A Study on the Application of Digital Technology in Large-scale Events Risk Management

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Abstract: China advocates high-quality industrial development and industrial digitalization, and digital technology urgently needs to empower the high-quality development of sports service industry. China advocates high-quality industrial development and industrial digitalization, and it is urgent for digital technology to empower the high-quality development of sports service industry. However, there is still no gap in the theoretical and practical research results on the improvement of digital technology technology efficiency in the risk management of large-scale sports events. This paper uses WSR methodology to analyze the application effect of AI in physics, reason and human reason in event risk management, with this mechanism combined with the theoretical framework, specific suggestions for the improvement of scientific and technological efficiency are put forward for the AI technology in the case.

Keywords: Large-Scale Events, Digital Technology, Artificial Intelligence, Event Risk Management.

1 INTRODUCTION

May this year, China gave up the right to host the men's Asian Cup as the organization of the competition was inconsistent with China's concept of putting the first in epidemic prevention. Moreover, in the next ten years, including the Olympic Games, the Women's Asian Cup and the Men's World Cup. China to reduce the occurrence of the number of large events phenomenon is not suddenly, survey nearly 40 years China to undertake the number of large events, ten years ago, the pursuit of quantity has begun to appear fade, this does not mean that the development of large events in our country gradually decline, but our country large events by quantity growth to high quality development gradually transition in the process of profile. We can also see something different from the changes in the development policy of the sports industry. In 2019, The Office of The State Council issued the Opinions on Promoting National Fitness and Sports Consumption and Promoting the High-quality Development of the Sports Industry,[1] (No.43), which adjusted the goals and priorities of the development of the sports industry under the new situation. Compared with the "Several Opinions on Accelerating the Development of Sports Industry and Promoting Sports Consumption" (No.46) issued by The State Council in 2014, the current development focus of China's sports industry has shifted from "rapid

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development" to "high-quality development". In the specific measures proposed, it is prominent in enriching the objects of policy adjustment and attaching importance to the acceleration of the development of sports service industry. With the advance of the supply-side structural reform, it has shifted from satisfying the demand side to focusing on two dimensions: the guarantee of the supply side and the activation of the demand side. In improving industrial structure, it is proposed to vigorously cultivate service industry, innovate business model and extend the industrial chain. By 2022, the added value of the sports service industry should account for 60% of the added value of the sports industry. Behind the change of the development direction of large-scale events is the repositioning of the functions of large-scale events under the adjustment of the national development strategy. Different political and economic system in China and western developed countries, has long been our country for large events to promote the function of international communication work more attention, due to our country to undertake large event market participation than developed countries, compared to the host city GDP contribution rate can be seen, the role of industry and urban development is relatively limited. With the rise of China's comprehensive national strength and the effective promotion of international communication, the main functions of large-scale events have shifted to vigorously promote the development of cities and sports industry, and large-scale events have moved towards a new stage of high-quality development.

Time of Operation	Host Country	Host City	Contribution rate to the GDP of the host city
1988	South Korea	Seoul	1.4%
1992	Spain	Barcelona	2.9%
1996	The United States	Atlanta	0.07%
2000	Australia	Sydney	1.0%
2004	China	Beijing	0.3%
2008	The United Kingdom	London	1.7%
2012	Russia	Sochi	0.83%
2016	Brazil	Rio de Janeiro	2.1%

Picture 1. The contribution rate of the previous Olympic Games to the GDP of the host cities

2 LITERATURE REVIEW

Combined with the international research in related fields, it is found that there is still a big gap in the depth of research on how to improve the efficiency of digital technology. In addition, the practical experience at home and abroad inspires us to study from the perspective of supply and demand matching, which is more in line with the current situation of China's economic development and the national development strategy. Zhao Wenting (2022) using the evolution of international sports industry research theory hot spots and practice frontier dynamic, found that the depth of the international sports industry and high and new technology fusion is mainly reflected in areas such as sports competition, and points out that at present our country in this aspect of research and practice is still mainly stay in the concept and form of cross-border accumulation [2]. Dang Ting (2022) analyzed the experience of the digital transformation practice of foreign sports industry, pointed out that the digital transformation changed the core business form of the sports industry from experience-driven to technology-driven, and proposed that China should take the matching between supply and demand as the main direction of the

digital transformation of the sports industry. Li Bo pointed out that China's sports industry has long had a shortage of effective supply and excessive ineffective supply dislocation, and the sports service industry should grasp the current national development of the tertiary industry and the supply side reform to achieve leap-forward development[4]. To sum up, this study tries to explore the mechanism of improving the efficiency of digital technology of large-scale events from the perspective of supply and demand matching in the dimension of large-scale events, in order to enrich the efficiency of diversified digital technology and complex large-scale event management business, and provide reference for the high-quality development of large-scale events.

3 WSR METHODOLOGY ANALYSIS OF AI TO OPTIMIZE THE EFFECT OF EVENT RISK MANAGEMENT

3.1 The WSR Methodological Analysis Framework

WSR methodology [9], namely physical matter and human theory methodology, was jointly proposed by researcher Gu Jifu and Dr. Zhu Zhichang methodology in 1994, and has been listed as "integrated system methodology" by ISSS. The WSR methodology is a system methodology or system thinking method, and it is applicable to complicated systems.

The risk management of large events is a enormous and complicated system, involving complex management objects, covering people, things and things. In recent years, due to inappropriate risk management, numerous unexpected events have caused severe consequences and adverse effects, which have put forward higher requirements for the risk management level of the sports events. However, there is no authoritative assessment system and standard process established in the field of risk management of large-scale events in China, and there are almost no such products in the market. Hikvision AI security products have significant technological efficiency in the event, and have become an efficient risk management tool. Therefore, based on its product characteristics, this paper analyzes the technological effectiveness of AI security in large-scale event risk management with the help of WSR methodology.

3.2 A Brief Description of the AI Operation Mechanism

AI --Artificial Intelligence, In computer science, AI is the intelligence displayed by a machine, known as machine intelligence. Colloquially, the term "artificial intelligence" is used to describe machines that mimic the functions of human "cognition", such as "learning" and "problem-solving". Data-centered machine learning makes data sharing and movement become simple, it regards data as durable basic assets, by compiling a substantial amount of data, the data preprocessing, and then cycle "machine learning modeling-training-evaluation-parameter optimization-training-evaluation-machine learning modeling" process, eventually release application.

3.3 WSR Methodological Analysis of Event Risk Management Efficiency

Hikvision is the official intelligent Internet of Things and big data service sponsor of the 19th Asian Games in Hangzhou in 2022. Asian games organizers signed hikvision, in intelligent command, intelligent security and security, intelligent traffic scheduling, based on several intelligence base power build "panoramic visual, risk prediction, efficient command, agile response" the innovative application of many scenarios, for athletes from various countries and regions, spectators, volunteers, organizers to provide high quality service.

Using AI technology to structure data to create value is the core of Hikvision's products. With video as the core, AI technology is equipped with cutting-edge algorithms to create the overall solution of the Internet of Things and support the linkage between the front and rear end. The huge and rich source data is structured so as to deeply mine the value of data and realize a variety of functions. According to the data based on the AI operation process, the advantages of hikvision AI security series product analysis: first, in the data collection stage, such as "deep eyes" intelligent camera with binocular stereo vision and behavior analysis algorithm, can be extracted in environmental characteristics can extract more rich, more suitable for the characteristics of the parameters, so as to achieve stronger ability to resist environmental interference. Then, in the pre-processing stage, such as the "Superbrain" series NVR, it can extract features with high-order semantics and strong expression ability from the original data, making the accuracy of identifying classified objects higher and effectively improving the value of video. Finally, in the stage of machine deep learning, after training based on enough samples, AI can achieve more accurate target classification identification and autonomous feature recognition, which is especially suitable for abstract and complex analysis of human characteristics and behaviors, and meet the needs of deep-level data value mining. For example, the "Facebook" series of face analysis server, can realize accurate face recognition, 1v1 comparison, identification, control alarm, real-time capture of suspicious targets and other functions. AI security series products have the advantages of comprehensive structured data, deep intelligent algorithm, front and background integration. The data characteristics in the field of risk management of large-scale events are very close to those in the general security field. Therefore, Hikvision's AI security series products can enable the application construction of Asian Games with scientific and technological efficiency in large-scale events and serve the risk management of large-scale events.

From the perspective of WSR system methodology, the risk of sports events can be divided into three categories: physical dimension risk factors, physical dimension risk factors and human dimension risk factors. Next, Hikvision intelligent game watching products analyze the scientific and technological effectiveness that AI security can play in the three risk management dimensions.

3.3.1 Wuli Dimension

Wuli in WSR methodology refers to the objective existence that people face in the problem processing process of a certain system project, which is the sum total of the laws of material movement. The threat factors at the wuli level of large-scale events mainly include environmental variation risks, venue and facilities risks, and event protection risks. In the Asian games, AI security can be based on the cloud platform, implementation and Hangzhou use city, transportation wisdom, wisdom, wisdom medical services such as data sharing and circulation,

to the environment of urban intelligent monitoring power events of natural disasters timely warning and continuous tracking outbreak hierarchical control, implementation of environmental variation risk timely warning and processing. Hikvision's "Facebook" series of face analysis server, can realize accurate face identification, 1v1 comparison, identification, control alarm, real-time capture of suspicious targets and other functions.AI security with video stereo vision combined depth intelligent algorithm layout wisdom, can control the location construction quality, rich venues wisdom function, rapid scheduling facilities, etc., for security and location epidemic prevention [9] and control, AI security in addition to basic face recognition, also can intelligent analysis across the cordon, wandering, running detection, the number of abnormal detection abnormal detection, spacing detection, strenuous exercise, leave detection, ground detection, stranded nine behavior, so as to realize the venue facilities risk and event security risk prediction, real-time control or avoid.

3.3.2 Shili Dimension

The principle of WSR methodology refers to the mechanism of objective existence and its intervention in the process of handling the problems of a certain system project. The risk factors at the wuli level of large-scale events mainly include event operation risk, organization and management risk, and information dissemination risk. AI + security innovative camera technology and cutting-edge algorithm can adapt to various scenarios, meet the needs of high-speed camera, diving, ball and other different events, zoom, precision, trajectory prediction and other functions, assist judges to make a more fair and more credible judgment, and reduce the risk of event operation. Hikvision's "Superbrain" series NVR can extract features with high-order semantics and strong expression ability from the original data, which makes the accuracy of identifying classified objects higher and effectively improves the value of video.AI security multidimensional information in the form of video, can greatly reduce the risk of distortion in the process of information transmission, blocked, and in the background algorithm for intelligent analysis, for decision makers to collect more comprehensive, objective, structured information, in various departments, complex process of large event management process, auxiliary science, efficient decisions, and based on cloud platform to realize real-time information sharing and rapid transmission, improve the efficiency of upload and department collaboration, realize timely response to emergencies and rapid and scientific processing, avoid the risk of information dissemination, and organization management risk.

3.3.3 Renli Dimension

Renli principle in WSR methodology relates to the interrelationship and the changing process of all the people involved in the problem processing process of a certain system project. The risk factors at the wuli level of large-scale events mainly include personnel relationship risk, financial management risk and legislative risk. On the basis of video surveillance, AI security can analyze human behavior and face expression, identify abnormal behaviors or crowds, and predict unexpected crowd conflicts or riots in advance. Video as the core of the AI security through the camera as the intelligent terminal of the Internet of things, build event scene digital twin, on the basis of insight, control, optimization of management and creation, timely meet the different national government personnel, coaches, athletes and other event participants demand, provide more tailored, humanized service, at the same time reduce the relationship and financial

risk. AI security linkage real-time camera and background intelligent analysis and storage, for tournament interrogation institutions provide intuitive and accurate evidence to assist judgment, to support the police in different scenes of face, behavior, traceability, will involve legal, moral, ethics, event cases as far as possible to reduce the influence of the impartiality, reduce the risk of event legislation.

4 MECHANISM REFINING

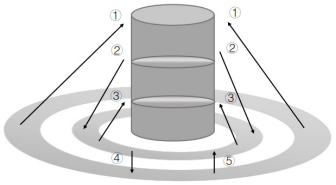
Event management and digital technology are characterized by high research and development risk, high application cost and long preparation cycle. The current efficiency improvement of shallow and decentralized digital technology will cause two problems: first, the new technology and the need to continuously run in with the old business process, which limits the full play of efficiency; second, the ecological formation of technological innovation and service upgrading, the lack of endogenous power, the sustainability of efficiency improvement is limited, and the process of industrial digitalization will be blocked. Even if the breadth of digital technology application coverage increase, various digital application scenarios, level between no systematic organic combination, then digital enough deep, efficiency can only be a form of "smart", does not achieve the true sense of "wisdom", events of high quality development may be easy to encounter bottlenecks. Reference to other industry digital experience, digital technology innovation is the industry the original management, marketing, system, process, concept of innovation, rather than the digital technology only as a new tool to use, single, the surface of the innovation cannot form a positive cycle, promote the industry sustainable development, efficiency promotion is also very superficial, short.

4.1 Mechanism Advantage

The internal and external double-ring mechanism is characterized by the dual subjectivity of the elements and the mobility of the ring structure. Its advantage is that the double subjectivity to comb the main body of supply and demand, has been clear about the fundamental demand of event management link, and the event management link execution process to distinguish as a supply factor, no longer just digital technology one-way to serve the existing execution process, but emphasize two supply factors dynamically mutual adjustment, jointly form supply products, to meet the demand of event management link at all levels. This can not only stimulate the improvement of event management efficiency, but also enable digital technology to give full play to different advantages at different levels. In the process of continuous adjustment and matching of digital technology and event management, the degree of digitalization of large-scale events will be deepened. The liquidity of the circular structure comprehensively considers the internal and external factors affecting the supply and demand, and enriches the dimension of adjusting the matching between supply and demand. The value generated is constantly accumulated in the closed loop to form the driving force to promote product innovation, and supply and demand tend to match, making sustainable development possible.

For digital technology, multi-level demand expands a great space for technology play. Accurate demand and timely application feedback provide direction guidance for continuous innovation, which is conducive to the improvement of scientific and technological efficiency at the

application level. Continuous funding sources and rich application scenarios can promote the technical efficiency of its technology.



① : Elements in the outer ring form multi-level requirements for a certain link in the management of large-scale events.

② : The inner ring elements adjust supply under the guidance of different levels of demand.

③ : After the inner ring elements are adjusted to each other, the products with high matching degree can be supplied to meet the needs of all levels.

④ : The inner ring supplies high-quality race service products to the outer ring, and circulates and generates value in the outer ring elements.

⑤ : The outer ring invests funds into the inner ring to promote the innovation and iteration of the inner ring elements and put forward new demands.

Picture 2.A Schematic diagram of the element interaction

4.2 The Power of the Mechanism in Operation

4.2.1 Elements and Factor Structure

Endogenous motivation is the value realization of event management and digital technology. In the process of pursuing supply and demand matching, the efficiency of competition management has been continuously improved, digital technology products have been constantly optimized, playing a role in large-scale events to realize technical value and increase the value in the market, thus promoting the continuous innovation of digital technology and improving the efficiency of science and technology. The external push is investment by markets, the government and society. External tension is the consumption of the market and the expansion of the downstream application of the industrial chain. For example, after the use of the venue, some technology transfer during the competition is applied to leisure, education, education, health care, etc. Large-scale sports events are located in the upper and upper reaches of the sports industry chain. High-quality sports event products can accumulate value along the industry chain and drive the development of the downstream and even the whole industry.

5 AI STRATEGY OF IMPROVING TECHNOLOGY EFFICIENCY IN LARGE-SCALE EVENT RISK MANAGEMENT

As for the improvement of technology efficiency of digital technology in large-scale events, this paper believes that from the perspective of supply and demand matching, digital technology optimizes supply to guide the demand of large-scale competition management, and to expand the breadth and depth of digital technology efficiency in the application of different levels with hierarchical demand. Specifically, through with large event management link execution process mutual adjustment, respectively meet the demand of all levels, improve the

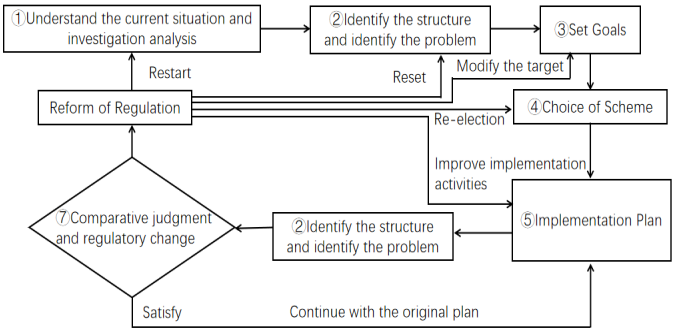
supply and demand of matching degree and on the whole application level to improve the efficiency of digital technology of digital technology, to a certain extent, promote technological innovation, improve the technical level of science and technology efficiency.

5.1 AI Security Based on WSR Methodology in the Risk Management of Large-Scale Events

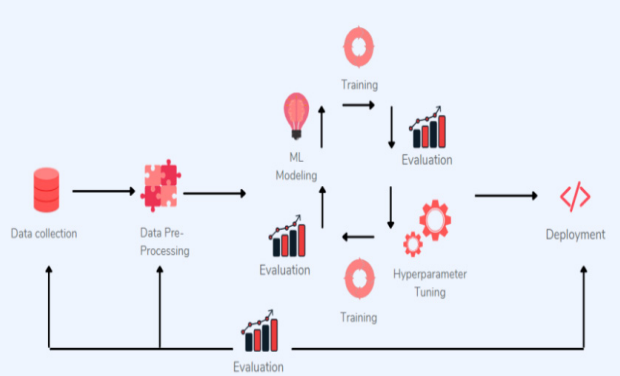
5.1.1 Wuli Level

When using AI security to layout the smart venues, on the basis of ensuring the operation function of large-scale events, it can be combined with the post-game utilization planning of the venues in advance, and flexible and diverse functions can be designed with digital technology to improve the economic and social benefits of the smart venues. Such as the application of digital technology to the mass sports activities, let mass sports events can also have event level AI referee and AI photography, AI coach and emergency medical reduce the risk of injury in sports, sports risk management [6] service mass sports risk management, with wisdom power health, to event level risk management to ensure the safety of mass sports. The transfer and application of the digital media technology of the events, the three-dimensional live broadcast of large-scale evening parties and concerts, the flow of people and risk management of immersive performances, etc., will meet the needs of the venues to transform into sports and sports centers after the competition, explore the diversified ways of profit of sports and sports space, and reduce the operation risk of the venues. And suggest wisdom venues through the cloud platform access wisdom city system, as the city of "wisdom assets" flexible scheduling, through the AI security deep learning all kinds of natural disasters, outbreaks and other force majeure risk plan, in order to quickly equipment become "square" wisdom, timely service urban governance and urban risk management. AI security enables smart venues, to precipitate and expand the technological efficiency of the digital technology in the event after the competition, and to return it to the people, and to magnify the social benefits of the digital technology of the event.

5.1.2 Shili Level



Picture 3. The WSR methodology workflow [5]



Picture 4.AI route chart

Making comparison,the workflow of the WSR methodology is similar to the operation principle of the AI: collect information (data) -information (data) structured (modeling) -implementation scheme (machine learning) and test regulation (regulation parameters) cycle-implementing the final protocol (release application). Therefore, it is suggested to take AI security as the digital intelligence base, build the AI event risk management system based on WSR methodology, and design the risk management operation mechanism of large-scale events based on the workflow of WSR methodology.

The AI event risk management system needs to be characterized by fast response speed, high degree of information structure, strong department collaboration ability and growth of the system, and it also needs to improve the management efficiency of large-scale events and optimize them in specific ways and work processes. Before the competition, digital technology was applied to comprehensively collect the requirements of the event, analyze and plan the event with physical-reason-human structure, use AI to continuously evaluate and adjust the planning scheme, and finally select satisfactory plans, so as to minimize the consumption of manpower, material resources and time cost caused by inappropriate decisions. During the competition, the intelligent command based on the Internet of Things and cloud platform helps high-level decision makers to achieve three-dimensional perspective of information, vertical important decisions can be transmitted quickly, and horizontal personnel of various departments can share information in real time, flexibly dispatch resources, and improve collaboration effectiveness. At the same time, the effect of the decision execution is monitored in real time, and the instructions are adjusted quickly through feedback to achieve the optimal decision of physical-matter-human dimension. In addition, AI can be used to restore the process of decision paths and organizational action. Through machine learning, a management effectiveness evaluation system can be established to identify the links and behaviors that need to be optimized, so that the event managers can optimize the workflow of event management and organizational cooperation from an objective perspective, and improve the management effectiveness.

5.1.3 Renli level

Large-scale event level high, project, there are many official organizations and authorities to participate in, the international attention and influence is very high, so the event is not only a

high-end sports competitive platform [7], but also an important window of spirit and culture communication, event to provide services and event management is the participants to convey the spirit of the most intuitive experience. Through AI deep learning of a large number of videos of the Paralympic Games and disabled athletes, the live habits and behavior characteristics of special spectators, and integrating the humanized facilities [8] for the smart venue, adjust the venue facilities based on video monitoring and face recognition, provide real-time following voice navigation for visually impaired people, monitor and clean up the venue channels, and ensure the safety and free activities of people with mobility disorders. AI event management through the application of digital technology, in the event planning to sustainable development, reusable principle design venue function management mode, extend in time, space on the economic benefits and social benefits, accurate events in the operation process of the regulation, save unnecessary manpower, material waste, after the game to evaluate event management, analysis and summary, formation methodology rich event management case and mode, continuous improvement provide reference for the next event. Moreover, the event management with video as the carrier and digital technology as the core can extend the management chain in the industrial chain, and interact with multiple roles such as audiences, sponsors and clubs by intervening in the media, marketing and other segments of the event. The peaceful call, the sports spirit of the event, as well as the humanized intelligence, environmental protection and sustainable advocacy of the event, so as to realize the cultural efficiency improvement of the event with the technological efficiency of digital technology.

6 RESEARCH CONCLUSION

In general, this paper combed the domestic and foreign to explore large event digital technology efficiency promotion strategy of the literature, determine the supply and demand matching for research perspective, through the analysis of case, combing and innovation of digital technology and competition management of supply and demand matching mechanism and digital technology science and technology efficiency promotion strategy, and use the mechanism combined with case the AI efficiency of science and technology improve specific Suggestions.

- AI security helps with the use of smart venues after the games to improve the social benefits of large-scale events.
- Use AI risk management to promote event management reform, and improve organizational management efficiency with WSR workflow.
- AI enables to optimize the service of special groups of the event, and improves the cultural benefits of the event with video as the carrier.

Due to the limited time and ability, there are still many deficiencies in this paper, such as the need for first-hand data and data for empirical testing to correct the mechanism. In the context of high-quality development, it is hoped that with the joint efforts of scholars, digital technology can be deeply combined with large-scale sports events, to promote the rapid digital development of the sports industry, and lead the development of the city.

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