Research on Physical Training of College Students under the Background of Digital Technology Empowerment

Wangda Li

College of Physical Education, Ankang University, Ankang, Shaanxi, 725000, China

Abstract: Physical training is the most basic course in ordinary colleges and universities or professional sports colleges. In order to improve students' physical quality and cultivate students' indomitable spirit, physical training has become an indispensable training content in physical education courses. With the development and progress of science and technology, digital technology has brought unprecedented opportunities for physical education. On the one hand, it can improve the accuracy and efficiency of training, and on the other hand, it can enrich the content and form of training. For college students, good physical fitness is not only the basis for their academic success, but also an important capital for them to participate in social competition. Colleges and universities strengthen personalized and scientific physical training through digital means, which can not only accurately assess the physical condition of students, but also customize training plans for them, so as to improve the training effect. Therefore, this paper discusses the principles of physical training for college students under the background of digital technology empowerment, and puts forward corresponding training strategies, in order to provide scientific guidance for enhancing students' physical fitness.

1. Introduction

The digital economy is a powerful force driving high-quality development in our country's economy, blending increasingly with sectors like agriculture, services, and industry. It plays a crucial role in the digital transformation of business processes such as product development, production, and management reform. In recent years, global digital economy has made remarkable progress, propelled by technological innovations and industry transformations. According to the "2021 Digital Economy Development White Paper," the global digital economy reached $38.1 trillion in 2020, with a year-on-year growth rate of 49.4%, and China stands out in this regard. Last year, the core industry's added value was about 7.8 trillion yuan, accounting for 9.6% of GDP, nearly a 1% increase from 2019. The digital economy has undoubtedly become a key engine driving economic and social prosperity [1].

As digital transformation promotes development across various industries, the sports industry is also gradually embracing digitization. The application of digital technology in sports not only changes how sports are played but also redefines spectator experiences and industry operating models. With rapid technological advancements, especially breakthroughs in big data, artificial intelligence, and cloud computing, the potential for digital empowerment in the sports industry is being further explored and utilized. This transformation not only brings new growth opportunities for the sports

industry but also creates unprecedented value for consumers and industry participants alike.

However, while digitization offers numerous opportunities for the sports industry, it also presents significant challenges. From an inadequate digital supply system to flaws in digital governance, from limitations in data resource sharing to a shortage of interdisciplinary talent, the sports industry faces multiple hurdles on its path to high-quality digital development. Against this backdrop, this article aims to analyze the value of digitization in the high-quality operational development of sports enterprises, explore the main issues that exist, and propose specific development pathways [2]. By providing a comprehensive analysis of the value of digitization in the business development of the sports industry, it intends to offer theoretical foundations and practical guidance for the digital transformation of the sports sector.

2. Connotation and status quo of digital economy and sports industry

2.1 Concept and development status of sports industry

The sports industry, as the name suggests, turns sports resources into goods and services for society to use. It covers various sectors like sports equipment manufacturing, sports event management, and fitness and leisure services. Its development helps meet the growing demand for sports, promotes the physical and mental health of the population, and drives high-quality growth. Recently, with the support of national policies, China's sports industry has seen significant development. According to the National Bureau of Statistics, in 2020, the overall scale of China's sports industry reached about 3.05 trillion yuan, an increase of 8.55% compared to the previous year [3]. Core sectors like sports equipment manufacturing, sports event services, and fitness entertainment are developing rapidly. However, compared to developed countries, China's sports industry still appears relatively small, with low industry concentration and a short industrial chain. There's still huge growth potential. Finding better ways to leverage the sports industry to improve people's lives, create jobs, and stimulate consumption still needs in-depth exploration.

2.2 The necessity of integration of digital economy and sports industry

The deep integration of the digital economy and the sports industry is a natural trend in response to the new wave of technological revolution and industrial transformation. It's also an urgent need for achieving high-quality development in both sectors. The sports industry needs to leverage digital technologies like the internet, big data, and artificial intelligence to improve resource allocation efficiency, optimize business processes, and innovate service models. This will unleash the potential for development [4]. On the flip side, the digital economy needs to deeply merge with traditional industries to create rich application scenarios and foster new drivers of growth. The enormous market potential of the sports industry offers valuable opportunities for digital economic development. It's clear that the digital economy has a significant positive impact on the sports industry, and their organic combination can generate new productivity and create fresh growth points, pushing the industry towards high-quality development. This aligns with our country's strategy to expand domestic demand, build a modern economic system, and optimize overall development structure.

2.3 Value of digitalization in sports industry

(1) Digitalization: The integration of new momentum and the sports industry

Digitalization is not just a new driving force for the sports industry; it's also a chance for a complete transformation. By introducing advanced digital technologies, the sports industry is undergoing a profound change. This transformation is evident in many areas: from athlete training and performance

analysis to audience interaction experiences; from innovative marketing strategies to the use of new technologies like live streaming and virtual reality. Digitalization not only enhances the fairness and accuracy of competitions but also boosts audience engagement and immersion, opening up new markets and revenue streams for the sports industry.

(2) New growth points in sports consumption: The role of digital transformation

As consumer demand for sports content becomes increasingly diverse, digital transformation plays a key role in creating new growth points for sports consumption. For instance, through online platforms, consumers can watch games anytime and anywhere, and even interact with other fans or athletes via social media. Moreover, digitalization enables personalized services, such as customized content recommendations based on user preferences, which further enhances user engagement and loyalty. These new forms of consumption experiences not only broaden the audience base for the sports industry but also create new revenue opportunities.

3. Challenges in digital empowerment of the sports industry

3.1 The application order clause of the applicable rules for the return of profits from infringement is in vain

(1) Policy and supply system: the gap between demand and reality

Even though the importance of digitalization in the sports industry is gradually being recognized, the corresponding policy support hasn't kept pace. This includes financial subsidies for digital sports innovations, tax incentives, and improvements in laws and regulations. The uncertainty in policies and a lack of clear guidance limit the investment and innovation in digitalization by businesses and organizations [5]. Despite rapid technological advancements, their application in the sports field hasn't become widespread. For small and medium-sized sports enterprises and organizations, high costs for technology investment, a shortage of skilled professionals, and inadequate technical support have become bottlenecks for development. This has created a significant gap between the supply of technology and the actual needs of the sports industry.

(2) Data sharing and application: existing bottlenecks and solutions

Data resources in the sports industry are often scattered across different organizations and platforms, lacking effective sharing mechanisms. This fragmentation leads to data silos, hindering effective circulation and utilization of data. For instance, if training data, competition data, and market data for athletes cannot be shared across organizations and platforms, their value cannot be fully realized. Even when data is available, many organizations in the sports industry lack the capability to process and analyze these large and complex datasets. This issue not only stems from insufficient technical capabilities but also from a lack of specialized talent. Effective data analysis is key to maximizing data value, yet this capability is generally lacking in the sports industry. There is also a lack of unified standards for data collection, storage, and processing within the industry, making it difficult to integrate data from different sources effectively. Additionally, the absence of a centralized data platform to manage and analyze these resources significantly reduces the efficiency of data utilization.

3.2 Digital governance: problems and improvement directions

Currently, the digital governance structure in the sports industry is often not well-developed or systematic. This includes issues like unclear policy guidance, incomplete regulations, and vague enforcement mechanisms. Such an imperfect governance structure can lead to irregular and inefficient digital applications. With the application of new technologies, particularly the infiltration of artificial intelligence and big data into the sports industry, issues of technological ethics and compliance are

becoming increasingly prominent. This includes how to reasonably use personal data, ensure the fairness and transparency of algorithms, and handle technical errors. Digitalization in the sports industry intersects with multiple fields, such as technology, media, and education, which requires the establishment of effective cross-sector collaboration mechanisms. At the same time, this cross-sector nature poses challenges for regulation, as coordinating different rules and interests to ensure harmonious operation of the entire system is a problem that needs addressing. Throughout the digitalization process, data security and privacy protection remain a perpetual topic. Establishing sound data protection mechanisms to prevent data breaches and misuse is a crucial aspect of digital governance that must be prioritized.

4. The path for digital economy to boost the high-quality development of sports industry

4.1 Strengthening digital infrastructure

Building robust digital infrastructure is a prerequisite for the deep integration of the digital economy and the sports industry. Investing more in new types of infrastructure like 5G and the Internet of Things (IoT) is crucial. The high bandwidth, extensive connectivity, and low latency of 5G will provide the necessary network support for live sports broadcasts, VR/AR viewing experiences, and smart venue operations. The widespread use of IoT sensing devices can achieve comprehensive monitoring of athletic activities, offering technical support for athlete training and event organization [6]. Therefore, speeding up the commercial rollout of 5G and expanding IoT coverage is vitally important for promoting the in-depth application of digital technology in sports. Continually improving the data resource system is essential. We need to build a centralized, unified, diverse, integrated, and secure sports big data platform, merging government-led and industry data to ensure open and shared data resources. This involves encouraging the collection of diverse datasets like demographics and consumer behavior, and integrating them with traditional sports data to create a comprehensive sports big data repository. This will support applications like targeted marketing and intelligent training with multidimensional data.

At the same time, it's important to strengthen data governance, regulate data collection and use, ensure data quality, and advance cloud computing infrastructure in sports. Fully leveraging the powerful storage and computing capabilities of cloud platforms can help streamline the deployment of sports-related systems and applications. For instance, a national cloud platform for sports event data management can provide informational support to local event organizing committees. We can also develop cloud services for sports venues and enterprises to establish smart management and operations systems. Additionally, the cloud platform can facilitate the integration and on-demand delivery of sports hardware and software products, improving resource allocation efficiency. In terms of computing infrastructure for sports, leveraging the national computing power network hub can consolidate sports big data and computing resources nationwide, building a unified and open sports computing network. This will foster the development of sports AI training platforms and a computational resource pool to support sports AI applications. Furthermore, encouraging sports enterprises to collaborate on a shared computing power initiative can offer training and inference computing services, creating a public computing ecology for sports AI.

4.2 Cultivating new sports digital formats

Focusing closely on the actual needs of the sports industry, we actively cultivate a new wave of digital businesses and models, pushing for a deep integration of the digital economy with the sports sector. We're working hard on upgrading sports venues with smart technologies, promoting solutions based on Internet of Things (IoT), artificial intelligence, and more. This includes digital management

of every aspect of the venue, along with comprehensive monitoring of people, equipment, and the environment through multi-sensor layouts and image collection. Using AI algorithms to analyze massive amounts of data, we aim to achieve smart scheduling and monitoring of these venues. We're also developing practical systems like smart security and smart parking to enhance audience experiences, improving overall operational efficiency and service quality. We're keen to expand the digital content sector of sports, encouraging the creation of digital works with sports themes, and building proprietary intellectual property (IP) content. Key focuses will be live sports broadcasting, event data analysis, sports gaming, and virtual fitness training, catering to the diverse digital consumption needs of different groups.

At the same time, we're optimizing marketing channels and business models, exploring revenue streams like subscriptions, ad placements, and copyright transfers, and establishing a value empowerment system for sports IP, aimed at fostering the growth of sports tech companies. With support from financial backing, technology transfer, and industrial services, we're committed to developing a range of sports tech firms that provide both hardware and software solutions primarily for sports venues, organizations, and fitness entertainment sectors. Entrepreneurs are encouraged to ramp up research and development investments, break new ground in critical technologies like AI and virtual reality, and strengthen independent innovation capabilities. We also support companies in cross-industry integration, merging sports with cutting-edge technologies such as 5G, cloud computing, and big data, pushing forward innovations in sports smart applications and services, and advancing the development of sports industry parks and clusters. By concentrating resources in sports manufacturing, services, and training, we aim to create distinctive digital economy parks for the sports sector. Relying on these parks for specialized public services, we're integrating resources across the industry, fostering an ecosystem for the sports industry, promoting the clustered development of new digital business forms in sports, and endorsing the "5G + industrial internet" application to construct a new model of intelligent manufacturing for the sports sector, ultimately enhancing the modernization of supply.

4.3 Promoting the digital transformation of traditional sports industry

Digital transformation is essential for traditional sports companies to boost their competitiveness and achieve high-quality development. It's important to enhance the integration of digital technologies across all operational processes, advancing digital, online, and intelligent upgrades. Innovating business models and nurturing new profit growth points are key to establishing a new sports economy driven by digital technology. We need to push for the digital transformation of the sports goods manufacturing industry, encouraging companies to widely adopt advanced technologies like the industrial internet and smart manufacturing. This will lead to the creation of smart factories and flexible production lines, improving production efficiency and lean management. Using digital design and R&D tools can shorten the development cycles of new products.

By leveraging big data analytics, we can uncover user insights and achieve personalized customization. We should also develop online sales channels and expand new internet marketing models, while accelerating the integration and restructuring of traditional businesses with advanced manufacturing, fostering a new advantage in smart hardware manufacturing. Furthermore, we need to drive the digital transformation of the sports service industry, utilizing mobile internet and big data to build an O2O sports service platform. This will enable remote services that offer "fitness at home" options, develop sports live streaming and event broadcasting, and nurture new media and rights operators in sports events. We should engage in sports data collection, exploration, and analysis to provide services for sports data operators, embrace the shared economy model, and develop subscription-based revenue models. Transitioning from single sales to operational services while

integrating online and offline businesses, merging virtual and physical experiences, will create an immersive sports consumption experience.

5. Conclusion

In the process of high-quality development in the corporate economy, digital factors are one of the most important driving forces behind improving business performance. As companies grow, boosting production efficiency, enhancing personalized service experiences, strengthening competitive power, and developing and marketing products all rely on the application and support of digital technologies. The digital economy injects new vitality and direction into the high-level development of the sports industry. Only by accurately grasping the trends in the digital economy and deeply expanding the application of digital technology in the sports sector can we effectively promote innovation and upgrades in the sports industry, making a positive contribution to building a modern sports industry system. At this historical juncture of rapid digital technology development, the digital transformation of the sports industry is a complex and comprehensive process that requires efforts and collaboration from multiple fronts. In the future, we look forward to seeing a more intelligent, personalized, and interactive sports industry that not only offers richer sports experiences but also becomes a significant force driving economic and social development.

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