

# ***The Economic Impact of Digital Productivity on Sports Competitions***

**Junqing Feng<sup>1,a</sup>, Cunyu Wen<sup>2,b</sup>, Yuheng Ren<sup>3,c,\*</sup>, Yiming Ni<sup>4,d</sup>**

<sup>1</sup>*Department of Economic and Management, Wuhan Sports University, Wuhan, 430079, China*

<sup>2</sup>*Art College, Wuhan Sports University, Wuhan, 430079, China*

<sup>3</sup>*Digital Industry College, Jimei University, Xiamen, 361199, China*

<sup>4</sup>*Jianpan Kunlu Internet of Things Technology Research Institute (Xiamen) Co., Ltd., Xiamen, Fujian, 361100, China*

*a. maodezishu@outlook.com, b. 18250163586@163.com, c. hoture@126.com,*

*d. niyimmm@163.com*

*\*corresponding author*

**Abstract:** In the digital era, the sports industry is undergoing substantial transformations, with digital efficiency emerging as a vital force for economic expansion and significantly impacting the financial results of sports activities. This investigation aims to explore the critical link between digital productivity and the economic consequences of sports events, as well as the influence of digital advancements on business tactics and value creation within the sports field. Through a theoretical analysis, the study highlights how digital productivity enhances resource management, introduces innovative business models, and intensifies audience engagement and participation, fostering a comprehensive growth in the sports economy. The empirical part of the research selects several exemplary sports events to examine economic performance before and after digital transformation, confirming the essential role of digital productivity in boosting event revenues and improving audience interaction. Additionally, it spurs local economic activities. The paper provides strategic guidance on the seamless integration of the sports industry with digital technologies, aiming to offer a theoretical foundation and practical recommendations for the industry's ongoing development. The emergence of digital productivity presents unprecedented opportunities for the sports sector, redefining event administration and driving the prosperity of the sports economy. This study offers an in-depth analysis of how digital improvements can enhance the economic vitality of sports, including superior user experiences, wider event dissemination, and the promotion of sports goods and service transactions. Comparative analyses demonstrate that digital transformation significantly enhances event financial returns, as seen in notable increases in ticket sales, sponsorship revenues, and broadcasting rights fees. Furthermore, digital innovations broaden the reach of the sports industry, introducing novel formats such as virtual reality (VR) viewing, online fitness communities, and e-sports, which create new avenues for economic growth. The theoretical perspectives and empirical results in this paper firmly support the notion that digital productivity is a pivotal facilitator of progress in the sports economy. By embracing digital transformation, the sports industry can more effectively adapt to market changes, thereby strengthening its competitive position and supporting sustainable growth. Therefore, the paper advises sports leaders and decision-makers to proactively utilize digital resources, increase investment in digital platforms, and enhance the production and dissemination of digital content to ensure the long-term prosperity of the sports economy.

**Keywords:** digital productivity, athletic competition, economic effect

## 1. Research background and purpose

The global trend towards digitalization is profoundly reshaping the sports industry, a sector vital for both cultural and economic development. As digital technologies, including the Internet, large datasets, and AI, advance at an accelerated pace, various aspects of sports events—from organization and marketing to spectator engagement and operational strategies—are being revolutionized. The integration of digital tools not only optimizes the administration of sports facilities and the distribution of resources but also elevates audience involvement through the deployment of smart management systems. Take, for instance, the adaptive lighting systems that can be fine-tuned based on real-time conditions, the streamlined electronic ticketing processes that ease the purchase and validation of tickets, and the innovative online broadcasting and VR technologies that offer remote viewers a fresh and immersive perspective on the games. These technological advancements are catalyzing innovative practices and operational shifts within the sports industry, serving as a critical catalyst for its sustained economic expansion.

The application of digital technology has markedly enhanced the appeal and viewing experience of sports events. Thanks to high-definition live broadcasts, virtual reality (VR), and augmented reality (AR), spectators can now enjoy a deeply engaging viewing experience, capturing the dynamism and excitement of the games from remote locations. This innovative method of viewing sports, unrestricted by physical location, not only broadens the reach of the audience but also amplifies the social impact and economic benefits of the events.

Digital transformation has spurred the evolution of sports business strategies. A prime example is e-sports. By integrating digital advancements with competitive dynamics, this nascent form of athletic engagement has rapidly garnered a substantial global following. Newzoo's Global Esports & Gaming Live Streaming Market Report indicates that the worldwide e-sports sector's earnings escalated from approximately \$960 million in 2019 to more than \$1.3 billion in 2022, highlighting a swift expansion trajectory. Moreover, the global e-sports viewer base hit 2.47 billion in 2022, representing 48.3% of the total global Internet user population, which underscores the extensive reach and impact of e-sports. The industry has developed a comprehensive value chain encompassing competitions, live streaming, coaching, and merchandise sales, thus offering innovative avenues for the diversification of the sports economy. Additionally, the digital revolution has given rise to novel consumption patterns within sports, including virtual fitness routines and remote event involvement, further enhancing the latent demand within the sports marketplace.

The utilization of digital technology has enhanced the distribution and oversight of sports assets. Through big data analytics, organizers can now make precise forecasts of event needs, facilitating a more rational allocation of resources and boosting the operational efficiency and economic gains of sports events. Furthermore, the implementation of digital frameworks, including sports event coordination platforms and athlete health surveillance systems, offers a robust technological foundation for optimizing sports resource management. This not only substantially lowers operational costs but also markedly increases the overall competitive edge of the sports sector.

The aim of this research is to explore the profound connection between digital productivity and the economic impact of sporting events, and to investigate the ways in which digital technology reshapes the business strategies and value creation processes of sports competitions. Through an analysis of the economic gains from sporting events before and after digitalization, the study seeks to

elucidate the significant role of digital productivity in boosting the profitability of such events, increasing spectator engagement, and invigorating associated economic activities. Additionally, it offers a theoretical framework and practical recommendations for the upcoming trajectory of the sports sector. Grounded in both theoretical insights and empirical examination, the study further puts forward a set of initiatives designed to foster the seamless integration of the sports competitive sector with digital technology, thereby aiding the sports economy in attaining advanced growth.

## **2. The integration of the concept of digital productivity and sports competition**

### **2.1. Definition and characteristics of digital productivity**

In the age of the digital economy, digital productivity serves as the primary driving force, arising from the seamless integration of digital technology with production processes[1]. It fosters economic structural change and advancement by optimizing resource distribution, revolutionizing production methods, and boosting operational efficiency. This study focuses on dissecting the challenges associated with digital productivity and suggesting appropriate remedies. Particularly within the sports sector, the evolution of digital productivity significantly alters the way events are communicated and enhances the audience's involvement, while also deeply influencing the business models and value creation of the sports economy. The following sections will provide a thorough examination of the notion and distinguishing traits of digital productivity.

#### **(1) Definition**

Digital productivity involves leveraging technologies like information technology, the Internet, big data, and artificial intelligence within a digital setting to optimize the allocation of production resources, drive the evolution of manufacturing techniques, and heighten the responsiveness and flexibility of production operations. This, in turn, fosters an increase in economic advantages[2][3].

In the realm of sports, the expression of productive capabilities encompasses advancements in event broadcasting technology, the development of audience engagement platforms, data-driven decision support systems, and the increasing adoption of intelligent wearable devices.

#### **(2) Features**

Digital productivity exemplifies a significant level of convergence. It arises from the profound integration and innovation across various technologies, distinct sectors, and business models. This notion encompasses not only the utilization of digital techniques but also the amalgamation of operational workflows, managerial concepts, and corporate tactics within the sporting sector.

Digital efficiency exhibits a high degree of flexibility, enabling swift reactions to shifts in market conditions and environmental changes. This capability allows for the timely refinement of resource distribution and strategic arrangements, thereby boosting the nimbleness and adaptability of manufacturing procedures.

Effective digital operations hinge on the extensive analysis of large datasets. This procedure encompasses data collection, manipulation, and examination, all aimed at furnishing a precise foundation for strategic decisions[4]. It fosters targeted marketing initiatives, enhances personalized customer experiences, and supports sophisticated operational management.

The growth in digital efficiency has progressively blurred the distinctions between the sports sector and numerous other fields, including information technology, entertainment, and healthcare. This interdisciplinary integration has led to the emergence of innovative commercial models and tactics, such as electronic sports and digital fitness solutions.

Digital productivity aims to improve user engagement and interaction excitement. Through the establishment of a communication platform utilizing digital technology, it enhances the connection between users and sporting events and brands, thereby fostering a vibrant and active community environment.

Based on the aforementioned definition and traits of the anatomy, the operational framework of digital productivity in the sports sector has become increasingly evident. It transcends mere technological advancements, driving industrial evolution and enhancing the core economic advantages. Below, we will delve deeper into the integration of digital productivity within the sports industry and examine its impact on the landscape of sports economics.

## **2.2. Application of digital technology in sports competition**

The dissemination of digital technology, akin to a robust gust of spring wind, has infused fresh vigor into the sports competition sector and substantially accelerated the innovation and enhancement of the sports economy. In the following discussion, we will explore multiple critical applications of digital technology within sports events, along with their enduring impacts on the economic landscape of sports.

### **(1) Innovation of event live broadcast technology**

With the steady advancement of 5G, cloud computing, and big data technologies, the quality of live sports broadcasts has seen a marked enhancement. The extensive use of high-definition and ultra-high-definition (4K/8K) streaming techniques, in conjunction with the innovative integration of virtual reality (VR) and augmented reality (AR) technologies, offers viewers an almost on-site experience, transforming the way they engage with sports events into a deeply immersive spectacle. This high-definition, multi-angle viewing and instant replay capability not only elevates the aesthetic appeal of the competitions but also broadens the viewer base, facilitating a wider global reach for the events and attracting more commercial support and advertising income[5]. Additionally, live broadcasting platforms employ intelligent algorithms to scrutinize audience viewing habits and deliver tailored content recommendations, thereby boosting user interaction and contributing to the flourishing of the event economy.

### **(2) The construction of audience interaction platform**

Digital technology has expanded the avenues for spectators to engage with sporting events. Platforms such as social media, online forums, and live interactive areas, including interactive websites, enable participants to share their real-time viewing experiences and deepen their involvement in the events through activities like voting, predicting outcomes, and sending virtual gifts. This enhanced interactivity not only amplifies the social dimension of the events but also facilitates the dissemination of their cultural messages, contributing significantly to the enhancement of the event's brand image. Moreover, these interactive platforms analyze user data to offer market insights, allowing event managers to execute targeted marketing strategies and brand partnerships, thereby boosting the commercial prospects of the events.

### **(3) A data-driven decision support system**

In the realm of sports, particularly within tennis, the utilization of big data analytics significantly enhances the precision and rationality of decision-making. The French Open, for instance, has benefited from IBM's solution, leveraging tools like SlamTracker to conduct an in-depth examination of match data. This analysis helps in uncovering strategic elements that are pivotal to the results of tennis matches, thereby enriching the experience for viewers and aiding coaches in refining their tactical approaches. By tracking athletes' conditions, scrutinizing event data, and studying audience interactions, and through the aggregation and manipulation of vast datasets, tournament administrators, coaching teams, and commercial associates gain robust assistance in their decision-making processes. An athlete monitoring system, for example, can assist in mitigating the risk of sports-related injuries and in designing more efficient training regimens. The examination of event data can also guide organizers in optimizing resource distribution and enhancing operational effectiveness. Additionally, insights into audience behavior offer precise direction for the event's marketing initiatives, bolstering its market attractiveness.

#### (4) Wide application of smart wearable devices

Smart wristbands and sneakers, equipped with advanced sensing technology, are capable of continuously monitoring athletes' physical states and athletic achievements, thereby offering personalized workout recommendations and enhancing strategic gameplay. For spectators, these devices can gather individual data, offer fitness advice, and thereby elevate their engagement experience. The broad adoption of this technology has not only accelerated the progress in sports science and technology, but also expanded the industrial ecosystem, encompassing health surveillance, recovery assistance, and data interpretation, thus injecting fresh momentum into the diversified evolution of the sports economy.

#### (5) cross-border integration of new formats

The integration of digital technology across different domains has spurred the development of various novel formats within the realm of sports competition, including e-sports, virtual exercise, and digitalized sports travel. These nascent formats have significantly broadened the spectrum of sports consumption and have further facilitated the convergence of sports with sectors such as leisure, technology, and tourism, thus acting as a pivotal catalyst for the expansion of the sports economy. To illustrate, e-sports, as a pioneering manifestation of sports activity, has built a comprehensive industrial framework encompassing event coordination, live streaming services, game creation, and the commerce of ancillary products, drawing in a substantial youth demographic and solidifying its role as a cornerstone of the sports economic landscape.

The integration of digital technology into sports not only amplifies the visual spectacle of competitions and enhances fan engagement, but also drives the evolution and expansion of the sports economy. Through refined resource distribution, novel business strategies, and elevated user experiences, digital advancements are progressively reshaping the landscape of sports events and are emerging as a critical foundation for the enduring growth of the sports industry.

### **3. Theoretical analysis of the impact of digital productivity on sports economy**

#### **3.1. Interaction mechanism between digital productivity and sports economy**

The core of examining the mutual enhancement and impact between digital productivity and the sports economy lies in understanding their interaction dynamics. This interaction extends beyond technological innovation, driving changes in the industry, and also encompasses transformations in business models, improvements in resource allocation, and advancements in the stages of value creation. Below, we will delve into a thorough analysis of this interplay:

##### (1) Technology-driven optimal resource allocation

The primary objective of digital productivity lies in enhancing the precision and effectiveness of sports resource allocation via technological advancements. Event organizers, for instance, can leverage big data analysis to predict audience interest more accurately, enabling them to arrange game schedules, locations, and ancillary services in a more strategic manner. This not only optimizes resource utilization but also alleviates the financial strain of operations. Furthermore, digital technology fosters a tighter integration among the various segments of the sports industry chain. The implementation of smart logistics systems, for example, has markedly streamlined the distribution of sports gear, mitigating the issue of surplus stock, and consequently, it has greatly enhanced the agility of the supply chain.

##### (2) Innovation and upgrading of business models

Digital productivity has spurred the evolution and advancement of the sports industry's business model. For instance, the emergence of online live streaming platforms has dismantled the traditional constraints of television broadcasting, thereby creating fresh revenue streams for sports, such as pay-per-view and subscription-based services. Furthermore, digital advancements have facilitated a more



profound convergence and interdisciplinary cooperation between sports and sectors like entertainment, technology, and health. Innovations like virtual reality viewing experiences and online fitness sessions keep surfacing. These developments not only substantially increase the range of sports-related consumption but also greatly expand the scope of the sports economy and its content.

(3) The remodeling of value creation path

Digital productivity has transformed the mechanisms of value creation within the sports economy. By leveraging digital platforms, event organizers are able to gather and scrutinize audience preferences, thereby offering tailored services that enhance customer loyalty and intensify business competition. Moreover, digital advancements drive innovation in sports products and services, for instance, utilizing big data to suggest customized sports gear, or crafting smart training programs. These developments introduce novel avenues for the diversified growth of the sports industry.

(4) The improvement of user engagement

The integration of digital technology has significantly boosted user engagement in sports events. Audiences now have the ability to share their viewing experiences instantly and engage in event forecasting and interactive activities via platforms like social media and live broadcasts. This heightened involvement not only amplifies the social connectivity and entertainment value of these events, but also expedites the spread of sports culture within society. Additionally, it plays a crucial role in strengthening the event's brand identity, thereby increasing its commercial impact and economic gains.

(5) Amplification of economic effects

The economic advantages of sports competitions are notably amplified through the advancement of digital efficiency. Digital tools enhance event administration, thereby boosting revenue streams like ticket sales and advertising deals directly. Additionally, they foster the growth of ancillary industries, including tourism, food services, and lodging, which contributes to a long-lasting positive impact on the event's economic ecosystem.

Digital productivity and the sports economy are intricately intertwined. The deployment of digital technology enhances the distribution of sports resources, fosters innovative business approaches, and elevates user engagement, thereby broadening the economic influence and advancing the sports economy's overall development. This dynamic interaction serves as a beacon, illuminating the path forward for the sports sector, indicating that by deeply integrating digital advancements, one can ensure the robust expansion of the sports economy and markedly boost its competitive edge in the marketplace.

### **3.2. The enhancement of digital technology to the value of sports events**

The extensive use of digital technology has significantly enriched the meaning of sporting events, as reflected in the following areas:

Digital technology not only elevates the aesthetic value and interactivity of sports events, but also broadens the audience base, thereby boosting the exposure and impact of these events. Technologies like virtual reality (VR), augmented reality (AR), and panoramic live streaming allow spectators to experience a sense of presence at the event, regardless of their physical location. This immersive sensation greatly amplifies the appeal of the sporting event. Moreover, the extensive adoption of social media and online platforms facilitates the swift spread of event information and increases the frequency of communication and engagement among the audience. This fosters a positive interaction between the event culture and the fan community, further cementing the brand's market position.

Digital technology has revolutionized the coordination and oversight of events, boosting operational effectiveness and reducing expenses. Leveraging big data analytics and artificial intelligence, event coordinators can derive a more precise foundation for decision-making in areas such as event strategy, resource distribution, and risk assessment[6]. For instance, AI utilized in sports

analytics can predict game outcomes by thoroughly examining historical data, thereby offering robust assistance in tactical customization. Moreover, by evaluating athletes' health status, mental condition, and environmental elements, it aids the coaching and medical staff in assessing athletes' health and recuperation periods, which in turn lowers the risk of injuries. Additionally, the analysis of audience behavior can accurately gauge the competition's demand, allowing for the rational scheduling of events and venues, and avoiding the underutilization and wastage of resources. Furthermore, the deployment of smart ticketing systems and automated machinery has significantly streamlined event operations and further enriched the spectator experience.

The advancement of digital technology has facilitated the emergence of novel business strategies and expanded various revenue streams. Take e-sports, a burgeoning athletic format, as an illustration; its growth is largely dependent on digital platforms and has seen substantial economic gains through live betting, virtual merchandise sales, event endorsements, advertising, and the exploitation of copyrights and intellectual property. In parallel, digital platforms have revolutionized the methods of distributing sports copyrights, including pay-per-view and subscription-based models, which have significantly diversified profit-making approaches. Moreover, the digital transformation has fostered a profound interconnection between the sports sector and other industries, such as travel, wellness, and leisure, creating a multifaceted economic environment that supports the sustained prosperity of the sports economy[7].

The adoption of digital technology has significantly amplified the worldwide presence of sporting events and facilitated the international sharing of athletic culture. Thanks to the extensive reach of the Internet and social networking platforms, details about these events are rapidly disseminated to global audiences, drawing in numerous international spectators and enthusiasts. This broadened global interest not only elevates the event's international impact but also fosters the blending and interaction of various sports cultures, thereby setting a robust stage for the expansion of the global sports market.

The utilization of digital technology has significantly enhanced the spectator experience at sporting events. It offers highly immersive viewing, instant data interpretation, increased audience engagement, and novel operational strategies, thereby boosting the organizational efficiency and economic benefits of these events. As we look ahead, the ongoing advancements in digital technology are expected to unlock further value-adding opportunities for sports events, injecting fresh momentum into the growth of the sports sector.

### **3.3. The role of digital platforms in sports economy**

Digital platforms encapsulate the essential components of digital efficiency and exert a highly significant influence within the realm of the sports economy. These platforms transform the way sports events are communicated and also deeply affect the business tactics and methods of value creation in the sports sector. Below are several critical areas where digital platforms impact the sports economy:

#### **(1) Revolutionary changes in the communication of events**

Digital platforms, particularly social media and online live streaming services, have significantly transformed how sports events are communicated. Viewers are no longer constrained by the scheduling and geographical limitations of conventional television broadcasts; instead, they can access high-quality live sports content anytime and anywhere via mobile devices like smartphones or tablets. This method not only elevates the accessibility and the aesthetic value of the events but also broadens the audience base and amplifies the global reach of the sports. Furthermore, these platforms enrich user engagement by offering features such as bullet screens, interactive comments, and gaming components, thereby promoting the widespread diffusion of sports culture and fostering a tighter bond within fan communities.

## (2) Innovation and expansion of business models

Digital platforms have significantly broadened the scope for business model innovation within the sports sector. Take esports as an instance; the infrastructure provided for live streaming encompasses not only the broadcasting of matches but also encompasses competition administration, services, merchandising, and the entire industrial chain. This multifaceted approach to business not only diversifies revenue streams from these events but also hastens the convergence of sports with entertainment, technology, and other domains, thereby fostering a distinctive economic landscape. Moreover, such platforms have catalyzed the development of emerging business formats like sports tourism and virtual fitness, further extending the boundaries of the sports economy.

## (3) In-depth mining of audience data

By meticulously examining the audience statistics of Liverpool and various other teams, the digital platform underscores the global reach and impact of sports events, offering precise market perspectives to associated sectors. Leveraging big data analytics, it uncovers the preferences, behavioral tendencies, and consumer practices of the audience, enabling event organizers and brands to refine their market tactics, deliver tailored services, and strengthen customer allegiance. This approach, which relies on data for strategic guidance, not only amplifies the commercial advantages of the events but also fosters meticulous administration and long-term development within the sports industry.

## (4) Digital management of sports rights

The relentless advancement of digital technology has revolutionized the approaches to trading and managing sports rights, facilitating a robust expansion of the sports rights market and a notable enhancement in the value of copyrights. Previously, the sale of copyrights was frequently constrained by geographical and temporal boundaries. However, the emergence of digital platforms has transcended these barriers, introducing greater adaptability and operational efficiency to the copyright market. Thanks to digital rights management tools, online transactions and cross-platform dissemination of copyrights have become viable, streamlining the process for both rights owners and consumers. Furthermore, these platforms foster various revenue models, including pay-per-view and subscription services, thereby diversifying the avenues for generating income from copyrights.

## (5) Online sales of sports goods and services

Digital platforms have significantly expanded the reach of sports goods and services sold online. By leveraging e-commerce sites, social media, and official brand web pages, the industry has overcome limitations imposed by location and time. Customers are now able to effortlessly buy tickets, athletic gear, and autographed merchandise over the internet. This seamless purchasing process not only greatly improves the ease of buying for consumers but also opens up fresh commercial prospects for the sports sector.

Digital platforms are playing an increasingly significant role in the sports economy, revolutionizing the ways sports events communicate and operate, while also enhancing audience engagement and fostering integration across various sectors. As digital technology advances, these platforms will likely sustain their momentum, driving the high-quality development of the sports economy and ushering in a new era characterized by the harmonious coexistence of digital and intelligent elements[8][9].

## **4. Case Study Analysis: Investigating the Influence of Digital Efficiency on the Sports Economy**

### **4.1. Case selection and research methods**

This part deeply explores the impact of digital productivity on the economic aspects of sports events, aiming to clarify the potential operation mode of digital technology to redefine business and further



improve the economic benefits of sports events through the digital transformation cases of specific sports activities. Case selection and research methods form the basis of this study, which ensures the accuracy and reliability of the research conclusions.

#### (1) Case selection

This study's case selection hinges on three key criteria: the first involves the magnitude and societal reach of sporting events, leading us to prefer those with worldwide appeal and substantial viewer bases; secondly, we assess the degree of digital evolution within these events, favoring those at the forefront of digital technology adoption; finally, an evaluation of the financial impact and growth prospects of the competitions, particularly focusing on the digital aspects of revenue generation, audience engagement, and peripheral economic dynamics. Adhering to these benchmarks, the NBA, the UEFA Champions League, and the global finals of electronic sports were chosen as the subjects of our investigation.

#### (2) the research methods

By conducting a thorough literature review and performing detailed interviews, we meticulously gathered information on the digital transformation of events, encompassing their contextual background, execution, and encountered issues. The reviewed literature comprised scholarly papers, sector analysis documents, and media coverage. Our interviewees spanned event coordinators, providers of digital solutions, specialists in sports economics, and attendees, with the objective of acquiring a broad spectrum of insights and real-world applications.

By analyzing financial reports, audience metrics, and market research, we conducted a thorough collection and assessment of the economic performance during the digital transformation of sports events. This shift has notably amplified the economic significance of these events. The integration of big data analytics and cloud computing, for instance, has enhanced the operational efficiency of events and markedly boosted spectator engagement and sponsor appeal. Additionally, the construction and upkeep of digital platforms, including electronic ticketing systems and virtual reality applications, have further solidified the sports market's competitive edge, positively impacting key economic indicators such as revenue growth, viewer attraction, funding enhancement, and media rights valuation.

To identify the key success factors and underlying challenges in digital transformation, the study employs a comparative analysis of economic performance pre- and post-transformation. It adopts a research strategy that involves time series analysis, parallel comparison, and trend examination.

This study explored the role of digital productivity in the diversification of the sports economy, encompassing the refinement of resource distribution, fostering innovation, enhancing business strategies, and boosting audience engagement and appeal. Empirical examination aims to offer practical assistance to sports industry executives, deepen their comprehension of digital technology's economic benefits, and contribute significant insights for future digital strategy formulation.

## **4.2. Data analysis and discussion of results**

This section will conduct a thorough analysis of three prominent sporting competitions: the National Basketball Association (NBA), the European Champions League, and the e-Sports Global Finals. Through the application of both qualitative and quantitative research techniques, the study aims to elucidate the tangible manifestations and operational mechanisms of digital productivity in influencing their economic impacts.

The NBA, as the leading basketball league globally, established a new industry standard through its digital transformation. Since entering into a broadcasting agreement with digital platforms in 2015, the league has witnessed a notable surge in online viewership. Statistics reveal that the 2024 All-Star Game, broadcast across multiple platforms including TNT, TBS, truTV, B/R Sports, and Max, garnered a total audience of \$116 million, marking a 20% rise from the previous year. Additionally,

the Finals of the midseason tournament drew an average of 4.58 million online spectators, the highest regular-season viewership over the past six years, excluding Christmas specials. These figures not only underscore the league's successful digital shift but also indicate a substantial expansion of its audience across various digital channels. Furthermore, an annual uptick in ticket sales and sponsorship income, coupled with a significant boost in sales from the official online store, directly attests to the positive economic impact of digital technology on the competition. The NBA's official Twitter account and enhanced fan engagement have also amplified the social significance of the games, fostering a greater sense of involvement among fans worldwide.

The European soccer champions league, being the premier club football competition, has also seen the advantages of a digital transformation. Studies indicate that integrating digital technologies, including high-definition broadcasting and multi-angle viewing, has markedly increased the tournament's attractiveness and significantly enriched the viewer experience. This has played a key role in boosting advertising earnings and media rights costs. Additionally, leveraging data analysis, event coordinators can identify potential viewers more precisely, thereby tailoring the event's content to enhance its worldwide impact and fully support the advancement of the competition's economic landscape.

In the context of the global digital age, the electronic sports world championships have emerged as a novel form of athletic competition, demonstrating significant economic expansion. Data analysis reveals that the audience for e-sports games online has surpassed that of conventional sporting events. Take the League of Legends S14 World Championship as an example; it drew over 1.7 million viewers, and the peak number of international viewers surpassed 6.9 million. These figures underscore the rapid growth in e-sports viewership, which may even exceed the audience of traditional sports events. The digital transformation of e-sports has not only captivated a large number of youthful spectators but also fostered a comprehensive industrial ecosystem encompassing game creation, event management, and merchandise sales, thereby introducing a fresh impetus to the sports economy. Additionally, the innovative copyright distribution strategies employed by electronic sports events, along with the support of digital rights management technology, have accelerated the adoption of online viewing fee models, further contributing to the diversification of the economic framework within the e-sports sector.

Studies indicate that digital productivity has played a crucial role in intensifying competition, enhancing economic gains, boosting audience engagement, and supporting peripheral activities within economic processes. Particularly, the utilization of digital advancements, such as innovations in live streaming technology, more sophisticated audience data interpretation, and digital rights administration, has markedly increased the economic advantages of these events and facilitated a diverse expansion in the sports economy. Furthermore, digital technology has fostered the convergence of the sports sector with other domains, including technology and entertainment, thereby offering a fresh impetus for the sustained growth of the sports economy.

Despite the substantial opportunities digital transformation has offered to the sports sector, it has simultaneously introduced challenges like network security and audience privacy that need addressing. Industry leaders and executives must prioritize these concerns and implement suitable measures to facilitate a seamless digital transition. As we anticipate the future, the ongoing advancements in digital technology will present the sports sector with additional opportunities and hurdles. Consequently, it is imperative for sports industry leaders and policymakers to proactively adapt to technological shifts, enhance investments in digital infrastructure, and continuously refine the creation and dissemination of digital content to foster the sustained and healthy growth of the sports economy.

## 5. The conclusion and suggestion

This research meticulously explores the fundamental connection between digital efficiency and the economic advantages derived from sports events. Through a combination of theoretical analysis and empirical study, it elucidates the pivotal role that digital efficiency plays within the sports sector. The key outcomes of the investigation are as follows:

By optimizing resource allocation and transforming business operation mode, digital productivity has greatly promoted the development of sports event viewing value and interactive experience, and promoted the diversified development of competitive sports economy. The application of digital technology not only expands the appeal of sports events, but also promotes innovation in the sports sector and promotes structural upgrading, thus providing strong support for the continuous expansion of the sports economy.

Digital technology has significantly amplified the economic prospects of sporting events. It enhances the appeal and engagement of spectators in these events, thereby broadening the audience base. This expansion not only boosts the events' public exposure and societal impact but also streamlines their organizational and managerial processes. Moreover, it elevates operational efficiency, curtails costs, and stimulates the development of novel business models and revenue streams. Consequently, digital technology has increased the global reach of sporting events and facilitated the international sharing of sports culture.

Digital platforms have significantly grown in their sway over the sports economy, transforming the way sports events are communicated and profoundly altering the industry's business strategies and value creation. Through the reform of sports event communication, the advancement and diversification of business models, detailed audience data analysis, the implementation of digital management for sports rights, and the facilitation of online sports product and service sales, these platforms have substantially amplified the worth of sporting occasions and expedited the high-standard development of the sports economy.

Based on the findings from the aforementioned study, we propose the following recommendations with the objective of enhancing the seamless convergence between the sports competition sector and digital technology, thereby fostering the superior development of the sports economy:

The sports sector must consistently enhance its commitment to digital infrastructure, such as rapid Internet access, advanced data analytics platforms, and superior cloud computing facilities, to facilitate the seamless advancement and innovation of sporting events in the digital realm.

Efficiency in the production and dissemination of digital content: Sports industry leaders and policymakers should leverage high-definition broadcasts and virtual reality to enhance the aesthetic appeal and interactivity of games. Additionally, they should bolster their cooperation with social media and online platforms to expand the reach and impact of sporting events.

To further advance digital innovation within the sports industry, it is essential to explore the integration with technology, entertainment, health, and other sectors, thereby constructing a novel economic ecosystem. This includes pioneering business models such as electronic competitions and remote fitness programs.

By thoroughly mining and analyzing data, it is possible to gain a deeper understanding of audience preferences and behaviors, enabling the provision of tailored services that enhance customer loyalty and facilitate the development of more precise market strategies for competition and branding.

During the digital transformation of the sports sector, it is crucial to prioritize the safeguarding of personal information, network security, and the well-being of the audience. Implementing appropriate policies and measures will facilitate a smooth transition.

The growth in digital productivity has created an unparalleled opportunity for the advancement of the sports sector. Recent data indicates that by the close of 2023, China's sports industry has reached

a value of 3.6741 trillion yuan, with an added value of RMB 1.4915 trillion, representing 1.15% of the GDP. This substantial expansion not only showcases the dynamism of the sports sector but also underscores a heightened consumer propensity to invest. By fostering ongoing innovation and enhancement, the sports industry can more effectively align with the demands of the digital age, achieving greater developmental heights and contributing to the sustained prosperity of the sports economy[10].

## References

- [1] Zhou, X., Wang, H., Zhou, J., et al. *Exploring the Productivity Implications of New Logistics in the Digital Economy. The Global Economy and Management Journal*, 2024
- [2] Fu, S. *Investigation into the research and application of digital factory technology in industrial explosive manufacturing. Engineering Construction Technology*, 2023
- [3] Jing Shi, He Lili, Han Hongye. *An exploration into the digitalization of farming through the lens of IoT. Development and progress in agricultural science and technology*, 2023
- [4] Li Qiangang. "Digital" factory construction and practice in the whole production process. *Electronic Communication and Computer Science*, 2023 (Chinese)
- [5] Liu, H. *His Research. This paper discusses the data collection and intelligent management analysis of digital workshop production site. Research and Practical Engineering*, 2022 (Chinese)
- [6] Ren Yuheng\*, Zhang Jue, Wang Xin. *The impact of leveraging data elements on overall corporate efficiency: An exploration of the productivity puzzle. International Review of Economics & Finance*. 204,10.
- [7] Ma Jun. *Exploration into the Development of a Novel Industry-Education Synergy Ecosystem in Digital Economy-Oriented Higher Vocational Institutions. Education Tribune*, 2023
- [8] Chen, L. & Fu, J. *Application and study of production equipment digital transformation technology -- "implant and forward" data collection technique. The Lancet* 2016-48
- [9] YAO Chong. *The creation of 1:2000 color digital orthophoto maps utilizing aerial imagery. 33:6 2016 189-191*
- [10] Ren Yuheng\*, Li Yufan, Ni Yiming. *An Examination of Digital Economic Growth Trajectories Under Traditional and Modern Development Models. Progress in Economics, Management, and Political Sciences*.