Research on the Development Path of Traditional Minority Sports Industry under the Background of Big Data

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Abstract. To comprehensively explore the evolution of niche sports within the larger sports industry landscape, we present a research initiative focused on the trajectory of minority sports development, specifically in the context of big data utilization. This document aims to assess the current state of China's sports industry, pinpoint opportunities for harmonizing supply and demand dynamics in the market, foster collaborative efforts for sports advancement, and unearth and nurture key players in China's sports sector. Additionally, this research seeks to delve deeper into understanding user requirements and values, advocate for the integration of big data in sports competitions, and fortify innovative strategies within the sports industry. Currently, the development of traditional ethnic minority sports is faced with diversity, economic and profit implications. In the construction of the Chinese dream, the development of minority sports should be scientific, ecological and secular.

Keywords: Big data; Minority; Sports industry.

1 Introduction

Big data always affects the development and change of human life. The US saw it as the "new fuel of the future" and launched Big Data Research and Development in 2012 to improve the ability to extract data text from large and complex files. The scientific and business communities recognize the significance of delving into and harnessing big data to drive favorable outcomes for the future progression of science, technology, commerce, and society at large. In this era of big data, the landscape within which the sports industry operates is characterized by constant dynamism and transformation, accompanied by an abundant influx of valuable unstructured data. The acquisition, exploration, and interpretation of vast datasets have ushered in unparalleled prospects for growth and advancement within the sports sector. Big data has influenced sports training and competition. For example, Major League Soccer (MLS) uses the miCoach system to track players' position, speed, distance, heart rate, and other performance characteristics and provide the statistics to the team's coaching staff. guess well and order to play. Big data has emerged as a pivotal catalyst for driving advancements in science and technology within the sports industry. This progress has been marked by the promotion of collaborative efforts at various levels of the sports sector's development. For instance, IBM's acquisition of products like SPSS, NVetezza, and Algorithmics exemplifies a strategic move aimed at enhancing the sports industry by facilitating the sharing of resources

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and fostering robust partnerships between the sports sector and technology, as well as promoting research and technological innovation. While bringing development opportunities, big data is disrupting traditional gaming business models. The development level of traditional sports research, sports competition decisions and cooperation will face new opportunities. In order to adapt to the development needs of the big information era, China's sports industry must follow the current trends and explore the development path[1-2].As shown in Figure 1.

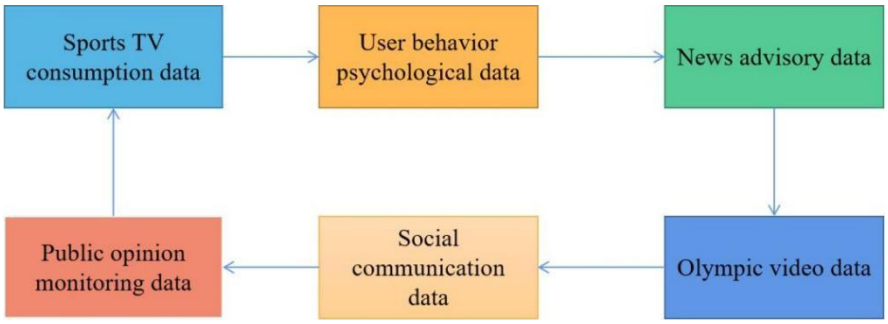

Fig. 1. Traditional Sports Industry of Minorities under the Background of Big Data

2 Current situation analysis of China's sports industry development under the background of big data

In 2019, the State Council issued the "Several Opinions on Accelerating the Development of the Sports Industry and Promoting Sports Consumption," commonly referred to as the "Opinions." This marked a significant milestone in China's sports industry, ushering it into a new phase of growth. Through the collaborative efforts of various levels of government and stakeholders within the sports sector, China's sports industry has achieved remarkable progress, characterized by multifaceted and diversified development[3].

First and foremost, the sports industry's scale has experienced consistent expansion (as shown in Table 1). In 2020, the total output value of China's sports industry exceeded 17 trillion yuan, representing a remarkable 26.02% increase compared to 2019. The added value of the industry reached 549.4 billion yuan, accounting for 0.8% of the GDP for the same period. Secondly, there has been a significant optimization of the sports industry's structure. Sports competition and performance activities have flourished, with the total output value surging from 9.506 billion yuan in 2019 to 32.067 billion yuan in 2013, boasting an impressive average annual growth rate of 29.67%. These activities now contribute more than 9% to the industry's added value. Thirdly, the infusion of technology into the sports industry has become increasingly evident. With numerous technology companies investing in the sector, the application of emerging technologies, particularly big data, has introduced fresh perspectives and innovations to the industry. Competitive sports, for example, have generated substantial amounts of data, presenting new opportunities for advancement. By collecting and calculating the game data to establish a simulation database, the team can provide the best tactics[4-5].

Table 1. Total output and added value of national sports industry in 2015

Sports industry category	Gross amount		Structure(%)	
	Gross output	increment	Gross output	increment
National sports industry	17108	5495	110	110
Sports management activities	223	116	1.4	2.2
Sports competition performance activities	150	114	1.3	1.1
Sports, fitness and leisure activities	280	130	1.5	2.5
Sports place management	860	460	5.1	8.2
Sports intermediary service	48	150	0.4	0.4
Physical training and education	250	180	0.3	0.1
Sports media and information services	180	140	1.8	2.6
Other sports related services	280	140	1.2	1.5

2.1 The current development of the sports industry is insufficient

1. Big data mining is insufficient, and sports consumption is insufficient

While China's sports industry is consistently growing, and the number of individuals engaging in sports activities is on the rise, it's important to acknowledge that there is still a substantial disparity when compared to developed nations. As illustrated in Figure 2, the current proportion of the population participating in sports in China stands at 40%. In contrast, the European Union (EU) and the United Kingdom boast a participation rate of approximately 60%, while Germany leads the way with a sports participation rate exceeding 70%. One of the important reasons for the relatively small proportion of sports population in China is the limited channel for residents to obtain sports information, that is, the transmission channel of sports data is not smooth[6].

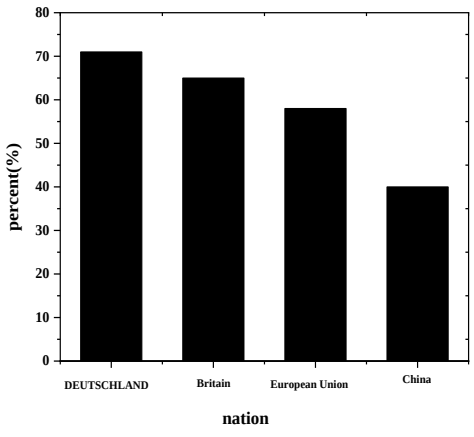

Fig. 2. Proportion of sports population to total population by country

3 Methods

3.1 Design of the Development Platform for Traditional Sports Industry of Ethnic Minorities

This design leverages advanced big data analytics technology to create a developmental framework for traditional minority sports industries. The structure of this sports industry platform is categorized into four distinct layers: the perception layer, transmission layer, support layer, and application layer. You can visualize the specific layout of this platform in Figure 3.

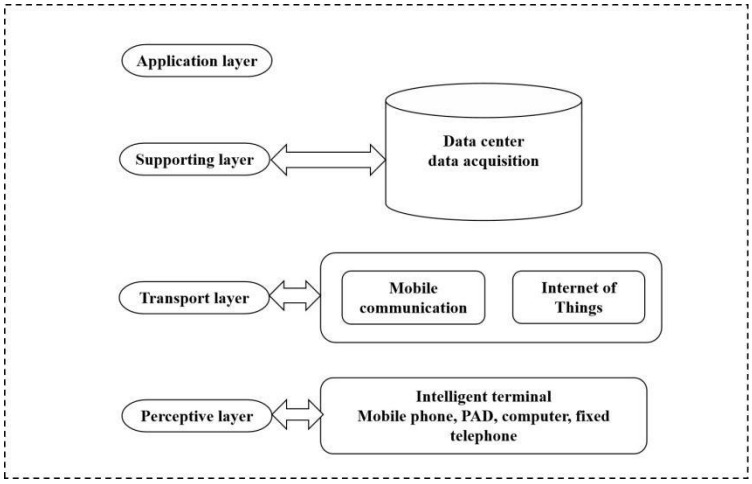

Figure. 3. Development Platform Module for Traditional Sports Industry of Ethnic Minorities

3.2 Information Mining

To investigate the growth of the traditional minority sports industry through the utilization of big data analysis technology, we break down the information mining process into two distinct stages as follows:

(1) Frequent Itemset Generation

In the initial phase, big data analysis technology is employed to scrutinize the fundamental data and essential attributes of ethnic minority traditional sports industries. By considering the core data within the development framework of ethnic minority traditional sports industries, we derive frequent item sets that pertain to specific regions or aspects. To facilitate this, we partition database Q into n separate and unrelated data segments, which are subsequently distributed across m nodes for processing. The calculation formula for this stage is as follows:

$$\text{Dap} = \frac{k}{\sum_v j \cdot |m *_n|} \tag{1}$$

In the formula, Dap represents the data output result; $\sum j$ is the data formatting factor; $m * n$ is to divide into n unrelated data blocks; k is a frequent itemset.

Through the above process, the global candidate frequent item set is formed. On this basis, the Big data analysis technology is used to clarify the purpose of analysis. In the analysis process, the value of low-density information in the information is refined.

(2) Association Rule Generation Stage

Firstly, scan the tourism information, calculate the support frequency of each candidate data, and compare it with the given minimum support frequency. Then output all frequent itemsets that meet the conditions to a file, generate association rules based on the output results, and segment each operation in the text. The calculation formula is:

$$G = \frac{l \Rightarrow n}{M \cdot |d_1, d_2|} \tag{2}$$

In the formula, G represents the information output result; M represents the file that meets the conditions; $l \Rightarrow n$ represents the information output process.

Through the above process, complete the mining of information on the development of traditional sports industries for ethnic minorities. Based on the results of information mining, provide users with visualized data and make predictive judgments for their choices based on the data[7-8].

4 Integration of traditional sports of ethnic minorities and sports industry

Explore the deep cultural connotation of national traditional sports and promote the development of sports industry. The characteristics of traditional culture are the most important value and foundation of minority traditional sports, and its value, function and function are based on traditional culture. China's minority culture and sports are well-known in the world, which has attracted the attention of Chinese and foreign people. The rich sports cultural resources contain great potential for economic development. Influenced by region, customs and production and lifestyle, each minority presents grassland culture, forest culture, nomadic culture, fishing and hunting culture, plateau culture, marine culture and so on, which has created the diversity of Chinese national sports culture and formed a spectacular cultural jungle. In terms of value orientation, minority traditional sports should be different from competitive sports, show more humanity and affinity, reduce the pursuit of utility, and emphasize the mutual understanding and integration of multi-ethnic cultures. Only in this way can minority traditional sports occupy a place in the future world development[9-10].

5 Conclusion

In the era of big data, its advent has brought about substantial positive impacts on our lives and the surrounding environment. This new approach has bolstered the management, decision-making processes, and regulatory framework within the sports industry. It has provided crucial

support for the growth of various branches within the sports sector, ushered in novel business opportunities and technological advancements, ultimately reshaping the landscape of sports development on a broad scale. Nevertheless, it's important to recognize that big data is akin to a double-edged sword, carrying both advantages and disadvantages. Its appearance creates more security issues, as well as competition, legislation, and other things in the way of economic development. However, the penetration and pervasiveness of big data is unpredictable and the sports industry must adapt and change with the times.

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