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A NEW PARADIGM FOR THE DEVELOPMENT OF THE SPORTS INDUSTRY IN DIGITALIZATION CONDITIONS (BASED ON THE EXPERIENCE OF HIGHLY DEVELOPED COUNTRIES IN THE WORLD)

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Abstract

The relevance of digital sports industry research represents new way of building up sports power and realizing the comprehensive development of a new sports paradigm, which is presented as a smart transformation of physical education in digital era. We investigated digital sports industrial innovations, that are in priority of national development in the highly developed countries as China and Japan, which are developing in reforming context and sports policy modernization at the state level. "Digital Sports Industry" ensures the seamless sports and technology, culture, medical care, elderly care integration, comprehensively stimulating the transformation and modernization of the industry, promoting economic development and sports power. The purpose of the research are theoretical and practical aspects of the new sports industry development paradigm in the digital age (an example of the highly developed countries' experience). Research objectives: 1) analyze the sports industry development in China and explore new digital technologies in the field of the sports industry; 2) demonstrate the artificial intelligent development in Japanese sports industry; 3) to reveal new artificial intelligent development in sports industry areas in advanced countries all over the world; 4) to find out new NFT paradigm implementation in the integrated virtual reality development in the sports industry. The digital sports industry not only provides a convenient environment for the sports industry, but also a variety of products and services for netizens surfing through the Internet. It can disseminate information about sports and health, when the sports knowledge dissemination system is unable to meet the needs. The deepening application of digital technologies in the sports powerfull countries to strengthen the of new technologies and means promotion in the technological update form, to increase digital capabilities and Internet literacy in various sport fields, in order to remove the institutional creation of obstacles to it's reform and "sports for the people" development. In new technological application conditions, digital technologies are widely used in sports competitions, mass sports. children and youth sports, increasing intelligence, convenience and a wide sports development range, developing versatility to promote sports conceptual popularization, health awareness and sports culture concepts promotion.

Key words: sports industry, digitalization, artificial intelligence, campus, physical education, smart sports, new NFT paradigm, China, Japan.

Problem statement in general form and its connection with important scientific or practical tasks

With the introduction of digital concepts such as Internet, big data and artificial intelligence, digital sport have become the core of the sports industry. The leading countries all over the world (the USA, China, Japan) have begun actively promote the digital sports construction, use the Internet to increase innovation and digital economic productivity and traditional industry integration. Digital technologies contribute to achieve the goals of sports reform. In order to create a sports power in the highly developed countries all over the world, it is planned to create a national system of fitness services, reform and improve the national competitive sports system, eliminate institutional and institutional obstacles that limits sports industry development, cultivate and improve the digital sports quality. The creation and improvement of a complex fitness service system is the cornerstone and basis for ensuring sports power realization.

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Analysis of the latest research and publications, from which the solution of this problem was initiated and author rely

The smart sports products and solutions offered by Geling Shentong have achieved great results in serving the national team, improving the performance of athletes and training efficiency. Since then, Geling Shentong's business planning has entered sports-related scenarios. Working with the national team, Geling Shentong accumulated valuable experience in the professional sports service field, and later extended this proven scientific receipt to sports training on campus. The best sports industry experience in digitalization conditions have been analyzed using the example of highly developed countries as China, USA, and Japan. In 2019, to better serve the Winter Olympics, the Beijing Municipal Government took the initiative to establish the Artificial Intelligence Sports Research Institute together with the Capital Physical Education Institute. The Shentong Atongmu Sports Training and Exam System is an "Artificial Intelligence Teacher Assistant" with intelligent management capabilities. Thanks to the sports brain support with artificial intelligence, even in complex environment with obstacles, it is possible to accurately capture the student's movements within 200 ms. NASCAR, a popular auto race in the US, uses race management software developed by Microsoft that collects game data and organizes it into an easy-to-view format. At World Cups, the VAR (Video Assistant Referee) system can minimize the number of false judgments in football matches. At the recent Education and Sports Exhibition in China (Nanjing), a new series of Geling Shentong sports products were introduced, and three new ones were introduced for the first time, which announced that artificial intelligence technology will be used to enhance sports opportunities on campus. As an important branch that helps Deep Tong achieve revenue growth and expand application boundaries, the sports health business has combined Deep Tong's three strengths: the power of the stage, artificial intelligence, and competitiveness.

Highlighting previously unsolved general problem parts, the specified article is devoted to

Digital technologies contribute to the sports industry prosperity. The combination of digital applications and the sports industry can contribute to the kinetic energy transformation in the sports industry, form the industrial development trend with innovation as the core, and realize the leap sports industry development. The combination of the sports industry and digital technologies meets the needs of the sports consumption masses, optimizes the market resource allocation with technological innovation, improve sports industry development in the integration of new styles and formats, and leads to the birth of a large number of sports-related companies, platforms and applications. Personalized fitness programs in some applications have increased users' interest in fitness and reduced the cost of fitness, which has played a role in the development of national fitness. Based on the analysis of the current reality, many countries (China, Japan, USA) are actively promoting cross-industry and cross-format sports industry development at the state governmental level. "Internet + sport" has become the key to implement the transformation and modernization of enterprises developed by the sports industry in the digital age. In a word, digital technologies are the general trend of the global industrial sports development, which should correspond to the current global development trend.

The purpose of the research is theoretical and practical aspects of the new development sports industry paradigm in the digital age (an example of the highly developed countries experience). **Objectives of the research:** 1) analyze the sports industry development in China and explore new digital ones in sports industry field; 2) demonstrate artificial intelligence development in the Japanese sports industry; 3) to reveal new artificial intelligent development areas in the sports industry by advanced countries all over the world; 4) to find out the new NFT paradigm implementation in the integrated development of virtual reality in the sports industry.

Presentation of the main research material with justification of the obtained scientific results

1. The development of sports industry in China and new digital technologies in the sports industry field

Once upon a time, competitive sports have become an arena for technology and artificial intelligence. Many sports have begun to use artificial intelligence. Physical education is the same as Chinese math are the main subjects in educational institutions. With the rapid artificial intelligent development, used in international sports competitions, has been extended to the civil sphere. In the construction of the smart AI+ campus, physical education intelligence has become an important net. AI companies are trying to enter the smart campus. The development of AI has reached a deep-sea industry, and AI companies are taking AI capabilities and delving into all life areas

to expand new application scenarios. Smart cities are the first foothold that AI companies have found. The term "smart city" is comprehensive and covers a wide spectrum, including smart security, transportation, parks, communities, logistics, policy, healthcare and other city lifestyle. Over the past few years, the mainstream of smart cities has been crowded with people from all life walks, and AI companies have begun to look for differentiated footholds. Following the actively promoted national trend construction of smart campuses, and ones that has entered the artificial intelligence company vision. A smart campus is a miniature smart city version, modified and modernized with the smart city concept in mind, including the smart city expansion. Compared to a smart city, a smart campus is a very small social organizational unit, from a technical point of view, they all rely on technologies such as the Internet of Things, big data analysis and artificial intelligence to perform two main tasks: data collection and analysis, with decision making. efficient services and improve the existing environment.

A small campus consists of students and faculties has all infrastructural types such as security, restaurants, apartments, classrooms, event venues, medical care, education, administration and services, reasonable needs for upgrading. Many AI companies focus on intelligent campus products and supporting solutions. Companies such as SenseTime, Megvii and Baidu have focused on software and hardware video surveillant capabilities, using cameras, sensors and other hardware as vehicles to enter smart campuses and enhance classroom learning. The rest of the venture will focus on physical education teaching, physical training and teaching, as well as research inside and outside the classroom. Increasing emphasis on sports and improving health care in primary and secondary school students has become an irreversible trend for schools. The sports industry in China is becoming more and more popular, and it is becoming more and more diversified. Focusing on the human orientation concept, smart sports built with intelligence in mind already have mature objective conditions. Due to the fact that smart sports campuses are developing as a new means increasing teaching and quality levels, new requirements for physical culture are increasing. In physical education classes, the influence of the human factor is particularly evident in the preparation, plan and data collection evaluation for students. Today, when the number of tests, test tasks and equipment a varied, it is difficult to count and record them. It is often difficult for a physical education teacher to care for dozens of students, and adding teaching assistants requires a lot of manpower. The existing teaching staff is not yet able to meet the diverse needs and the new teaching physical cultural policy and sports, training high-level athletes. With the collective training method, physical education teachers are unable to scientifically evaluate and monitor the sports results of the students. For the full-time studies, it is difficult for the teacher to provide individual and special training according to the each student differences.

In addition, a large number of provinces and cities in China still face problems such as uneven teacher professionalism and insufficient number of teachers. Smart sports are based on technologies such as the Internet of Things, artificial intelligence and big data, which is equivalent to the traditional sports training, introducing an "AI assistant" with an "AI sports brain". Thanks to the artificial intelligent technology implementation in smart sports, educational paradigm has undergone a disruptive change: now it is possible not only to analyze and record the sports level of each student in real time, but also to generate data for every lesson, every training and every movement.

Formation of a personalized sport

Real-time data analysis and intelligent feedback can be provided to monitor student exercise status and formulate targeted exercise plans. This means that smart sport, which expands traditional physical education possibilities, should become a systematic project. In this regard, based on the learning, training, competition and evaluation integration, Geling Shentong launched an intelligent sports paradigm covering six main scenarios, including 1) campus medical examinations; 2) extracurricular physical education services; 3) special sports classes; 4) physical training; 5) cloud games; 6) sports training and research. The intelligent sports paradigm includes three main products: 1) Shentong Atongmu sports training and examination system; 2) Shentong Atongmu somatosensory interaction system; 3) Shentong Atongmu big data analysis system. Since its establishment in 2013, GreenShentong has achieved many technological breakthroughs, including the strong artificial intelligence technology base of Shentong Brain and the industry-leading 3D stereoscopic vision technology. Geling Shentong's 3D stereoscopic visionable technology not only reducing equipment costs, but also improving reliability and ease of use. Motion pose analysis technology can solve the inaccurate and unstable

human body key point collection problem collecting human body pose data in different scenes and use self-developed three-dimensional human body pose estimation algorithm.

Based on ten years of accumulated skills and focusing on sports business, Geling Shentong offers a paradigm focused on "sports fitness + visual gesture recognition + AI", based on 3D reconstruction technology combined with action models and human kinesiology. This set of solutions can track students' daily training and medical examination throughout the process, automatically evaluate and record the results, and finally perform automatic statistical data analysis, which not only reduces the burden on physical education teachers, but also solves traditional physical tasks. teaching education pain points that are difficult to record, track and analyze. The traditional teaching physical education method is teacher-centered one, and students passively follow guidance and activities with low enthusiasm and little interaction. In addition to teacher training, the Shentong Atongmu somatosensory interaction system also includes human-computer interactions. As one of the most advanced technologies in the world today, artificial intelligence is having a profound impact on campus sports. In sports on college campuses, artificial intelligence will play an important role, creating a smarter, richer and more personalized sports experience. With the AI development, sports can fully become an interactive game-like sport. The use of modernization theoretic Chinese-style is the China's sports modernization promotion, a new sports era, China's historical mission to accelerate the construction of a sports nation and achieve the goal of building a healthy China. It is believed that: 1) Chinese sports are the adhering result to the idea of "people-oriented development" and constantly proceses meet people's fitness and health care needs and improving people's health; 2) sports modernization, which contributes to the formation of a sports spiritual civilization; 3) sports standardization and internationalization, include practical aspects of the reform and country's sports modernization development; 4) sports modernization and comprehensive human development.

While smart sport brings modern technology and instrumental support to the physical education classroom, it not only overcomes the inadequate physical education limitations of teachers and unequal learning abilities, but also addresses efficiency and equity issues. Smart sport became a new starting point for Geling Shentong to expand its innovative business in human-computer interaction field. With the AI development, sports can become fully interactive sports, such as games. When physical education teachers throw away whistles, rulers, stopwatches, roll calls and scorebooks and embrace artificial intelligence technology, they will find that classes can become so simple and relaxing. The Shentong Atongmu camera will collect real-time video of the student's squatting, perform human body detection, and output human action key points. Because the Shentong Atongmu sports training and examination system can perform real-time scoring and violation marking, as well as provide referee tracking, the machine is more reliable and stable, so it can also ensure uniform standards and norms in AI.

2. Artificial intelligent development in the Japanese sports industry

The Japanese government sport positions as an important national industry has set a goal to increase the market to 15 trillion yen by 2025. As in 2015, the market sports industry size in Japan was ¥5.5 trillion, so we expect a 2.7-fold growth in 10 years. The sports industry is characterized by its attractive drama and broad industrial base. The sports industry is closely related to other businesses and is in close contact with various industries such as food and beverages manufacture and travel. In addition, by recording sports events and combining them in information technology, the content can be used to increase profitability. So, sports is an industry with immense potential, the trend to explore additional business opportunities using advanced AI is gaining momentum.

In addition, sports have a lot of similarities with AI in terms of their characteristics, and can be expected to be used in all scene kinds. In the following sections, we will explain in details the AI use in the sports industry. In recent years, AI has been used in all industries, and the sports industry is a prime example. The sports industry is using AI to do many things that were previously impossible. The use of AI allows you to simulate the opponent movements, which can be used to plan the strategy of martial arts and other sports. Until now, human have traditionally analyzed data based on opponents and managers formulating strategies, but the AI use will lead to data-driven strategy formulation that does not rely on experience or intuition.

By implementing AI in sports, you can:

1) formulate strategies using predictive and analytical abilities to model the opponent

movements of s, use for planning strategies in the field of martial arts and ball games. Until now, the staff responsible for the analysis analyzed the opponent's data, and the manager formulated the strategy. Apparently, it relied on human power and years of intuition, such as a trainer replicating the opponent's movements, acting as a training partner. From now on, it is likely to change to a format where the player plays or captures a strategy given by an AI that can formulate strategies for simulation.

2) player information can be viewed in real time. By implementing AI, the audience can receive data in real time. There will be more ways to enjoy watching sports events in stadiums. Currently, when players are served at match venues, information that uses data is also published, but rarely covers the data that individual viewers need. Using AI, real-time data such as opponent data, past match results and current match data can be obtained. Data visualization using AI will be able to provide the information that the audience wants.

3) You can broadcast the competition scene using a tracking drone. The introduction of auto-tracking drones for sports broadcasts will greatly increase the number of cameras compared with current live broadcasts, allowing you to enjoy the real thrill of road racing competition. Automatic tracking requires the collection of basic data to predict the player's movement and assess the environment, so many tasks must be implemented. However, surveillance drones can also provide data to viewers at the same time. Viewers can also follow only the players they want to support. You can say that a detailed athlete broadcast who keep move is the commentary style that viewers who can't make it to the stage are looking for.

4) You can understand the situation with traffic jams. AI predictive analysis allows you to check the event and competition statuses. Fields where many spectators and participants gather will be overcrowded, particularly with staff. At that time, AI predicts the people movement based on data such as information about the smartphone location and the ticket use status offices at the station. If an overload situation is foreseeable, the operator can take appropriate measures, such as staffing. Eliminating traffic jams will make spectators more comfortable, reduce dissatisfaction with the event and reduce the burden on management staff.

5) can be used for scoring competitions. Currently, digital devices are used to officiate ball games, but AI is also expected to use in scoring competitions that rely on human judgment. Referee preferences can affect score in events such as gymnastics and figure skating. Thus, if performances are digitized and score rules are clarified, fair judging will become possible. It will be easier for viewers to understand the evaluation criteria and you will have more fun than ever.

6) there is a possibility that player's accident can be predicted. It is not suitable for young athletes with little data, but with a large amount of data, such as veteran athletes, it can predict injuries and mental disorders. By analyzing training menus, game situations, physical By analyzing training menus, game situations, physical condition, injury history, etc., it is possible to predict to some extent the situation in which injuries will occur. AI will take over the conditioning and psychological support, which until now depended on the experience of the players.

7) learning with the help of AI becomes possible. AI can also determine the position of baseball, football, etc. instead of the coach. The order in which the ball is hit and the timing of the decision to serve determine the course of the game. The observation and experience of managers and coaches is also hard to get rid of, but AI theorizing also motivates players. When used in amateur competitions, players are expected to grow through successful experience, eliminating coaching staff dissatisfaction with player assignments and strategies. This is also useful information for coaches. In fact, AI has already been implemented in various sports. At first, many coaches focused on data, and athletes used their own equipment to record their performances and games for reference. Currently, software companies are beginning to use data to increase the entertainment value of spectators and increase the efficiency of competition and event management. The development of programs for sports fans is also popular.

3. New development directions of artificial intelligence in the sports industry by advanced countries all over the world

We will present new implementative AI directions in the sports industry, that began to be used with digital technology application.

1) Predict the development of the game. A media tool has been developed that uses AI to predict the situation in a football match. "SPAIA toto" predicts the status and result of matches intended for toto based on accumulated data. A wide range of data is studied and developed of the games is simulated 100 times increasing the predictive accuracy.

Predict the sequence of the match, for example, the movements of the starters and players. There are many predictors the rampant development risk, such as player grooming and weather;

2) determines the ticket price. The Chiba Jets, a professional basketball team, have implemented "dynamic pricing", in which artificial intelligence changes ticket prices based on demand for each game. We analyze big data such as game schedules, opponents, seat types and individual preferences and calculate our own prices based on past ticket price records. In order to suppress resale prevention, this system can be weakened by making price fluctuations independent of the purchase time;

3) provides psychological support to athletes. With psychological support, you can motivate players. "Vi" is a headphone-type device that measures, accumulates and analyzes running data such as heart rate, road gradient and speed. Based on the results of the analysis, you will also be able to get answers to the questions you are interested in using the exercise menu. It is said that high results can be achieved by maintaining a solitary practice mentality while also recording sleep times and lifestyle habits;

4) checks the status of the player. There's also an app that measures your heart rate and more with the wearable you're wearing, checks and keeps track of your health. WHOOP also measures exercise fatigue and recovery from sleep. Based on the results, it calculates the amount of sleep you need and suggests the ideal time to wake up. Recommendations for the menu of exercises and the number of exercises are also displayed, as well as the level of goal achievement. Performance can also be fine-tuned, and this app can be used by professional athletes, regular people, and gyms alike;

5) develop a training menu. A program has been developed that uses AI to suggest nutrition menus according to the level of athletes. "Food Coach" is an application that allows you to receive nutrition recommendations from a sports nutritionist. You can calculate the nutritional value of the food you eat based on various food data and make suggestions depending on the situation, for example before or after the game. Sports have relied heavily on data for strategic planning, but AI is still in its infancy. By implementing AI, players can get support for training menus and conditions. The coaching staff will be able to use support players. Spectators can enjoy more spectacular competitions by viewing the data they need, and organizers can run events efficiently.

With program advent that can be used by non-professional sport fans, the collaboration between AI and sports is endlessly expanding. In addition, some companies actively use AI mainly for sports videos, for example, to edit highlights of sports videos using AI. Why not consider companies looking to expand their sports business with AI? The Australian company CATAPULT sells GPS devices for sportsmen. The device is worn on the upper body and can measure the player's movements using a sensor attached to the back. Particularly, in addition to mileage and speed, detailed movements such as acceleration, deceleration, body tilt and change of direction can be recorded. This data can be analyzed by the program and can be used to consider tactics and prevent injuries. Particularly, nursing a player through an injury is a huge waste of energy and investment, so it is important to manage the players condition and prevent injuries. CATAPULT products are used in various sports, mainly football, as in 2020, they are used by more than 2,970 teams in more than 150 countries around the world.

Mizuno's Swing Tracer is a device that attaches to a baseball bat and analyzes the swing. By attaching the nozzle to the handle end, it can be easily installed. The following eight points can be analyzed: 1) swing time (time from the start of the swing to hitting the ball); 2) the swing turning radius is maximum; 3) head speed – change of speed before hitting the ball), rolling (bat rotation), swing trajectory. You can check the measured data in the app, and you can see the movement during the swing and the bat trajectory as an animation from your favorite point of view. You can use it to improve your fitness and record your training, or use it as a player database to help you think about tactics (Oleksenko K., 2018).

The Suntory Sungoliath rugby team uses a DJI Inspire1 aerial drone to analyze video games and training sessions. The drone can shoot from an optimal position according to the athletes' movements, so it is possible to shoot movements that are difficult to see from a fixed point in three dimensions. This allows accurate flow analysis of precise movements and passes, resulting in improved tactics and improved coaching. In addition to rugby, drones are being implemented in various sports. In football, the shape is analyzed by shooting from the sky, and in baseball, this shot is analyzed by three dimensions. In addition, it is expected that more advanced analysis will be carried out by combining with each player's

wearable sensor and that it will be used to prevent heatstroke by taking pictures with a thermal camera. The Internet of Things is changing the way we watch sports. If you go to the store to get food and drinks while you're watching the game, you may miss important scenes while you move or wait in line. To prevent this, we have made it possible to order at your location and receive it at your location. You can place an order by scanning the QR code attached to your seat using your smartphone. As it is filled in the browser, it can be used without downloading the app and there is no need to enter a seat number or register as a user. Sellers no longer have to walk around to find buyers, that results in a reduced workforce. The management side can accumulate data about purchases in the log form, analyze them and improve the product line.

This is an NTT Group project that uses ICT to provide new services and content at stadiums. We provide "ARDIJA FREE Wi-Fi" as a high-density Wi-Fi service that allows you to comfortably use the Internet and watch high-definition video programs. In addition to game coverage, the program will include player-specific videos and game-related support programs. There is also an event where you can see the shooting from the point of goalkeeper view using virtual reality. MOALA Ticket is a service that allows you to issue electronic tickets on a smartphone and log in. It eliminates the hassle of issuing paper tickets and you can easily share it with your companions on social networks. Tickets are issued together with LINE accounts, etc., which helps prevent resale and unauthorized use. The e-ticketing chat allows you to share plans during the event and can also be used as a means of communication between the administration and visitors. In addition, MOALA Ticket has an international patented technology called "Electronic stamp", which allows you to put a stamp directly on the smartphone screen. As a result, it can be used in conjunction with paper tickets and entered without the need to create a dedicated e-ticket lane. Come on It is a sport in which AR is used for competitions using beams and barriers. The main display is attached to head and sensor is attached to the hand. You can earn points by fighting in 3vs3 battles, using techniques, cooperating with allies and dealing damage to the enemy. HADO is gaining popularity all over the world, and official tournaments are regularly held both in Japan and abroad. Expertise centers are also deployed in various countries, as in September 2019, are located in 65 locations in 26 countries around the world. HADO is also a Superhuman Sports Association certified sport. The Superhuman Sports Association is committed to reinventing sports with modern technologies, creating and researching new sports. In addition to HADO, various competitions using technologies are introduced, so please check the site.

We have introduced a new way of playing sports game that uses the latest technologies such as informational one, artificial intelligence and augmented reality. In recent years, there has been an increase in the number of venture companies with sports technologies, such as sports medicine. "SPORTEC2020' opportunities in the new sports industry. In addition to app-linked exercise equipment, there are home workouts, app-based programs and recommendations from world-class trainers who are in remoted areas using connectivity while staying at home, likely due to the coronavirus infection effects. There were also boots dedicated to systems that allowed users in remote areas play sport games at the same time, as well as the Maishima Project, a collaboration between professional sports team and a private company based in the region, and the application of sports technology in medical care. Made us realize the sports industry expansion. Receiving information about the player in real time. Player information can still be obtained, but the detailed data that individual viewers need is not considered. With the AI introduction, it will be possible to get detailed player data in real-time, so you can instantly get data on the match in front of you. This will expand the opportunities through which people can enjoy watching sports and enrich the sports viewers' experience. Some sports are difficult to broadcast because the athletes' movements are very intensive. A typical example is road racing, where drones with AI-based automatic tracking are expected to be effective. By introducing drones with automatic tracking, you can see more realistic images and bring additional benefits to sports spectators. Predictive AI analytics can be used to predict how crowded sports venues will be based on historical data. As a result, from the point of sports spectators' view, this will become the basis for making a decision to travel to the event venue, and from the point of operators' facility view, it will be possible to allocate the appropriate personnel. By accumulating and analyzing past data such as training menus, match results, physical condition and injury history for specific players, AI can automatically predict injuries. In the past, athletes themselves made subjective judgments, but

with the AI use, it is now possible to understand the conditions from objective point of view.

4. Introduction of the new NFT paradigm in the integrated development of virtual reality in the sports industry

NFT in English "Non-Fungible Token" is translated as a non-homogeneous token, which is a block of data stored in a blockchain digital ledger. An NFT is a digital document of ownership stored on the blockchain. This is a certificate that confirms that the file exists in only one instance and is the original. NFT trading, like cryptocurrency trading, is done through the blockchain network. In NFT transactions, information about the buyer, seller, transaction amount is open. NFT as a blockchain technology can be used in many areas, including the sports industry. In the era of the digital economy, the influence of a new paradigm based on technological innovation, born of digital transformation, is growing day by day. Being another achievement of technological development in the era of the digital economy, NFT has broad prospects for application in the sports industry. The management improve the development of sports games and at the same time creates a new model of sports production, bringing new economic formats and business models to the sports industry, promoting the further digital development of the sports industry, and helping the modernization and transformation of the sports industry. An NFT is represented as a set of time-stamped metadata on a blockchain that has a unique focus with a specific digital file stored in cyberspace and realizes the value of the data content by anchoring the flow of digital assets.

The NFTs emergence provides a new paradigm for the creation, issuance, storage, transaction and use of digital assets, realizing a major paradigm shift from the Internet of Information to It's Value. NFT has a wide range of application advantages and development prospects in the sports industry. The sports industry will no longer be just athletes, tickets, event peripherals or other things related to sports facilities, but will become a world full of digital information and asset value. First of all, NFT helps to expand the new space in the development of the sports industry. First, information products expressed in intangible form can be quickly distributed through simple copy and paste operations, consumers can buy rather than just watch the highlights of their favorite sports, realizing the sport consumption transformation from static sports products to digital dynamic content. Secondly, NFT helps shape a new format for the sports industry development. Through cooperation with various digital technologies such as NFT, cloud computing and digital doubles, an interactive mechanism is created between the audience, athletes and sports events, so viewers can watch sports events in a visually exciting three-dimensional space and through NFT. This provides an opportunity to increase the variety and efficiency of sports products and services, break the established thinking of the traditional ones industry, realize the co-creating sports events value and its consumers, promote the structural sports industry modernization. Third, NFT helps to give new impetus to the development of the sports industry. In the information society, everyone is a producer, creator and informative consumer. The decentralized nature of NFTs allows sports companies, clubs, athletes, fans and other entities quickly and easy participate in the sports market, make reliable transactions without the need for third-party intermediaries, and realize the transactions publicity and reliability of digital sports products (Oleksenko, K., & Khavina, I., 2021).

Currently, the most widely used NFT in the sports industry is digital sports collections. The birth and growth of this new sports consumption form not only lowers the entry barrier for sports collections, but also opens up a new one. As an important sports culture and consumption parts, collections occupy an important place in the its industry. Traditional sports collections mainly include various trophies and medals for sports competitions, consumables and souvenirs for major events such as the Olympic Games and the World Cup, sports memorabilia and sports clothing, other tangible goods. NFT digital collections are specific digitized works, artworks and goods that are uniquely identified using blockchain technology, including digital paintings, images, videos, music and others. The NFT digital collection application in the sports industry has brought a new experience to the sports consumer and sports collection market, bringing sports collections to the technological revolution forefront and disrupting people's sports collection notions.

NFT sports collections not only include content similar to traditional sports collections, such as digital medals and memorable from major events, but can also have dynamic content, such as digital star maps and video clips from sport events. These sports collections can be created and developed not only by official organizations such as International Olympic Committee, but also by content developed by athletes or sports fans themselves. Compared

to traditional sports collections, the digital sports collection has many advantages, such as in-depth study of the value of the personal brand of sports stars and establishing a closer relationship between fans and clubs. In the traditional environment, most of the revenues from the sports industry are collected by a few high-ranking brokers and related intermediaries in the industry. NFT sports collections can carry out direct transactions between consumers and athletes or official publishers, and collectors do not need to open a separate collection space to bear the trouble of maintaining the collection, and the threshold of technical operation is low. site for mobile phones. The digitization application in the management of sport events has become more common, and NFT provides more opportunities for sports events in the digital economic era.

NFT can greatly alleviate the ticket fraud problem for sport events. With blockchain technology, ticket issue and transaction behavior are recorded on chain and cannot be altered, ensuring the ticket authenticity and prevent the creation of counterfeit tickets. The issuer can also use smart contracts to define business rules such as ticket sales, transactions, and destruction, such as no resale, resale price limits, etc., through the automatic smart contract execution so that each participant automatically follows relevant rules. And each ticket resale will capture the change in the asking price on the network to create a more open and efficient ticketing market. More importantly, NFTs can provide new revenue opportunities for event tickets. By converting different ticket types into NFTs, the ticket collection value will be further explored. At EURO-2020, they started issuing digital tickets in the NFTs form. In addition to the application in ticket management, the NFT application in event management also provides a new way for the development and operation mode of sports events, realizing the transition from information dissemination to stage interaction and bring great benefits to the sports development. The organizer of the 2022 Australian Open Tennis Championship will integrate NFT with sport events and launch several NFT tennis balls. Each ball's metadata will be randomly associated with different areas on the tennis court during casting. The winning point falls in the space allocated by the owner, and the metadata of the NFT tennis ball corresponding to this area will be updated in real time to record the game information and report the rewards received by the owner. By combining the first NFT tennis coinage with real-time game data, fans around the world can participate in the game in a unique way. The country has also begun further exploring the combining blockchain technological possibility with sport events.

Informational technologies represented by blockchain, big data and algorithms are increasingly being used in the sports industry. As the latest development in blockchain technology, NFT's uniqueness, tamper-proofness and traceability have enabled the digital sports content activation, giving new impetus to the deep digital economic and sports industry integration. Currently, the NFT application in the sports industry as China, Japan, and the United States is still in the research period. On the one hand, it is necessary to encourage technological innovation and the application of NFT to expand the future development space of the sports industry. Many problems related to the NFT application in the sports industry cannot be ignored and must be prevented from various perspectives, such as government supervision, platform responsibility and technological management, to achieve the balance between encouraging innovation and preventing risks. Only by overcoming the inherent thinking paradigm, actively embracing and participating in the NFT integration and the sports industry construction, the sports industry can open a new era in the integrated development by virtual reality.

Research conclusion and prospectives for further research in this direction

Sports continues to integrate with other industries through digitization, informatization, network and intelligent technologies that can contribute to economic development in general and lead the sports industry to new glory. The digital sports industry provides an important opportunity to solve optimization problems and modernization of production and insufficient innovation motivation in sports development in a new era. AI is an Artificial Intelligent abbreviation, the artificial intelligent reproduction of, computers have been introduced into the sports data analysis, it is expected that that expanding the sport possibilities. As artificial intelligence is implemented in sports, athletes and coaches could plan strategies and manage their physical condition. Spectators can also use it to get information about competitors. So far, AI has been used for data analysis and referee evaluation, but with the AI development, it is expected to be used more than now.

The sports manufacturing industry is the largest sports industrial branch. In the digital economic era, manufacturing companies have also begun

to follow the digital transformation trend, using new technologies to promote the development of the sports goods manufacturing industry and the intelligent manufacturing and customized tailore realization. The NFT emergence has brought new changes to the sports manufacturing industry, improve the sports manufacturing industry transformation from traditional physical manufacturing to virtual manufacturing, and provide consumers with diversified products and services. The NFT applications in the sports manufacturing industry take the collectible digital form of sports goods, and can also have its equipment that the owner wears and uses in a virtual sphere, such as in video games or in virtual world. Through the issue and NFT digital assets circulation, each entity can actively participate in the sports ecological construction to fundamentally change the development system and logical movement of the traditional sports industry based on institutional trust, breaking down barriers to the value circulation, and bring more benefits to sports industry.

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НОВА ПАРАДИГМА РОЗВИТКУ СПОРТИВНОЇ ІНДУСТРІЇ В УМОВАХ ЦИФРОВІЗАЦІЇ (НА ПРИКЛАДІ ДОСВІДУ ВИСОКОРОЗВИНУТИХ КРАЇН СВІТУ)

Анотація

Актуальність дослідження цифрової спортивної індустрії у тому, що вона представляє новий спосіб нарощування спортивної потужності та реалізації комплексного розвитку нової парадигми спорту, яку представлено як розумну трансформацію фізичного виховання в епоху цифровізації. Нами досліджено цифрові інновації спортивної індустрії, які є пріоритетом національного розвитку високорозвинутих країн Китаю та Японії, що розвиваються у контексті реформ та модернізації спортивної політики на державному рівні. «Індустрія цифрового спорту» забезпечує безперервну інтеграцію спорту та технологій, культури, медичного обслуговування, догляду за літніми людьми, всебічно стимулюючи трансформацію та модернізацію галузі, сприяючи економічному розвитку та спортивної потужності. Мета дослідження – теоретичні і практичні аспекти нової парадигми розвитку спортивної індустрії у цифровому столітті (на прикладі досвіду високорозвинутих країн). Завдання дослідження: 1) проаналізувати розвиток спортивної індустрії у Китаї та дослідити нові цифрові технології у сфері спортивної індустрії; 2) продемонструвати розвиток штучного інтелекту у спортивній індустрії Японії; 3) розкрити нові напрями розвитку штучного інтелекту у спортивній індустрії передових країн світу; 4) з'ясувати упровадження нової парадигми NFT в інтегрованому розвитку віртуальної реальності спортивної індустрії. Цифрова спортивна індустрія не тільки забезпечує зручні умови для спортивної індустрії, але також надає безліч продуктів і послуг для користувачів мережі, що займаються серфінгом в Інтернеті. Вона може здійснювати поширення інформації про спорт та здоров'я, коли поширення спортивних знань система неспроможна задовольнити потреби. Поглиблене застосування цифрових технологій у сфері спорту змушує країни посилювати популяризацію нових технологій та засобів у вигляді технологічних оновлень, підвищувати цифрові можливості та інтернет-грамотність у різних сферах спорту, щоб усунути інституційне створення перешкод для спортивної реформи та розвитку «спорту для людей». У нових умовах технологічного застосування цифрові технології широко використовуються у спортивних змаганнях, масовому спорті та дитячо-юнацькому спорті, підвищуючи інтелект, зручність та широкий спектр спортивного розвитку, розвиваючи універсальність, щоб сприяти популяризації спортивних концепцій, поінформованості про здоров'я та просування концепцій спортивної культури.

Ключові слова: спортивна індустрія, цифровізація, штучний інтелект, кампус, фізичне виховання, розумний спорт, нова парадигма NFT, Китай, Японія.

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