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Research on Intelligent Transformation Path of Sports Industry Based on AI Big Model

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Abstract: With the rapid development of artificial intelligence technology, the application of AI big model in the sports industry is becoming more and more widespread, promoting the intelligent transformation of the sports industry. Based on the theoretical foundation and technical characteristics of AI big model, this study constructs a theoretical model of intelligent transformation of sports industry and analyzes the current status of the application of AI big model in sports industry. The study finds that AI Big Model can effectively improve the operational efficiency of the sports industry, innovate the service mode, enhance the user experience, and provide technical support for athletes' training and competition. The study also proposes a series of policy recommendations and implementation strategies to promote the wide application of AI Big Model in the sports industry. However, the study also has limitations, such as the lack of empirical studies and interdisciplinary perspectives. Future research can be expanded in terms of empirical studies, interdisciplinary studies, long-term tracking studies, international comparative studies, and studies on risks and challenges, in order to deepen the understanding of the intelligent transformation of the sports industry and provide theoretical and practical support for its sustainable development.

Keywords: AI Big Model; Sports Industry; Intelligent Transformation; Digital Development; Industrial Ecology; Policy Recommendations; Implementation Strategies

1. Introduction

1.1. Background of the study

In the context of globalization and the digital era, the sports industry, as an important part of the national economy, is experiencing unprecedented changes. With the rapid development of artificial intelligence (AI), big data, cloud computing and other emerging technologies, the operation mode, consumption mode and service experience of the sports industry are undergoing profound changes. The digital transformation of the sports industry has become a key way to promote industrial upgrading and enhance industrial competitiveness.

At present, the sports industry is facing challenges in many aspects. Firstly, consumers' demands are becoming increasingly diversified and personalized, and the traditional sports service model is difficult to meet the market demand. Secondly, the digital infrastructure of the sports industry is not yet perfect, the phenomenon of data silos is serious, and the value of data has not been fully explored and utilized. Again, the intelligence level of the sports industry is not high, and many sports organizations and enterprises lack effective technical and management support in the process of intelligent transformation. Finally, the international competition in the sports industry is fierce, and it is necessary to enhance international competitiveness through intelligent transformation.

Against this background, intelligent transformation has become an inevitable choice for the sports industry to realize sustainable development. Intelligent transformation can not only improve the operational efficiency of the sports industry, but also create new consumption scenarios and business models to meet the diversified needs of consumers and enhance the overall competitiveness of the sports industry.

1.2. Research significance

As a cutting-edge technology in the field of artificial intelligence, the application of AI big model in the sports industry has an important role in promoting the application of AI big model, through deep learning and natural language processing and other technologies, can process and analyze the massive amount of sports data, providing accurate decision-making support, personalized service experience and innovative business models for the sports industry. For example, AI Big Models can be used in scenarios such as data analysis of athletes' training, optimization of game strategies, intelligent live broadcasting of sports events, intelligent management of stadiums, etc., which can greatly enhance the level of intelligence in the sports industry.

In addition, AI big models can also promote the integration of the sports industry with other industries, such as health, education, tourism, etc., and promote the diversified development of the sports industry. Through the application of AI big model, the sports industry can realize more efficient resource allocation, more accurate market positioning and wider user coverage, thus realizing the innovative development and transformation and upgrading of the

industry.

1.3. Research objectives and issues

This research aims to explore the intelligent transformation path of the sports industry based on AI big model and solve the theoretical and practical problems faced by the sports industry in the process of intelligent transformation. The research objectives include:

(1)Analyzing the necessity and urgency of intelligent transformation of the sports industry, and exploring the potential and value of the application of AI big model in the sports industry.

(2)To construct a theoretical framework for intelligent transformation of the sports industry and propose a transformation path model based on the AI big model.

(3)Explore the current situation and effect of the application of AI big model in different fields of the sports industry, and analyze its role in promoting the transformation of the sports industry.

(4)To put forward strategies and suggestions for the intelligent transformation of the sports industry, and provide reference for policy formulation and industrial practice.

The research questions include:

(1)What are the main challenges and opportunities for the intelligent transformation of the sports industry?

(2)How can AI big models help the intelligent transformation of sports industry?

(3)What are the paths and strategies for intelligent transformation of the sports industry?

(4)How to evaluate the effect of AI big model in the intelligent transformation of sports industry?

2. Literature review

2.1. Research Status

In the context of the digital era, the intelligent transformation of the sports industry has become a hotspot of academic and industry attention. Scholars generally believe that the digital transformation of the sports industry is an inevitable choice to respond to the needs of the digital economy era. For example, Zhu Jing (2024) pointed out in her study that digital intelligence technology, as the main driving force of economic development and social progress in the new era, has an important impact on the modernization process of physical education. In addition, the PETSAI system proposed by Thanh Ma and Minh Thu Tran Nguyen (2024) demonstrates the potential of AI technology in physical education support by calculating sports scores through an audio-visual framework, which exemplifies the prospect of applying AI technology in sports.

At the international level, the digital transformation of the sports industry has received equal attention. For example, Yinfu Lu et al. (2024) explored the application of AI technology in energy exchange networks for sports systems in remote areas, demonstrating the potential value of AI technology in the global sports industry. Meanwhile, the study by Sayed Mohammad Majidi Dorcheh et al. (2024) focuses on the application of AI in intelligent cropping of sports videos, which further confirms the potential of AI technology in enhancing the efficiency of sports content distribution.

However, the intelligent transformation of the sports industry is not without its challenges. For example, although the study by Rebecca Pedersini et al. (2024) focuses on the physical condition of breast cancer patients during treatment with aromatase inhibitors, it indirectly reflects the need for digital transformation of the sports industry in the area of health and nutrition. In addition, the study by Chengping Zhang (2024) directly explored the innovation of elementary school sports training model based on AI technology, which demonstrated the potential of AI technology in the field of physical education.

2.2. Research Review

Although existing studies have provided a certain theoretical foundation and practical cases for the intelligent transformation of the sports industry, there are still some research gaps and limitations. First, most of the existing research focuses on the application of AI technology in specific sports fields, such as training, education and health management, while relatively few studies have been conducted on the application path and transformation strategy of AI big models in the whole sports industry. Second, most studies lack an interdisciplinary perspective and fail to fully combine theories from economics, management and information technology to comprehensively analyze the complexity of the intelligent transformation of the sports industry.

In addition, existing studies tend to focus on the exploration of the technical level, while there are relatively few studies on the non-technical factors such as policy support, market demand, capital investment and talent cultivation in the process of intelligent transformation. The existence of these problems limits the in-depth development of intelligent transformation of the sports industry and affects the effective formulation and implementation of transformation strategies.

Therefore, this study aims to fill the gaps in existing research and provide comprehensive theoretical guidance and practical suggestions for the intelligent transformation of the sports industry by constructing a theoretical model of the intelligent transformation of the sports industry based on the AI grand model, and comprehensively analyzing a number of factors, such as technology, management, and market. The full necessity of this study is that it can not only provide a new theoretical perspective for the digital transformation of the sports industry, but also provide policy makers and industrial practitioners with specific implementation strategies to promote the innovative development and transformation and upgrading of the sports industry.

3. Theoretical framework

3.1. Theoretical foundation and technical characteristics of AI big model

AI big models refer to machine learning models with a large number of parameters and complex computational structures, usually constructed from deep neural networks with billions or even hundreds of billions of parameters. These models are designed to improve the expressive power and predictive performance of the model, and are able to deal with more complex tasks and data.AI big model learns complex patterns and features by training massive amounts of data, and has a stronger generalization ability, which allows it to make accurate predictions on unseen data.

The technical characteristics of AI big model mainly include the following aspects:

(1)Large-scale parameters: AI big models have hundreds of millions or even hundreds of billions of parameters, which gives them a powerful representation capability.

(2)Data-driven: training through a large amount of data enables the model to capture the complex laws in the data.

(3)Pre-training and fine-tuning: AI Big Models usually use pre-training plus fine-tuning, where they are first pre-trained on large-scale data and then fine-tuned on specific tasks.

(4)Migration learning: AI big models have strong migration capabilities and can be applied to tasks in different domains.

(5)Emergence ability: When the training data and parameters of the model are continuously expanded until it reaches a certain critical size, it shows some unpredictable and more complex capabilities and characteristics, which is called “emergence ability”.

3.2. Constructing the theoretical model of intelligent transformation of sports industry

When constructing the theoretical model of intelligent transformation of sports industry, we can learn from Michael Porter's diamond model, which is a systematic project that includes macro, meso and micro elements and perspectives, and involves the industry, enterprises, consumers, sports products and services and other levels. The diamond model takes into account multiple factors such as production factors, demand conditions, related and supportive industries, corporate strategy and government, and provides a comprehensive analytical framework for the digital transformation of the sports industry.

The theoretical model of intelligent transformation of sports industry can be constructed according to the following elements:

(1)Factors of production: including high-level factors of production (such as big data, cloud computing, artificial intelligence and other digital technologies and specialized equipment) and primary factors of production (such as capital, unskilled manpower, infrastructure, etc.).

(2)Demand conditions: related to the market growth target of the sports digital industry, the digital business model of sports enterprises, and the demand for sports digital products and services.

(3)Related and supporting industries: The digital transformation of the sports industry requires the support of related industries, such as information technology and financial services.

(4)Corporate strategy, structure and competitors: sports enterprises' digital strategy, organizational restructuring, production mode change, business process reshaping, etc.

(5)Government and opportunities: government policy support, changes in market demand, technological progress and other external opportunities.

Through this theoretical model, all aspects of the intelligent transformation of the sports industry can be systematically analyzed to provide theoretical support and decision-making reference for the development of corresponding strategies.

4. Application status of AI big model in sports industry

The application of AI big model in the sports industry is gradually deepening, becoming an important force to promote innovation and transformation in this field. The following are some key application cases and analysis:

4.1. Application Case of Shanghai Sports Big Modeling

Shanghai University of Physical Education and Sports released the first domestic sports industry big model, the SI Sports Big Model, on June 29, 2024. This model was developed by Shanghai University of Physical Education and Sports in cooperation with Baidu, marking the in-depth integration and application of AI technology in the field of sports. The Shanghai Sports Big Model combines three vertical big models of sports literature, action recognition and technical and tactical analysis, and multimodality, and builds 20 intelligent bodies on the Baidu Wenxin intelligent body platform.

The Sports Literature Vertical Big Model is able to provide professional and systematic answers by learning domestic and international sports literature. The Action Recognition and Tactical Analysis Vertical Large Model is able to automatically parse sports training videos and images, output quantitative indicators, and help with biomechanical analysis. The multimodal vertical big model integrates text, voice, video, and 3D information to provide professional sports question answering and technical action analysis, and is capable of AI commentary and personalized course generation.

4.2. AI Big Model Promotes Innovation and Transformation of Sports Industry

The application of AI big model not only improves the data processing capability in the sports field, but also promotes the innovation and transformation of the sports industry. For example, the SI Sports Big Model has been applied in physical training, soccer, badminton, tennis and other scenarios, and has provided support for the daily training of several national teams and Olympic preparations, helping athletes improve their competitive level through AI technology and systems.

The application of AI big models has also been extended to live broadcasting of sports events, assisting training, field management, public opinion monitoring and other aspects. For example, at the 2024 Paris Olympics, AI technology is widely used to enhance the spectator experience and competitive level. the AI-assisted training system can accurately assess the training status and effect of athletes, provide scientific basis for the coaching team, and enhance the training quality.

In addition, AI big models also play a role in other areas of the sports industry, such as monitoring major social media platforms through AI technology, flagging accounts with a tendency to cyber violence, and providing a safe cyberspace for athletes. These applications demonstrate the extensive potential and practical benefits of AI big models in the sports industry.

In summary, the current status of the application of AI Big Model in the sports industry shows that it has become a key technology to promote the innovation and development of the sports industry. Through the deep integration with the sports field, AI Big Model not only enhances the spectacle and professionalism of sports events, but also provides powerful technical support for athletes' training and competitions, and at the same time opens up a new road for the commercialization and marketization of the sports industry. With the continuous progress of technology and the depth of application, it is expected that AI Big Model will play a more

important role in the sports industry.

5. Path Analysis of Intelligent Transformation of Sports Industry

5.1. Path Design of Intelligent Transformation of Sports Industry Based on AI Big Model

When designing the path of intelligent transformation of the sports industry, it is first necessary to establish a data-centered transformation framework. The starting point of this framework is data collection and integration, which involves collecting data from multiple dimensions such as events, athletes, and spectators. This data will be used to train big AI models that will enable them to recognize patterns, predict outcomes, and provide decision support. Next, intelligent applications need to be developed that translate the predictive and analytical capabilities of the AI Big Model into actual products and services, such as personalized fitness plans, event analysis tools, and viewer interaction platforms. These applications can not only enhance user experience, but also improve operational efficiency. Finally, through the promotion and application of intelligent applications, it is possible to integrate various links in the sports industry chain to form a highly synergistic intelligent sports ecosystem. This system will be constantly iterated and optimized to adapt to market changes and technological advances.

5.2. Feasibility Analysis of Transformation Path

The feasibility analysis of the intelligent transformation of the sports industry needs to be conducted from multiple perspectives. First of all, technological maturity is a key factor. Currently, AI big model technology is mature enough to handle complex data analysis tasks and provide valuable insights in the sports industry. Second, market demand is also an important driver for intelligent transformation. As consumer demand for personalized and high-quality sports content continues to grow, intelligent transformation can meet these needs and provide richer and more personalized sports products and services. Policy support is also an important factor in intelligent transformation. Policy support at the national level provides direction and impetus for the digital transformation of the sports industry. In addition, capital investment is another key factor for intelligent transformation. As the capital market pays more attention to the sports industry, the capital investment required for intelligent transformation will be guaranteed. Finally, human resources are the foundation of intelligent transformation. A group of talents with digital skills need to be cultivated and attracted to support the smooth progress of transformation.

5.3. Risk Assessment

Risk assessment is essential in the process of intelligent transformation of the sports industry. Technology risk is a primary consideration, as rapid iteration of technology can lead to rapid obsolescence of existing solutions. Therefore, continuous investment in research and development is required to stay ahead of the technology curve. Data security and privacy protection is another important risk point. When handling large amounts of personal data, it is important to ensure compliance with relevant laws and regulations, as well as effective technical measures to protect data security. Economic risk is also a concern. Intelligent transformation requires a large upfront investment, which may put pressure on the company's financial position if the investment fails to deliver the expected returns. Human resource risks should likewise not be ignored. If there are not enough professionals to support intelligent transformation, it may lead to a slow or even failed transformation process. Finally, ethical risks also need to be taken seriously. With the popularization of intelligent applications, some ethical issues, such as algorithmic bias and unfair competition, may arise, which need to be properly addressed in the transformation process. By identifying and managing these risks, the smooth progress of intelligent transformation can be ensured.

6. Policy Recommendations and Implementation Strategies

6.1. Policy Recommendations

In order to promote the intelligent transformation of the sports industry, the following is a series of policy recommendations:

(1)Strengthen top-level design: a comprehensive plan for the intelligent transformation of the sports industry should be formulated at the national level, with clear objectives, paths and key tasks for the transformation. This includes formulating standards for the digital transformation of the sports industry, promoting cooperation between the government and sports enterprises, creating a digital support platform for the sports industry, and strengthening fiscal and financial policy support.

(2)Promoting policy innovation: After the epidemic has stabilized, many places have taken the initiative to make policy innovations to promote sports consumption. The overall development momentum remains positive, and it is necessary to continue to promote policy innovation to meet the needs of digital transformation.

(3)Increase financial support: The government should increase investment in sports enterprises to build a digital transformation ecosystem. Promote the integration of the sports industry and digital technology through technological innovation, service innovation and institutional innovation.

(4)Cultivate professionals: Increase the cultivation of composite talents for digital sports, encourage colleges and universities and vocational and technical schools, etc. to carry out interdisciplinary talent cultivation, and encourage extensive cooperation between digital enterprises and sports organizations in the fields of talent cultivation, academic research, and industry consulting.

(5)Promote technology R&D and application: Encourage sports enterprises to cooperate with scientific research institutions, strengthen the R&D and application of key technologies such as AI big models, and enhance the intelligence level of the sports industry.

6.2. Implementation Strategies

(1)Establish a sports industry digitalization platform:

Create a digital platform for the sports industry, integrating the participation of multiple subjects such as national, provincial and municipal sports bureaus, sports industry-related enterprises, organizations and individual sports consumers, and providing shortcuts for the subjects to focus on the intelligent opinions of the public and put forward their demands. This platform can promote information sharing, optimal allocation of resources and synergistic development of the industry.

(2)Strengthen the construction of new infrastructure:

Strengthen the construction of new infrastructure, improve the Internet big data platform, integrate advantageous scientific and technological resources, and create a national sports industry "high, precise and sharp" research platform within sports enterprises. This will help enhance the scientific and technological innovation ability and international competitiveness of the sports industry.

(3)Create a sports atmosphere and enhance the willingness to consume sports:

The benefits of joining sports are publicized through various channels, and the concept of national fitness is constantly spread to the masses. In the era of digital economy, new economic forms are emerging in various industries, and new forms of sports industry can be boldly innovated, which not only can dominate the field of sports consumption, but also create more choice channels for the masses to participate in sports and increase their willingness to participate in sports.

(4)Promote the integration of the sports industry with related industries:

Implement the "Sports+" action, deepen the integration of the sports industry with tourism, culture, education, media, health, science and technology, pension and other industries, build a whole industry chain ecosystem, and expand the development space of the sports industry. This kind of integration can not only bring new growth points for the sports industry, but also promote the development of other industries and realize a win-win situation.

(5) Accelerate the construction of sports informatization:

Focus on key construction projects, clarify the development ideas of sports informatization, implement the digital sports construction project, make up for the shortcomings of the foundation, and encourage the research and development of promoting digital sports to meet the needs of the public for fitness and fun. This will help improve the quality and efficiency of sports services and enhance the attractiveness and competitiveness of the sports industry.

7. Conclusion and Outlook

7.1. Conclusion.

Based on the application of AI big model in the sports industry, this study explores the path of intelligent transformation of the sports industry. It is found that AI Big Model, as an emerging technology, has shown great potential and value in many fields of the sports industry. By analyzing the theoretical foundation and technical characteristics of AI Big Model, this study constructs a theoretical model for the intelligent transformation of the sports industry, which emphasizes key steps such as data collection and integration, AI Big Model training and deployment, intelligent application development, industry chain integration, and continuous iteration and optimization.

The study also found that the current status of the application of AI Big Model in the sports industry shows that it has become a key technology to promote the innovation and development of the sports industry. The application of AI Big Model not only enhances the spectacle and professionalism of the sports events, but also provides powerful technical support for athletes' training and competitions, and at the same time opens up a new path for the commercialization and marketization of the sports industry.

In addition, this study proposes a series of policy recommendations and implementation strategies to facilitate the widespread application of AI big models in the sports industry and to promote the intelligent transformation of the sports industry. These recommendations include strengthening top-level design, promoting policy innovation, increasing financial support, cultivating professionals, and promoting technology R&D and application.

7.2. Outlook

Although this study provides theoretical guidance and practical suggestions for the intelligent transformation of the sports industry, there are some limitations. First, due to the very fast development of AI big model technology, there may be new technologies and application scenarios not covered by this study. Second, this study mainly focuses on theory and status quo countermeasures discussion, and fails to conduct in-depth data analysis and empirical research, which may limit the generalizability and applicability of the findings.

Future research can be expanded in the following directions:

(1)In-depth empirical research: through collecting and analyzing a large amount of actual data, empirical research is conducted on the application effect of the AI grand model in the sports industry, in order to verify the validity of the theoretical models and strategies proposed in this study.

(2)Interdisciplinary research: Combining the theories and methods of multiple disciplines, such as computer science, sports science, management science, etc., to conduct a more comprehensive research on the intelligent transformation of the sports industry.

(3)Long-term tracking research: to conduct tracking research on the long-term effects of intelligent transformation of the sports industry in order to assess its continuous impact on the development of the sports industry.

(4)International comparative study: To provide more references and lessons for the development of China's sports industry by comparing the paths and effects of intelligent transformation of sports industry in different countries.

(5)Risks and challenges research: in-depth study of the risks and challenges that may be encountered in the process of intelligent transformation of sports industry, and put forward corresponding coping strategies.

Through these future research directions, we can further deepen the understanding of intelligent transformation of sports industry and provide more theoretical and practical support for the sustainable development of sports industry.

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