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THE USE OF DIGITAL SPORTS TECHNOLOGIES IN SPORTS BROADCASTING

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Abstract. From past to present, technological developments have had a profound impact on the professional sports world. Sport, which became a mass spectacle with the construction of large stadiums in Ancient Greece, has influenced the entire world through the development of its own systems and the widespread use of mass communication tools. The rise of the Internet and digital technologies, which have transformed the nature of modern sport and sports psychology, has provided significant potential benefits for both sport and its audiences. At the same time, these developments have led to fundamental changes in decision-making mechanisms, timing systems, and data tracking in sports, while also enabling the more effective sharing of collected data with viewers. All these developments have not only affected sport itself but have also influenced the ongoing broadcasting practices of sports media worldwide and the ways in which sports audiences experience these broadcasts. Advances in Internet and digital technologies, together with the emergence of new media, have created a dynamic and interactive structure in the production, marketing, presentation, and viewing of sports content on screens. This has initiated a synergistic relationship between the presentation of sport and the audience.

Keywords: digital technologies, digital sports technologies, television broadcasting, sports television broadcasting, new media

Introduction

Today, digital technologies have emerged as important tools used by sports broadcasters and integrated into all levels of sporting events within the global sports industry, which is becoming increasingly complex and technologically advanced. Digital technologies bring together sports fans with similar interests and enable them to interact with each other. At the same time, they have become one of the major driving forces behind the diversification of broadcasting platforms. As competition within the sports industry continues to intensify, this diversification has increased interest in sports content, sports products, teams, leagues, federations, events, athletes, commentators, and sports broadcasting-in short, the entire sports industry. In line with the preferences of sports audiences, this process has led to the emergence of new broadcasting platforms such as mobile-based systems, online and offline services, uploaded and downloaded content, streaming services, narrowcasting, and podcasts [1].

With digitalization, digital technologies have rapidly expanded and are now used at almost every level of professional sport. Today, these technologies can provide coaches with real-time data about athletes' physiological responses and movement speeds, support decision-making mechanisms, reduce the frequency of controversial decisions, monitor compliance with rules, and enhance team performance through artificial intelligence and tactical deep learning techniques. In addition, automation systems minimize human intervention and contribute to ensuring fair competition.

In recent years, the sharing of data produced through these technologies with audiences has also introduced alternative content and presentation strategies for sports broadcasters. Presenting athlete or team performances through statistical data, broadcasting images obtained from decision-support systems using slow motion, freeze-frame techniques, and two- or three-dimensional graphics, and sharing data collected from sensors embedded in sports equipment

such as balls, rackets, nets, and helmets have increased the natural appeal of sports on television. These developments have created new and enthusiastic audiences for many different sports while enriching the fan experience and contributing to the development of trust among viewers [2].

In addition, audiences seeking a deeper connection with sports-such as access to the latest statistics about their favorite players or behind-the-scenes sports content-tend to use mobile-compatible applications. Through these platforms, fans can instantly interact with the teams they support or with other supporters who share similar opinions. This situation extends beyond sport itself and expands the target audience of sports broadcasters. As broadcasters respond to continuously evolving viewer demands, the value of sports broadcasting continues to increase.

This study aims to present the interconnected relationship between digital sports technologies and sports broadcasting. At the same time, by reviewing the literature on sports technologies used in broadcasting, the study seeks to explain how this process is reflected in the viewing experience of sports audiences. Based on the findings, the study demonstrates that digital technologies used in sport contribute to the development of the sports industry-including sports broadcasting-and enable sports audiences to experience sports content in a more engaging and enjoyable way [3].

Method

In this study, motion capture systems, timing systems, and decision-support systems used in sports, as well as the presentation of the data obtained from these systems in sports television broadcasting, are examined. The study was prepared using the literature review method. Within this framework, digital sports technologies are introduced, and the integration of these technologies into sports broadcasting, along with their impact on viewers, is described in detail.

Digital technologies

Digital technologies refer to electronic tools, automation systems, applications, or resources that receive, process, display, transmit, or store information in digital form, as well as techniques that provide computer-based products or solutions. Computers, the Internet, websites, blogs, online audio and video streaming platforms, social media platforms, mobile devices, cryptocurrencies, artificial intelligence technologies, cloud computing systems, 5G technology, e-books, GPS technologies, virtual reality systems, smart devices, 3D printing technologies, QR codes, ATM machines, digital cameras, robotic equipment, sensors, radars, and drones are among the most widely recognized examples of modern digital technologies.

These technologies positively influence communication, collaboration, productivity, content management, access to analytical data, and user experiences. With their advanced performance capabilities, flexible structures, and connectivity features, they significantly reshape mass customization and supply chain systems, thereby contributing to the development of the industrial world.

In recent years, digital technologies have affected nearly every aspect of human life. Advancing faster than any previous technological development in history, they have reached more than half of the global population within the last two decades and have significantly transformed modern societies. At the core of this global transformation lies humanity's desire to obtain information, solve problems, simplify daily life, and improve living standards. The rapid integration of digital technologies into everyday life is largely due to their positive effects and the advantages they provide [4].

Digital technologies used in sports

Data analysis in sports has become one of the most intensively studied topics in recent years. Increasing awareness of the capabilities of data analysis and statistics, along with the emergence of new tracking technologies, has been a major driving force behind this development. The analysis of positional and movement data in sports not only provides valuable information

related to training processes but has also become an increasingly important source of information for enhancing audience engagement and improving sports broadcasting in professional sporting events [5].

Today, the use of wearable technologies, big data analytics, and sensor technologies has created a revolution in the way sports are played, analyzed, and developed. Through these technologies, professional athletes are able to gain more detailed information about their performance, improve training methods, and enhance their skills. Digital technologies also provide unique opportunities for growth in the sports industry by bringing fans closer together through innovative and personalized experiences.

Motion capture technologies

Modern technology enables the measurement of sport-specific characteristics in order to improve athletes' performance and enhance effective decision-making processes between sports scientists and coaches. Motion capture technologies, which have developed significantly in recent years and are widely used in such measurements, make it possible to evaluate athletes' tactical, technical, physical, and emotional performance through optical tracking systems.

Optical tracking systems refer to information technologies that can monitor athletes and their environments in real time, detect movements, and collect data through micro-sensors. These systems generate and exchange data with minimal human intervention by spreading network connectivity and data-processing capabilities to objects, sensors, and everyday devices that are not traditionally considered computers.

Through these technologies, coaches, players, and even fans can analyze data collected from multiple devices. This analysis allows them to shape game strategies, evaluate potential injury risks, and personalize the overall sporting experience [6].

Wearable technologies

Motion capture systems have the ability to analyze the biomechanics of many functional and athletic activities. Optical systems generally consist of cameras that track passive or active markers placed on anatomical points of the body in order to capture full-body movement. However, due to installation limitations, these camera-based systems usually have restricted capture areas. Wearable technologies have emerged as alternative solutions capable of overcoming these limitations.

Since the 1950s, digital technologies have played an important role in the development of sports. Early examples include the design of lighter and flatter athletic shoes to provide optimal grip and balance. In the early 1980s, radio-frequency technologies such as transponder or RFID antenna systems were developed to record athletes' times through chips attached to competitors. Later developments included smart clothing technologies introduced in 2013 that could measure athletes' heart rate, breathing activity, posture, speed, and weight distribution. In 2016, new sports uniforms were produced that remove sweat through evaporation rather than absorption, and sensors capable of measuring players' field positions, fatigue levels, and physical condition were introduced to provide performance data to team managers and help prevent injuries.

The main characteristics of wearable technologies are their ability to collect, process, and transmit data, information, services, and resources to end users. One of the major advantages of these systems is their ability to provide real-time feedback in actual sporting environments, something that traditional video analysis cannot always offer. In addition, wearable devices are typically designed to be small, lightweight, wireless, and unobtrusive, allowing athletes to move freely during competition or training. This makes it possible to observe athletes in natural training environments rather than only in laboratory settings [7].

Wearable devices are widely used particularly in team sports to collect performance data and provide comprehensive real-time measurements of players' physical and physiological

conditions during training and competitions. Signals transmitted from these devices are monitored through Global Positioning Systems (GPS) and used to analyze positional demands during gameplay. Because of their reliability and ease of use, these technologies are widely implemented in many team sports without requiring complex installations.

Sports television broadcasting

The emergence of television in the 1930s is considered one of the most significant technological developments that transferred sports from public venues to the home environment. Sports broadcasting began in England in 1936 and continued until 1939, when it was suspended due to the outbreak of World War II. In the United States, sports television broadcasting started in 1939 when NBC aired baseball and American football games. In Germany, television technology was used during the 1936 Berlin Olympic Games to transmit live images to cinema screens.

By 1970, approximately 130 countries had begun broadcasting sports content live and in color. Throughout the 1980s and 1990s, television-previously viewed primarily as a mass communication tool-underwent another wave of technological transformation. The use of television as an alternative screen-based entertainment medium alongside videos, DVDs, computers, and computer games diversified both its concept and functions. The emergence of video recording technologies and digital time-shifting devices freed viewers from the strictly linear structure of television programming, while cable, satellite, and especially digital technologies created a multi-channel broadcasting environment [8].

The interdependence between technology and sport is undeniable. When television broadcasting is included in this relationship, the connection becomes even more evident. With the development of the Internet and communication technologies, increasing audience demands have made it necessary for sports broadcasting techniques to adapt to new technological conditions. This transformation has significantly changed sports broadcasting, with traditional terrestrial, cable, and satellite systems gradually giving way to Internet-based platforms such as online and offline streaming services, downloadable content, mobile broadcasting, podcasts, and other multimedia formats. As a result, audiences now have a much wider range of tools to interact with sports content on screens.

Evaluation and conclusion

Today, local, regional, national, and international sports media organizations broadcasting worldwide utilize the emotional appeal of sports and the new platforms offered by digital media to promote global brands and connect with their audiences. These platforms provide broadcasters with the ability to target specific audiences and measure digital engagement, while also giving consumers flexibility regarding which media content they access, when they access it, on which device, and for how long.

In addition, the rise of social media has enabled audiences to become more actively involved in sporting events. Viewers can now create their own media content, share their opinions, participate in polls, and benefit from the collective power created through interactive engagement. Investments in video analysis technologies designed to analyze sports events and help audiences better understand the game continue to increase. The primary motivation behind these investments is the desire to present new visual elements that deepen viewers' interest and enhance their understanding of competition.

In sports broadcasts, viewers' attention generally focuses on players and the ball. Using technology to detect and track these objects within camera images makes it possible to visualize movements more effectively. Almost all professional sports competitions are presented to audiences through content created by the collaboration of various broadcasting equipment traditionally used in television production. Depending on the broadcasting capabilities, match

footage is supported by commentary, sound effects, and computer-generated images, while key moments can be replayed through slow-motion techniques when necessary.

Although these technologies have long contributed to the experience of sports audiences watching from their screens, the development of communication technologies and the increasing expectations of viewers have placed greater pressure on sports content producers and led to the adoption of new production techniques. This pressure has encouraged broadcasters to utilize the power of digital sports technologies to combine rich real-time data with extensive historical databases in order to produce more content, provide personalized experiences, generate unique insights, and connect fans with the most relevant content.

Another factor influencing this transformation is the growing popularity of video games, particularly sports games. While early sports video games drew inspiration from television broadcasting styles, this trend is now reversing. Television broadcasts increasingly adopt technological features and visual styles inspired by video games. Both television broadcasters and game developers imitate each other's visual presentation styles as part of strategies aimed at distributing their products across multiple media platforms.

Digital technologies used in sports and the data obtained from these systems have become valuable resources not only for sports science but also for sports broadcasting. Data generated by these systems can be integrated into broadcasts as on-screen graphics, highlighting player positioning and movement while providing audiences with detailed insights into performance, strategy, and other critical aspects of the game. Data-driven graphic models-such as dynamic markers, lines, shading techniques, heat maps, labels, and performance indicators-can also be delivered through mobile technologies, making sports content more engaging and accessible for viewers.

References

1. Dietz, V., & Ward, N. (2015). *Oxford Textbook of Neurorehabilitation.* Glasgow: Oxford University Press.
2. Finn, J. (2020). *Beyond the Finish Line: Images, Evidence, and the History of the Photo Finish.* Canada: McGill-Queen's University Press.
3. Galily, Y., Samuel, R. D., Tenenbaum, G., & Filho, E. (2021). *Sport Psychology, Performance and Ethics.* London: Frontiers Media SA.
4. James, D. A., & Petrone, N. (2016). *Sensors and Wearable Technologies in Sport.* Singapore: Springer.
5. McGinnis, P. M. (2020). *Biomechanics of Sport and Exercise.* USA: Human Kinetics.
6. McLoughlin, J., & Sabir, T. (2017). *High-Performance Apparel: Materials, Development and Applications.* United Kingdom: Woodhead Publishing.
7. Ryall, E. (2016). *Philosophy of Sport: Key Questions.* London: Bloomsbury Publishing.
8. Shishoo, R. (2015). *Textiles for Sportswear.* Cambridge: Elsevier Woodhead Publishing.