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The Functional Positioning of Digital Media in the Upgrading of Sports Industry: The Case of NBA

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Abstract. Sports industry is an important part of many industries in modern society, and more and more people are paying attention to sports industry. The rapid development of the Internet has led to the rapid progress of digital media, which also brings great opportunities and challenges to the sports industry. However, how to make good use of the functions of digital media to promote the upgrading of the sports industry in the current digital transformation process still deserves further research. This study aims to explore the positioning of the functions of digital media in the upgrading of the sports industry, and to study and analyze the NBA as an example. The significance of this study is to provide the sports industry chain and sports industry practitioners with an in-depth understanding of the important role of digital media in the transformation and upgrading of sports industry development, and to provide experience and reference for the future development of the sports industry. This study adopts the literature research method and case analysis method. By systematically collating and analyzing the literature, it elaborates the functional positioning of digital media in the upgrading of sports industry. Then, the NBA is chosen as a typical case, and the case study method is used to analyze the application and effect of digital media in the development process of NBA. Finally, through comparative analysis, the common features, and referable experiences of digital media in the sports industry are summarized.

Keywords: digital media, Sports industry, NBA, Innovation, Spectator experience.

1. Introduction

Sports industry is an important part of many industries in modern society, and more and more people begin to pay attention to sports industry. The rapid development of the Internet drives the rapid progress of digital media, which also brings huge opportunities and challenges to the sports industry. However, in the current process of digital transformation, how to make good use of the functions of digital media and promote the upgrading of sports industry is still worth further research.

The purpose of this study is to explore the functional positioning of digital media in the upgrading of take NBA as an example to conduct research and analysis. Specific research objectives include 1) Analyze the role of digital media in promoting sports industry innovation; 2) Explore the impact of digital media on improving the spectator experience; 3) Study the role of digital media in broadening sports marketing channels.

The significance of this study is to provide practitioners of the sports industry chain and the sports industry with an in-depth understanding of the important role of digital media in the development of the sports industry transformation and upgrading, and to provide experience and reference for the future development of the sports industry.

This study adopts literature research method and case analysis method. First of all, through the reading and review of relevant literature, the literature is systematically sorted out and analyzed, and the function positioning of digital media in the upgrading of sports industry is expounded. Secondly, NBA is selected as a typical case, and the case study method is used to analyze the application and effect of digital media in the development process of NBA. Finally, through comparative analysis, summed up the digital media in the sports industry common characteristics and experience can be used for reference.

2. Development and Impact of Digital Media in the Sports Industry

2.1. The Concept of Digital Media

Digital media encompasses the utilization of digital technology, the internet, and various information communication technologies to facilitate the dissemination and exchange of information. This encompasses a wide range of platforms such as the internet, mobile internet, social media, mobile applications, and more. These platforms offer users diverse, real-time, and interactive channels for obtaining and communicating information [1].

2.2. The significance and trend of upgrading the sports industry

The upgrading of the sports industry means that in the digital era, through the application of digital technology and media means, the sports industry can achieve a higher level of development and innovation. Sports industry upgrading has the following significance and trends:

First of all, it well expands the audience. Digital media can break geographical and time constraints, deliver sports events, news reports and other content to a wider audience, and improve the influence and visibility of the sports industry.

Next, Enhance the spectator experience is also the significant result. Through digital media, the audience can enjoy a diverse spectator experience, such as HD live broadcast, multi-angle viewing, real-time statistics, etc., thus enhancing the audience's sense of participation and fan adhesion [2].

Meanwhile, it will also innovatively marketing model. Digital media provides a variety of marketing channels and ways, so that the sports industry can better carry out activities such as brand promotion, event marketing and fan economy, and achieve commercial value enhancement and revenue diversification.

Promote the development of sports science and technology is the last advantages. the combination of digital media and sports technology will promote the innovative application of sports industry in smart wearable devices, virtual reality technology, data analysis, etc., to improve the competitive level and the training effect of athletes.

2.3. Renewal and Promotion of Digital Media in Sports Industry

In recent years, the rapid development of digital media has brought about a lot of changes in the sports industry. In this process, the mutual integration of digital media and sports industry has become an important channel to accelerate the transformation of sports industry [3]. The development of science and technology can promote the improvement of sports level, enable people to improve sports performance more scientifically, and enjoy the happiness brought by sports more healthily. The development of digital media updates and promotes the sports industry in the following aspects:

(1) Enhance the audience's sense of participation: Through digital media, the audience can understand the event dynamics in real time, interact with athletes, and participate in discussions, increase the audience's sense of participation and interaction, and improve the spectator experience [4].

(2) Expand communication channels: digital media has broken the restrictions of traditional media. Through platforms such as the Internet and social media, sports information can be spread more quickly, expanding the coverage and dissemination effect of content.

(3) Improve the competitive level: The combination of digital media and sports technology promotes the collection and analysis of sports data, provides more real-time statistics and training AIDS, and helps to improve the competitive level of athletes and teams.

(4) Promote industrial transformation and upgrading: Digital media provides a new business model and marketing means for the sports industry, promotes the transformation and upgrading of the sports industry to the direction of digitalization and intelligence, and promotes the sustainable development of the industry.

To sum up, the smart device innovation and big data analysis brought by digital media greatly improve the competitive level and fairness of sports events and enhance the enjoyment of sports

events. Athletes collect all kinds of data with the help of intelligent devices, process and analyze it through professional software, and conduct targeted training according to the analysis results, effectively improve the competitive level and enhance the competition enjoyment; At the same time, to the greatest extent to help athletes avoid sports injuries and other dangers, improve sports safety.

Furthermore, an array of video technologies is employed to aid in making penalty decisions. Examples include goal-line technology and VAR (video assistant referee) technology in football, as well as the hawk-eye system (instant replay system) in sports like tennis and badminton. These technologies serve to prevent erroneous judgments and enhance the overall fairness of the game [5].

3. NBA's Innovative Practices in the Field of Digital Media

3.1. Remodeling communication channels

The success of the NBA league is attributed mostly to television broadcasting. Former NBA President Stern utilized the advantages of television broadcasting media to successfully deliver NBA games to thousands of households, accumulating many customers, and the commercial value of the NBA league continues to rise, spreading its influence on the world. In the rapidly changing modern society, traditional communication channels and methods are no longer able to meet the diverse needs of fans. It is urgent to use modern technology to achieve another leap in the NBA league. During the era of the second NBA president, Xiao Hua, he placed greater emphasis on internet communication channels and the use of data technology, and his focus gradually shifted to new media.

In 2014, the NBA League signed a 9-year \$24 billion broadcasting contract with television broadcasting companies such as ESPN, TNT, and ABC [6]. Unlike the television broadcasting contracts signed during the Stern era in the past, the television broadcasting contracts signed by Xiao Hua are more digital, including online live streaming, external authorization of digital goods, and other content.

The NBA League has embraced modern technology by utilizing online communication channels, marking a significant shift that addresses the diverse preferences of its current customer base. The proficient use of mobile internet technology guarantees the efficiency and ease of online communication, enabling a larger number of fans to engage with the NBA via the internet. Concurrently, the conversion of communication channels into partnerships has unlocked fresh avenues for expanding performance. The NBA has introduced a greater array of online game-watching services and entertainment initiatives, fostering closer and more timely connections between fans and their favorite basketball stars. Additionally, a range of data and information services has been introduced, leading to increased revenue for the league [7].

3.2. Cooperation with external parties and change business methods

With the development of the NBA league and the upgrading of technological means, after decades of development and accumulation, there are more and more types of data recorded in the NBA league database, and related data records are becoming more accurate. A huge database has been established. However, although traditional massive data is rich, the relationships between the data are complex, and their guiding significance for business management is limited. It is also difficult to directly push it to fans, and the massive data remains superficial. In recent years, the NBA League has partnered with Stats to introduce a big data Sport player tracking system to record and track basketball and player movements. This system will provide continuous data flow and innovative statistical data, including speed, distance, player spacing, and ball control, to achieve more targeted analysis. At the same time, the NBA League collaborated with SAP to launch the HANA platform, which reorganizes complex and massive data, innovates data presentation methods, and enhances the interactivity between data and fans. Since the 1947-1948 season, the NBA has a total of over 4500 trillion data segments, all of which can be retrieved in an intuitive and simple way on the NBA official website; On the other hand, analyze the basic data and construct new indicators to measure the performance of players and teams [7].

3.3. Payment system for online broadcasting of sports events

With the rapid development of internet technology and the increasing number of global internet users, the dividends of the internet era benefit all people involved in internet construction. Nowadays, there are numerous major online platforms, and the awareness of property rights protection on various platforms is becoming increasingly prominent. The past methods of free use and advertising profit can no longer keep up with the development of the internet. The system of paying for content has become an important way for internet giants and major internet portal websites to stabilize core users and create profits [8].

The rapid development of China's economy and the significant increase in people's income have also led to a change in the consumption concept of some viewers. The improvement in the consumption level of sports event audiences has led to some people being willing to pay for additional services. The guarantee for paying users should be based on improving program content, improving program production level, and timely updating program broadcasting equipment. At the same time, it is necessary to continuously enrich event resources and pay attention to the connection between users and events from the perspective of humanistic care [9].

The improvement of the audience's consumption level has promoted the development of payment models. The development of technology enables broadcasting platforms to provide better viewing experiences, and the payment system allows users to prioritize the use of new technologies to bring different viewing experiences [10].

Luo Bo (2017) believes that program quality, technology utilization, marketing plans, inherent thinking guidance, and brand building are the future development strategies for paid broadcasting [11]. Ding Rui (2017) believes that at present, broadcasting platforms should adopt measures such as acquiring event resources, accumulating event copyrights, innovating viewing methods, providing diverse options, and improving broadcasting technology to cultivate user awareness of payment [12].

4. The layout of NBA's digital media model and corresponding case studies

4.1. Official website

The NBA official website is the NBA's official digital media platform, providing fans with an authoritative website to learn about NBA games, players, and game results. Fans can access the latest NBA news, game analysis, and player data through the official website, and can also participate in various NBA official events and lucky draws.

In the 2021 NBA All Star Voting event, NBA officials used their official website to initiate voting for fans, who could participate in the voting through channels such as the official website, NBA App, and social media. The NBA official website also announced the voting results and related information to fans, attracting more fans to participate.

4.2. Social media platform

NBA officials use social media platforms to interact and communicate with fans, allowing them to stay updated on NBA games and player dynamics anytime and anywhere. The NBA official also promotes the NBA brand image and products through social media platforms, conducts brand cooperation and sponsorship, and develops diverse digital products and services to meet the different needs and preferences of fans.

During the 2021 NBA Finals, NBA officials utilized social media platforms such as Twitter, Instagram, and Facebook to promote NBA Finals information and short videos to fans, attracting more fan attention and interaction. In addition, NBA officials have collaborated with a well-known sports shoe brand to launch the NBA Finals limited edition sneakers, which are promoted and sold to fans through social media platforms.

4.3. Mobile application

NBA officials use mobile applications to provide fans with more NBA game information and player interviews, allowing fans to stay updated on games and player dynamics anytime, anywhere. The NBA official also promotes the NBA brand image and products through mobile applications to meet the different needs and preferences of fans.

During the 2021 NBA regular season, NBA officials used the NBA App to launch applications such as "NBA Daily Practice" and "NBA Player Practice" to help fans improve their basketball skills and understand NBA players. In addition, NBA officials also hold online events through the NBA App, such as NBA themed photography competitions and NBA official novels, to attract fans to participate in interactive activities. These applications provide fans with rich NBA content and interactive experiences, improving their participation and loyalty to the NBA.

4.4. Virtual Reality (VR) and Augmented Reality (AR)

The NBA actively explores the application of VR and AR technologies in digital media. By using professional VR devices to watch live sports events, users can break the traditional television viewing effect and have an "immersive" viewing experience at home without leaving their homes.

From the perspective of viewing costs, the cost of frequently using VR technology to watch sports events is lower than the cost of purchasing tickets to watch the event on site. This allows sports fans to gain a cost-effective visual experience through VR devices [13].

In addition, the NBA has also launched the application of AR technology, which combines VR devices to simulate various scenarios in games. VR technology has been widely used in sports training. By identifying VR motion capture data, it is possible to detect and analyze whether user actions are standard, thereby improving training efficiency [14]. VR and AR technologies also provide more marketing and brand promotion opportunities for NBA teams and brands. For example, teams can use AR technology to display virtual billboards on the field or showcase their history and culture through VR experiences.

In summary, the NBA's digital media model layout provides fans with a comprehensive game experience and interactive opportunities through official websites, social media, event live streaming platforms, virtual reality technology, and data analysis. These practical cases demonstrate how the NBA utilizes digital media to enhance fan engagement, enhance brand value, and create more business opportunities.

However, AR and VR technologies require specific hardware devices, such as smartphones or VR helmets, as well as corresponding software and content. These devices and software typically require high costs to be produced and sold. In addition, AR and VR technologies also require strong computing power to ensure a smooth user experience. However, with the continuous development of technology, the cost of popularizing AR and VR is gradually decreasing. At present, AR and VR technologies have been widely applied in various fields, such as gaming, video entertainment, healthcare, etc. The cost of these technologies is also constantly decreasing, for example, the AR and VR functions of smartphones have been widely applied, and with further improvements in technology, the cost of these functions is also constantly decreasing.

Similarly, devices such as VR helmets and game consoles are constantly being updated and improved to provide a higher quality virtual experience. In addition, network and communication technology are also important factors in the popularization of AR and VR. High speed internet and low latency network connections can provide a smooth user experience, and the development of technologies such as 5G and cloud computing is also expected to further reduce the costs of AR and VR. Overall, the cost of popularizing AR and VR technologies is gradually decreasing, and with the continuous progress and innovation of technology, the cost and availability of these technologies are expected to be further improved.

5. The Synergistic Function of Digital Media in the Sports Industry

The sports sector has changed remarkably in the digital age. The emergence of digital media has led to a convergence of technology, media, and sports, fostering a mutually beneficial partnership that has driven the sector to unprecedented heights. These are the main ways that digital media has helped modernize the sports sector by working in concert with other media [15][16].

5.1. Increased Interaction with Fans

Digital media channels provide fans with a more engaging experience, like social networks and specialized sports applications. Now, supporters can communicate with their favorite players, teams, and other fans in real time. Digital media has also contributed to the popularity of e-sports by enabling worldwide participation and viewing [17].

5.2. Player Performance and Data Analytics

The utilization of digital platforms for data collection and analysis has ushered in a profound transformation in the assessment of performance and coaching methods. By harnessing real-time data sourced from wearable technology and cutting-edge video analysis tools, coaches and athletes now have the capability to fine-tune their training routines and strategic approaches [18]. This advanced approach to data acquisition and interpretation has not only modernized performance evaluation but also enabled coaches and athletes to adapt and optimize their training regimens and strategies like never before. Through the instantaneous feedback provided by wearable technology and the in-depth insights gleaned from video analysis tools, they can make precise adjustments to achieve peak performance [19].

5.3. Novel Sources of Income

With digital media, the sports sector now has more ways to make money. These days, major revenue streams include virtual ads, digital goods, live streaming, and video-on-demand. Additionally, traditional sports have entered the digital sphere through collaborations with tech businesses, such as through augmented reality (AR) and virtual reality (VR) experiences [20].

5.4. Globalization and Accessibility

Digital platforms have dissolved geographical barriers, making it easy for individuals from various regions to support football teams from distant parts of the world. The emergence of online fan communities and digital broadcasting has simplified the process of following and rooting for teams, irrespective of their geographic origin. Consequently, many sports have experienced an expansion in their global fan base, driven by the effects of globalization, which has, in turn, attracted more sponsors and transformed sports into a genuinely international spectacle [21].

6. Challenges in the Application of Digital Media

While there is no denying that digital media has benefited many different industries, there have been difficulties in integrating it. In particular, the sports sector has seen the advantages and possible drawbacks of the digital era. In this context, the NBA is an especially instructive case study.

6.1. Privacy and Data Security

With the increasing prevalence of wearables and the widespread adoption of data analytics in sports, concerns regarding the privacy of both athletes and spectators are growing more prominent. There is a rising apprehension that unauthorized access or security breaches could potentially lead to the exposure of sensitive and confidential information [22]. As wearables and data analytics continue to gain traction in the sports industry, the need to safeguard the privacy of individuals involved, be they athletes or fans, becomes increasingly critical. The fear of unauthorized parties gaining access

to privileged data, or the possibility of security breaches heightens the risk of confidential information being unintentionally disclosed [23]. This underscores the importance of implementing robust security measures and data protection protocols to ensure the safe and responsible use of this technology in the sports domain.

6.2. Changing Viewer Habits

As traditional TV broadcasting gives way to internet streaming platforms, viewership has become more dispersed, which makes it more difficult to sustain a steady supply of advertising revenue [24].

6.3. Competition from Digital Entertainment

Much like numerous other sports, the NBA finds itself in a competitive landscape, facing formidable challenges from the world of esports and various other digital entertainment genres. This formidable competition has the potential to diminish the NBA's fan base and overall popularity [25]. In common with many other sports, the NBA is confronted with intense competition emanating from the realm of esports and various digital entertainment categories. This formidable competition poses a real threat to the NBA's ability to maintain and expand its following [26].

7. Future Prospects and Recommendations

7.1. Digital Media's Future Impact on Sports

As technology advances and digital media evolves, the convergence of the sports industry and digital platforms will grow, offering both opportunities and challenges. The following aspects are poised to shape the future of digital media's role in enhancing the sports industry: 1) Enhanced Fan Interaction: Digital media will amplify the fan experience by integrating virtual reality (VR) and augmented reality (AR) technologies. This immersive approach will allow spectators to actively engage with athletes, enhancing the overall entertainment value. 2) Personalized Content Delivery: Leveraging big data and AI, digital media will tailor sports content to individual preferences, bridging the gap between sporting events and the audience, thereby improving viewer satisfaction. 3) Global Accessibility: Expanding network coverage will extend the reach of sports events to more regions globally, increasing the international audience for sports programs.

From a Technology Acceptance Model (TAM) perspective, the success of digital media in sports hinges on users' perception of its utility and ease of use [27]. Users' acceptance and adoption of new technology are driven by whether it aids productivity or task completion and how user-friendly it is. In sports, digital media is expected to break down barriers between fans and the game. VR and AR technologies promise an immersive viewing experience that may reshape fans' understanding of sports [28]. However, it raises questions about the potential decline in stadium attendance, affecting ticket sales and traditional experiences.

Guided by the theory of diffusion of innovations, the extended use of digital media will usher in new trends in sports. Yet, it's crucial to examine how these technologies can bring about social and cultural changes [29]. For instance, in the NBA, deeper digital media integration may foster more active fan involvement in the game but could also lead to games being influenced more by 'popular opinion', raising concerns about fairness. Therefore, maintaining fairness and professionalism while adopting new media requires careful consideration.

7.2. Recommendations for Advancing Digital Media in the NBA

As a globally recognized sports league, the NBA has achieved considerable success in digital media. To remain competitive and foster further growth, the NBA should consider the following steps: 1) Cross-Platform Integration: Integrate various digital media platforms, including social media and streaming services, to create a comprehensive digital ecosystem. This will enhance the NBA brand's exposure and influence. 2) Technological Innovation: Actively explore emerging technologies such

as AI, VR, and AR to enrich the viewing experience. Experiment with these technologies in live game broadcasts and interactive gaming to offer viewers new forms of entertainment. 3) Community Building: Leverage digital media's power to deepen fan engagement and build a stronger community. Promote fan interaction through online discussions and activities to strengthen emotional connections with the NBA. 4) Education and Outreach: Beyond game content, use digital media to educate viewers and develop young talent. Produce educational content and training programs to enhance the NBA's social impact while nurturing a new generation of basketball enthusiasts.

8. Conclusion

The aim of this thesis is to explore the function of digital media in the upgrading of the sports industry, and to use NBA as a case study for in-depth analysis. By discussing the development and impact of digital media, NBA's innovative practices and the synergistic function of digital media in the upgrading of the sports industry, we have come up with a series of key conclusions that provide new perspectives on the upgrading of the sports industry and the application of digital media. Through digital media, the sports industry has not only renewed its business model, but also made important breakthroughs in facilitating the connection between games and audiences. In this context, the NBA, as the world's most famous professional basketball league, has provided audiences with a richer viewing experience through the innovative practice of digital media, expanding the visual and feelings of the game.

However, we must also face up to the challenges facing the application of digital media. Among the challenges of digital media application, the rapid development of technology may bring about the instability of technological change, and the risks of new technologies need to be carefully assessed and managed. In addition, the introduction of digital media may lead to controversy over the fairness of competition, and there is a need to preserve the core values of sports competitions in the digital transformation.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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