Analysis of the Technological Pathways for Sports Culture in the Context of a Leading Sports Nation

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Abstract: *Using the literature review method, this study investigates the current state of the promotion and popularization of sports culture in China's large-scale sports events, as well as the role of technology in facilitating the dissemination of sports culture, and analyzes the pathways for future technology-assisted popularization of sports culture. It was found that in recent years, the promotion of sports culture in domestic large-scale sports events has been relatively weak, with insufficient impact; technology has provided limited assistance to the potential cultural elements in sports, and the development of sports culture lacks core technological support. In the new era of rapid technological development, sports culture needs to deeply integrate with technological achievements, realizing the technological transformation of the content, form, and promotional means of sports culture, in order to meet the demands of sports culture popularization, make sports culture more aligned with the characteristics of the times, and satisfy people's growing material and cultural needs.*

Keywords: *sports culture; large-scale sports events; digitalization; media convergence*

Introduction

Currently, governments at all levels attach great importance to the promotion of sports culture in large-scale events, but there are still many problems in the promotion of sports culture. In recent years, the promotion of sports culture in domestic large-scale sports events has been relatively weak, with insufficient impact. Although technological means have to some extent enhanced the influence and appeal of large-scale events, technology has primarily assisted the information about the events themselves, with limited involvement in potential cultural elements, especially those such as Chinese culture and regional cultural elements inherent in sports, and the development of sports culture lacks core technological support. The display and promotion of sports culture need to deeply integrate with the technological achievements of the digital era. Whether in terms of promotional means or the content and form of culture, relevant research on technological integration must be conducted to make sports culture more aligned with the characteristics of the times, thereby better satisfying people's growing material and cultural needs.

1. The Meaning and Necessity of the Technologization of Sports Culture

1.1 The Meaning and Role of the Technologization of Sports Culture

The technologization of sports culture refers to the deep integration of sports culture with technology, which can effectively enrich the forms of expression of sports culture and enhance the appeal, expressiveness, influence, and accessibility of sports cultural products. Through technological means, the elements, symbols, and artifacts of sports culture are presented in a more diverse and vibrant manner, strengthening the aesthetic, viewing, experiential, interactive, and participatory qualities of sports culture and providing people with entirely new cultural enjoyment and experiences. The widespread application and deep integration of technology in the field of sports culture, with modern technologies such as big data, cloud computing, informatization, and digitalization at its core, will transform the methods of cultural supply, production, and experience. A new technological sports culture environment, characterized by trends such as experiential, interactive, personalized, specialized, and diversified offerings, will drive the production of cultural products from a single, extensive model

to an industrialized, batch-produced, and refined one. Cultural supply will shift towards precision, diversity, and pluralism, thereby comprehensively meeting people's sports cultural needs and significantly enhancing the influence of sports culture.

Large-scale sports events serve as crucial platforms for advancing the development of sports undertakings and promoting the popularization of sports culture, playing an irreplaceable role in the development and dissemination of sports culture. During the preparation and hosting of these events, the use of technologically enhanced sports culture products for display can provide robust support for the promotion of sports culture and the cultivation of a dynamic sports culture atmosphere, thereby effectively increasing the influence of the events. The primary focus of this study is to analyze the technological pathways for sports culture that are applied to support the promotion of sports culture and the creation of a sports culture atmosphere in large-scale sports events.

1.2 The Necessity of Developing the Technologization of Sports Culture

The development of sports culture is a vital component of building a leading sports nation. The national sports culture inherent within sports culture is an indispensable part of Chinese culture and serves as a significant source for fostering cultural confidence [1]. Therefore, the development of sports culture is also crucial work for establishing national cultural confidence. The "Outline for Building a Leading Sports Nation," issued by the State Council in 2019, specifically emphasizes focusing on project culture to build sports culture. It particularly highlights the importance of inheriting the excellent traditional Chinese sports culture that can effectively demonstrate national characteristics and embody the value of sports culture in the new era [2]. The effective popularization of sports culture significantly promotes public enthusiasm for participating in sports activities. Large-scale sports events serve as essential platforms for advancing the development of sports undertakings and promoting the popularization of sports culture, playing an irreplaceable role in the development and dissemination of sports culture. To better serve the overarching goal of building a leading sports nation, large-scale sports events should consider the material and cultural needs of the public, emphasize the development, popularization, and promotion of sports culture, and fully consider how to appropriately and scientifically integrate Chinese culture, sports spirit, and competition activities during the event preparation process. This approach aims to achieve the goal of "comprehensively showcasing the charm of Chinese culture."

In the technological era, conducting research on the pathways for deep integration of sports culture and technology, addressing the needs of sports culture development and the requirements for its popularization and promotion in large-scale events, helps enhance the technological innovation capability of sports culture. It also drives the better and faster development of sports culture initiatives and the sports culture industry.

2. Application and Development Trends of Technology in the Promotion of Sports Culture

In the rapidly developing digital age, the widespread application of technology in sports event promotion has facilitated the rapid rise of new media and self-media, thereby advancing the refinement of sports event communication methods. Sports network media, characterized by their broad content coverage, fast information updates, and close interaction with the public, have successfully attracted the attention and support of the younger generation, who are increasingly becoming the mainstream of the consumer market, and are progressively becoming the primary channel for information dissemination[3]. During the 2016 Rio Olympics, mobile clients completely surpassed computer clients, as internet users began to obtain sports event information first through WeChat subscription accounts and news apps on their phones[4]. Particularly with the rapid development of artificial intelligence[5] and big data technologies [6-7], these platforms push the most interesting sports information to users based on their preferences, satisfying personal interests and making the popularization of sports events better aligned with people's needs. Taking the "Hupu Sports" app as an example, Hupu consistently delivers first-hand sports news worldwide without delay, providing users with primary data on various competitions. The disseminated information includes athlete profiles, event highlights, pre-match predictions, real-time game statistics, and medal standings, enabling users to stay informed about event developments immediately.

With the rapid advancement of VR (Virtual Reality) technology, its application in large-scale events is becoming increasingly common, significantly enhancing the technological sophistication of event promotion.[8] For instance, during the 2018 Russia World Cup, live broadcast rooms utilized VR

technology to project famous football stars beside commentators, offering audiences a tremendous visual impact. This approach greatly captured viewers' attention even before the matches began, igniting their enthusiasm.

It can be observed that with the support of artificial intelligence and big data technologies, new media and other technological means have rapidly proliferated in sports event promotion. This enables media audiences to obtain more timely, multi-angled, and audiovisually satisfying information reading experiences on demand, thereby enhancing the influence of the events. The application of VR (Virtual Reality) technology has elevated the technological sophistication of event promotion, with dazzling special effects significantly boosting its appeal. However, in terms of current promotional content and forms, technology primarily assists event information dissemination. Although event information constitutes part of sports culture, it seldom delves into the potential cultural elements within sports, such as the Chinese cultural and regional cultural elements inherent in sports activities. Modern technologies like virtual reality and augmented reality could enable audiences to personally experience and interact with historical culture during viewing, effectively addressing many challenges traditionally difficult to showcase in sports culture. Consequently, these technologies should have broader applications in the technological demonstration of sports culture, yet their current utilization remains relatively limited, and the development of sports culture still lacks core technological support.

In this new era of rapid technological advancement, where 5G and even 6G and 7G networks will gradually become widespread, the demonstration and promotion of sports culture require deep integration with technological achievements of the internet age. Whether in promotional methods or the content and formation of culture, technological integration must be pursued to make sports culture more aligned with contemporary characteristics and meet people's growing material and cultural needs. Therefore, conducting research on the pathways for deep integration of sports culture and technology, addressing the needs of sports culture development and the requirements for its popularization and promotion in large-scale events, will help enhance the technological innovation capability of sports culture and drive the better and faster development of sports culture initiatives and the sports culture industry. Hence, in the forthcoming technological era, the preparation processes for large-scale sports events will inevitably involve a series of studies on the deep integration of sports culture and technology, creating innovative achievements in their convergence. Leveraging advanced technological means to provide robust support for high-quality dissemination of sports culture will become an inevitable choice for event promotion and sports atmosphere creation in large-scale sports events[4].

3. Integration of Sports Culture and Modern Technological Means, and Analysis of Related Work

Addressing the goals outlined in the Outline for Building a Leading Sports Nation, which emphasize developing sports culture with a focus on project culture and particularly stress the inheritance of traditional Chinese sports culture, requires continued research into the exploration of sports culture. Utilizing the systematic research outcomes on sports culture as a textual foundation, a series of studies on the deep integration of sports culture and technology should be conducted. Advanced technological means must be employed to provide robust support for the high-quality dissemination of sports culture, thereby addressing the current shortcoming of lacking core technological support in its development. This involves creating application demonstrations of the integration between sports culture and technology, promoting these outcomes, leading the trend of deep integration in this field, and simultaneously supporting the promotional efforts and the creation of a sports culture atmosphere in large-scale events.

Sports culture that embodies the traditional culture of the Chinese nation and regional characteristics will never be achieved overnight. It requires continuous, systematic, and comprehensive development, exploration, and refinement to meet the promotional needs of large-scale sports events across different regions and with distinct features. Therefore, the process of technologically popularizing sports culture necessitates ongoing development and improvement work.

With technological advancements, numerous new technologies such as artificial intelligence, big data-supported new media, and VR (Virtual Reality) technology have been successfully applied in event promotion, enhancing its technological sophistication. Dazzling special effects have significantly increased the appeal of event promotions. However, these high technologies primarily focus on disseminating information about the events themselves, aiding the spread of competition details[9]. While event information is part of sports culture, the current technologically assisted sports culture contains too few potential cultural elements. The support for sports culture, especially project-based

culture, remains significantly insufficient and fails to achieve the goal of "comprehensively showcasing the charm of Chinese culture." Thus, systematic research on the integration of sports culture and technology is essential. Regarding the integration of culture and technology, scholars have proposed several models. For instance, Yin Hong (2013) summarized the integration of culture and technology into three models: "Creativity + Technology, Content + Channels, Extension + Expansion"[10]. Concurrently, issues such as insufficient innovation, lagging key technologies, imperfect technology application systems, inadequate technical standard systems, and underdeveloped cultural-technology platforms exist in the current integration of culture and technology. As sports culture is part of culture, it also faces these problems. The technologization of sports culture must achieve integration with technology at three levels: "Creativity + Technology, Content + Channels, Extension + Expansion," addressing a series of issues including "insufficient innovation, technological backwardness, imperfect systems, underdeveloped cultural-technology platforms, inadequate technical services, and incomplete standard systems." Resolving the problem of insufficient innovation requires research on the technological content of sports culture; addressing technological backwardness necessitates studies on technological demonstration methods for sports culture; tackling underdeveloped cultural-technology platforms requires research on the deep integration of culture and media; and solving issues with technical service standard systems demands studies on technological communication models and service technology demonstration models for sports culture. These studies will address the imperfect systems in the technologization of sports culture.

Sports culture requires continuous development and refinement, and technological innovation is always an ongoing process. The integration of sports culture and technology will also continually improve and enrich. Therefore, constructing technological pathways for the promotion of sports culture and the creation of a sports culture atmosphere in large-scale events cannot be achieved instantly. Consequently, current research efforts primarily focus on establishing demonstrative outcomes for the technologization of sports culture, providing references for the subsequent scaled and industrialized development of sports culture technologization.

Therefore, researching the pathways for the technological popularization of sports culture requires systematic efforts in developing sports culture. Simultaneously, using the systematic research outcomes on sports culture as a textual foundation, a series of studies on the deep integration of sports culture and technology should be conducted to bridge the "last mile" of their integration. This involves creating innovative achievements in the integration of sports culture and technology, utilizing advanced technological means to provide robust support for the high-quality dissemination of sports culture. Through these studies, the shortcoming of lacking core technological support in the development of sports culture will be addressed, application demonstrations of the integration between sports culture and technology will be established, and outcomes will be promoted. This will lead the trend of deep integration between sports culture and technology, while also supporting the promotional efforts and the creation of a sports culture atmosphere in large-scale events. Specific research work should include the following aspects:

3.1 Research on Exemplary Digital Outcomes of Sports Culture Content

We will integrate emerging technologies such as the Internet of Things, cloud computing, big data, and artificial intelligence while utilizing advanced cultural equipment including laser projection, VR (Virtual Reality), optical motion capture, film and video recording, high-definition production and broadcasting, and image editing. This research aims to explore intelligent presentation technologies for sports culture and establish exemplary digital outcomes that demonstrate sports culture effectively.

3.2 Research on Exemplary Technological Demonstration Methods for Sports Culture

Using digitalization, networking, and intelligentization as the technical foundation for integrating sports culture with technology, we will fully leverage system integration technologies from fields such as news publishing, broadcasting, film and television, culture and arts, creative design, and cultural tourism. The research will develop exemplary demonstration methods for sports culture that enable visual presentation, interactive dissemination, and immersive experiences of sports culture content through technological applications.

3.3 Research on Demonstration Achievements of Deep Media-Sports Culture Integration

This research will fully adopt the "content + platform + terminal" model of modern news

production and dissemination systems. By leveraging advancements from the information revolution, it will establish a "content + platform + terminal" framework for sports culture and develop exemplary digital technology demonstrations compatible with various media platforms. It will explore the feasibility of applying artificial intelligence to the distribution, reception, and feedback mechanisms of sports culture, comprehensively enhancing the influence of sports culture. This approach will enable personalized customization and intelligent distribution services for sports culture promotion, meeting the needs of both cultural publicity and atmosphere creation in large-scale sporting events.

3.4 Research on Technological Dissemination Models and Service Technology Demonstration Models for Sports Culture

This research will investigate demonstration models for multi-channel release, multi-network distribution, and multi-terminal presentation of sports culture products. It will also explore demonstration models for cultural service technologies, including personalized recommendations based on big data and quality evaluation systems for cultural products and services.

Conclusion

Currently, governments at all levels place significant emphasis on the promotion of sports culture in large-scale events. However, numerous problems still exist in the promotion of specific sports culture. The display, promotion, and popularization of sports culture require deep integration with the technological achievements of the internet era. Research on technological integration is necessary both in terms of promotional methods and the content and formation of the culture itself. This will make sports culture more aligned with the characteristics of the times and better satisfy people's growing material and cultural needs. The research required for the technological pathways to popularize sports culture includes: the development and refinement of sports culture, research on exemplary digital outcomes of sports culture content, research on exemplary technological demonstration methods for sports culture, research on demonstration achievements of deep media-sports culture integration, and research on technological dissemination models and service technology demonstration models for sports culture.

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