory of system science, this article discusses the concept, structure, function, elements and characteristics of the development system of my country's sports industry. Analyzed the development status of my country's sports industry; systematically analyzed the advantages and disadvantages of information technology to support the development of the sports industry, and on this basis, proposed the strategic choice of information technology to support the development of the sports industry in the current environment. This paper conducts experimental research through questionnaire surveys, analyzes the composition of the sports market, the characteristics of sports consumption, influencing factors and sports property rights, and summarizes the development models, characteristics and enlightenments of the foreign sports industry. The experimental research results show that the data collection function of the sports industry development system C accounted for the highest proportion and the correctness test was the most accurate, 41.43% and 37.12%, respectively. The index feasibility function was System A, accounting for 38.07%. Both A and System C are around 35%, and System B is the lowest, only 29.65%. All in all, System C is a good reference system with outstanding functions in all aspects.

## 1. Introduction

Nowadays, the rapid development of computer information technology has led to the progress of its related technologies and industries [1-2]. In order to develop the sports industry more conveniently, make it more intelligent and better serve mankind, people have gradually increased their attention to the development of the sports industry [3-4]. The report of the 19th National Congress of the Communist Party of China pointed out that in the next period of time, we will focus on implementing the "Healthy China" strategy, and the sports industry will be an important part of "Healthy China" and modern life consumption [5-6]. Affected by many favorable factors such as national policies, market demand and industrial structure adjustment [7]. However, with the rapid development of the economy and society

and the overall progress of people's lives, the demands in all aspects are also constantly improving [8-9].

Many scholars at home and abroad have studied the system based on big data to support the development of the information technology sports industry, and have achieved good results. Cui L believes that the social responsibility of the sports industry is important, but few people know how to recognize and take on the social responsibility of the sports industry [10]. Liao X believes that sports is a strategic industry, and it is feasible to implement sports industrialization in our country [11]. As long as the dialectical relationship between sports is both a career and an industry is correctly handled, the sports industry will become a new growth point for our country's national economy in the early 21st century [12].

Based on the theory of system science, this article discusses the concept, structure, function, elements and characteristics of the development system of my

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country's sports industry. Analyzed the development status of my country's sports industry; systematically analyzed the advantages and disadvantages of information technology to support the development of the sports industry, and on this basis, proposed the strategic choice of information technology to support the development of the sports industry in the current environment. This paper conducts experimental research through questionnaire surveys, analyzes the composition of the sports market, the characteristics of sports consumption, influencing factors and sports property rights, and summarizes the development models, characteristics and enlightenments of the foreign sports industry.

## **2. Research on the System of Supporting the Development of Information Technology Sports Industry Based on Big Data**

### **2.1. The Development Status of My Country's Sports Industry**

#### *2.1.1 Development level*

Compared with countries with mature sports industry in the world, our country's sports industry is still in the initial stage of development. In 2014, the total value of the sports industry in the United States reached 441 billion US dollars, accounting for about 3% of GDP that year. It also accounted for more than 2% of GDP in Germany, the United Kingdom, and Denmark. The mature development of the sports industry in these countries has long become an important industry that drives economic development. In our country, this proportion was only 0.67% during the same period. In addition, the US sports industry has become a pillar industry of the national economy, with the top ten industries ranking sixth, while our country's sports industry is still far from this level. On the whole, the development level of our country's sports industry is relatively low.

#### *2.1.2 Great development potential*

From 2014 to November 2017, our country has successively introduced up to 14 policies related to the sports industry. The density and intensity of the policies have been unprecedented. These policies are designed to guide social capital into the sports industry with more development potential. Driven by various factors such as policy dividends, our country's sports industry has maintained a relatively rapid growth rate.

#### *2.1.3 Broad market demand*

With the improvement of our country's economic development level, residents' demand for sports products and services has also increased. Increasing market

demand and changes in demand structure, on the one hand, guide sports industry enterprises to adapt to market demand, constantly update new products, expand product lines, and extend the sports industry chain; on the other hand, make those who do not adapt to market changes and consumer demand structural adjustments. Backward sports companies withdrew from the market.

### **2.2 Building a Sports Industry Development System**

#### *2.2.1 System definition*

Defining the system is the first step in system research. Its purpose is to clarify the object of investigation, establish the scope of research, promote the stable and sustainable development of mass sports and competitive sports in China, and finally realize the all-round development of people. The system takes the external environment as the macro level, the interconnected subsystems as the middle level, and the core level, namely mass sports and competitive sports, as the micro level.

#### *2.2.2 System structure*

The theme structure of the sustainable development of sports in our country is divided into three parts. The first is the external environment, also called the macro level. This level provides a relatively stable external environment for the sustainable development of sports in our country. It mainly includes the country's politics, economy, culture, technology, population, resources, etc. The meso layer is located between the external environment layer and the core layer, so it can also be called the middle layer. From the basic theory of the system, this layer is also the central object of this research. The meso-level has the function of transmission and transformation. When the external environment changes, it will pass information to the core layer. When the core layer changes, it will also digest it, and then feed the corresponding information back to the external environment. There are three core layers. The core layer is mainly composed of our country's competitive sports system and mass sports system. What should be explained is the commonly referred to as school sports. In this study, it is classified as the mass sports system, because the purpose of participating in sports is the standard of division. School sports is essentially a part of mass sports. The three levels of the system are progressive, where matter, energy, and information influence and restrict each other.

### **2.3 Analysis of System Elements**

#### *2.3.1 Elements of sports population*

It controls and adjusts the structure and behavior of the entire system, issues instructions to various interferences inside and outside the system, adopts reasonable

countermeasures, selects, acquires, and allocates system resources, so that they can be fully utilized. It is the core element of the system. It is also a subsystem in itself, and its content mainly includes sports system staff, sports reserve talents, athletes, coaches, referees, and sports participants.

### 2.3.2 Elements of sports economy

It provides material and financial support for the development of the system. It is the driving force of the system. It becomes the driving force of the system. Only when the economy develops to a certain extent, can more funds be injected into sports culture and promote the development of sports. Sports economic factors cover sports industry, sports tourism, sports architecture, etc. The main content of its own subsystem includes gross domestic product, engel coefficient, national sports business expenses, national sports revenue, total output value of sports output, and third Total industrial output value, cultural and sports consumption of households, etc.

### 2.3.3 Elements of sports culture

People's outlook on entertainment, values, and consumption depends to a large extent on the cultural education they receive, cultural education guides their concepts, and changes their concepts. Only when a person's concepts change will the individual's behavioral style be changed. The change of the concept of the country will lead to the change of the nation, and the change of the concept basically comes from the culture. It can be seen that sports culture is a long-term and potential element for the development of the system. Sports culture covers a wide range, and the main content of the system is Sports system cultural teachers, education development level, coaches cultural level, athletes cultural level, sports information exchange, sports education career investment, sports media, etc.

### 2.3.4 Elements of Sports Science and Technology

It improves the efficiency of the system's work and transforms substances through effective means, thereby improving resource utilization, improving management levels, and improving product value. The main content of the sports science and technology system includes national science and technology investment, patent application and acceptance, sports science and technology papers, sports research talents, financial investment in sports science undertakings, sports science and technology personnel, and sports management.

### 2.3.5 Elements of sports resources

It is the material basis of the entire system. It is the continuous provision of resources that will enable more stadiums, sports facilities, and sports projects.

### 2.3.6 Elements of sports security

Provide a stable structure for the system, guide the development direction of the system, and determine the policy, tasks and goals of the system. The main content of the sports policy and regulation subsystem includes national system, sports system, sports policy, sports tasks, sports goals, etc.

## 2.4 Recommendations to Promote the Development of the Sports Industry

### 2.4.1 Optimize the structure of the sports industry

The development of the competitive sports industry should take the promotion of the development of the competitive sports industry as the main means, continuously increase the proportion of the output value of the competitive sports industry in the entire competitive sports industry, and further optimize the structure of the competitive sports industry. This is both the development of the world competitive sports industry. The trend is also in line with the policy requirements of our country's economic restructuring.

### 2.4.2 Promote the balanced development of the sports industry among regions

With the industrial upgrading in eastern China and the deepening of the western development strategy, the competitive sporting goods industry should move to the western region, which has more advantages in land and labor costs. On the one hand, it can reduce the production cost of enterprises, further improve competitiveness, and improve local labor. The developed regions in the east can take advantage of their location advantages to attract more talents and funds for product research and development.

## 2.5 Population and Sample

Suppose a finite population contains N population units, and the k-th population unit is identified by k, where the finite population can be expressed as:

$$U = \{1, \dots, k, \dots, N\} \quad (1)$$

Let y denote a research variable, which is the value of the research variable of the k-th overall unit in the population. Usually before the investigation, the value is unknown. And what we need to estimate is the total value of the research variable y

$$t = \sum_{k=1}^N y_k \quad (2)$$

Or study the overall mean of variable y

$$\bar{y} = t/N = \sum_{k=1}^N y_k / N \quad (3)$$

### 3. Systematic Experimental Research on Supporting the Development of Information Technology Sports Industry Based on Big Data

#### 3.1 Experimental Subjects and Methods

This experiment takes other sports industry development systems as the research object, analyzes its various functions, and studies the most suitable ways for reference. At the same time, the various subsystems of the system are studied, and the key parts of the system to be highlighted are selected. This experiment conducted experimental research through questionnaire surveys and analyzed the answers of relevant personnel.

#### 3.2 Data Collection

Investigation task decomposition makes a detailed breakdown of the total amount of investigation activities, assigns investigation tasks to investigators or investigation teams, and assigns tasks equally by default. The survey task is broken down into specific task assignments, such as how many answers each investigator or survey team needs to collect, the time range for collecting the answer sheets, and the location of the survey. The survey tasks can also be manually assigned. If the system automatically divides them into an inappropriate way, you can modify the assigned tasks.

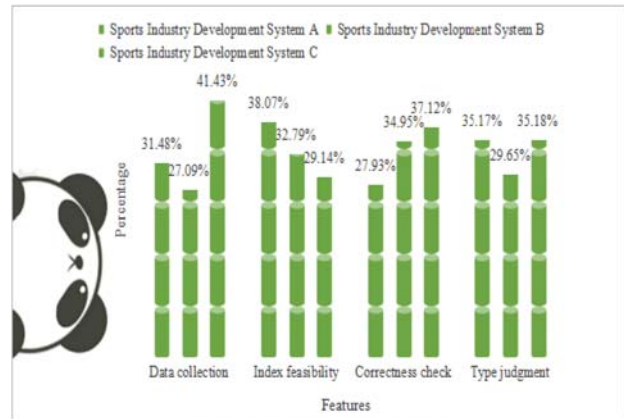
### 4. Systematic Experimental Research Analysis Based on Big Data to Support the Development of Information Technology Sports Industry

#### 4.1 Systematic Analysis of Sports Industry Development

This experiment takes the sports industry development system as the main research object. By comparing other sports industry development systems, it analyzes the advantages of other systems in data collection, index feasibility, correctness, and category judgment, and draws lessons from the survey results. The experimental results are shown in Table 1:

**Table 1.** Function analysis of sports industry development system.

	Data collection	Index feasibility	Correctness check	Type judgment
Sports Industry Development System A	31.48%	38.07%	27.93%	35.17%
Sports Industry Development System B	27.09%	32.79%	34.95%	29.65%
Sports Industry Development System C	41.43%	29.14%	37.12%	35.18%



**Fig. 1.** Function analysis of sports industry development system.

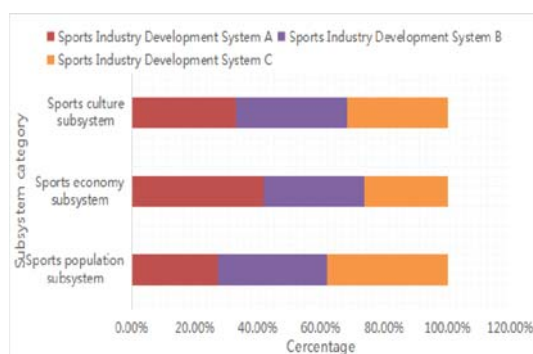
As shown in Figure 1, the data collection function of the sports industry development system C accounted for the highest proportion and the correctness test was the most accurate, 41.43% and 37.12%, respectively. The index feasibility function was System A, accounting for 38.07%, and the category judgment function Both System A and System C are around 35%, and System B is the lowest, only 29.65%. All in all, System C is a good reference system with outstanding functions in all aspects.

#### 4.2 Analysis of the Subsystems of the Sports Industry Development System

This experiment takes the subsystems of the sports industry development system as the research object, analyzes from the sports population subsystem, sports economy subsystem, and sports culture subsystem to study which parts of other sports industry development systems are mainly prominent. The experimental research results are shown in Table 2:

**Table 2.** Analysis of the proportion of subsystems.

	Sports population subsystem	Sports economy subsystem	Sports culture subsystem
Sports Industry Development System A	27.18%	41.71%	32.78%
Sports Industry Development System B	34.62%	31.93%	35.29%
Sports Industry Development System C	38.20%	26.36%	31.93%



**Fig. 2.** Analysis of the proportion of subsystems.

As shown in Figure 2, the sports economic subsystem in the sports development industry system A accounts for the largest proportion, with 41.37%, followed by the sports population subsystem of system C with 38.20%, and finally the sports culture subsystem of system B. 35.29%. The conclusion is that this sports industry development system should be used for reference and improvement based on the above advantages.

## 5. Conclusions

In the era of big data, it is necessary to cultivate compound talents who are familiar with information technology and the sports industry, use information technology to support the market promotion of the development of the sports industry, raise the level of consumer awareness in various regions, and establish a good market image. Secondly, on the basis of legal compliance, we must innovate business models and be guided by the needs of the sports market to maximize our own advantages and provide more professional and efficient Internet services. At the same time, information technology can accurately grasp the needs and development trends of the sports market, and can better support the development of the sports industry.

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