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# Transformation through the Use of New Technology in Sports: Impact, Analysis, and Future Prospects

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**A B S T R A C T**

Today we are living in the computer age. The use of computers is increasing in every field of human life. In almost all the activities of our daily life, we have started using computers and related modern technology. Modern technology is also being widely used in the field of sports. Players have been establishing new records, not only that, the sports performance of the players has increased, but the popularity of the game has also been increasing. As a result, the interest of the person in sports has increased and the physical, mental, social and emotional development of the person is taking place.

Keywords: sports industry, wearable devices, modern technology.

## Introduction

Before the mid-twentieth century, watching sports was not easy, but the invention of television revolutionized the way live sports were viewed. Then, the rise of computers and broadcasting technology brought sports to homes around the world, which made people aware of new sports, which led to an increase in the popularity of sports lovers and sports.

The use of instant replay and video technology for official decision-making by referees in sports has made quick and accurate decisions, which has made it easier for players and sports officials to plan sports training, select sports equipment, sports training loads, player diet, rest, etc., keeping in mind the player's performance.

The genetic and biomechanical aspects of a player are studied through the use of advanced technology, through which the player's DNA is tested to get information about the genetic potential of the player and which sport and skill are selected for him. Improving their techniques and preventing injuries are the ways to make a player a high-quality player. The use of technology has led to the widespread use of various devices, which has led to the use of wearable technology by coaches, players and referees to monitor a player's performance using fitness trackers, GPS systems and heart rate monitors to increase their playing ability and prevent injuries.

As a result of such a digital revolution, teams have started using computer software to analyze player performance, game strategy and statistics. Using data obtained through analytics with the use of advanced devices not only helps in injury prevention, but also enables coaches and players to improve strategy and maximize performance.

## Methodology

This study adopts a mixed-methods approach combining qualitative and quantitative analyses. Primary and secondary data were collected from international research articles, sports technology reports, and statistical datasets covering the period between 2020 and 2025. The Delphi method was used to gather expert opinions on the future impact of technology on sports, while descriptive and comparative analyses were conducted to assess trends in AI coaching, wearable technology, and AR/VR adoption.

 ***Sports world and modernity:***

**1. AI coaching applications**

New technology and its applications (Artificial Intelligence - AI) enable computers to obtain real-time accurate information about a player's movements, analyze and evaluate them, identify the good and bad aspects of a player's game performance, and provide appropriate recommendations to the player accordingly.

Key uses of Artificial Intelligence (AI):

• Data analysis: AI algorithms process large amounts of data to identify players' strengths, weaknesses, and performance patterns.

• Personalized training: AI creates customized training programs for individual players, designed to improve performance and reduce the risk of injury.

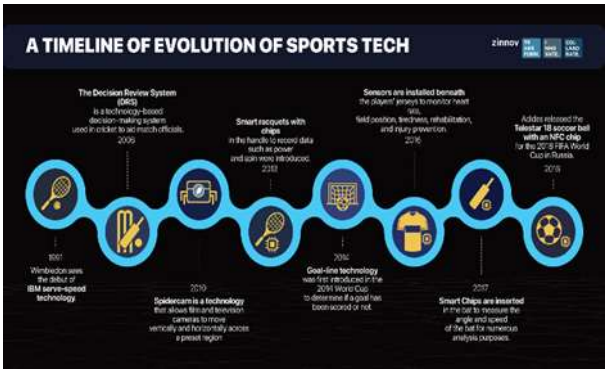
• Game strategy development: AI-based simulations analyze opponents' strategies so that teams can develop effective defensive plans.

**2. Smartphone Apps Technology:**

According to the "Worldwide Survey of Fitness Trends for 2016" (American College of Sports Medicine), smart phones are being widely used by fitness enthusiasts for tracking, education, reporting and physical fitness, through which the athlete can get information about his heart rate, blood flow, blood pressure, respiratory function, etc. during exercise without depending on anyone else and increase or decrease the workload according to himself.

**3. Advanced Performance Analysis**

The athlete's training method is prepared by collecting and analyzing statistical information from every aspect that touches the athlete. Which is very effective for the athlete. The changes in the athlete's sports performance during training are also predicted by keeping an eye on his future results.




SportsTech Metrics which provides a comprehensive framework for the field of sports technology, which is based on two directions: user and technology. These two directions together show how different types of technologies provide solutions to different user groups. Which studies how technology will affect sports in the future. In which a Delphi method-based foresight study was presented with expert opinions, which found that by the year 2030, advanced technology will have a significant impact on players, spectators and fans working in sports, as well as sports organizers. In which two possible future scenarios were discussed:

1. Probable Future

2. Game Changer

These findings will provide useful guidance for sports decision-makers and other stakeholders and open up promising directions for future research.

**4. Augmented and Virtual Reality (AR/VR) Experience**

This technology provides extensive experiences such as 360-degree game views and virtual stadium tours in a small room. Which becomes a very immersive experience.

**5. Wearable Technology and Performance Analysis**

These are modern devices that collect real-time data on a player's heart rate, speed, movement patterns and performance and monitor player performance.

The main benefits of which are as follows.

 Advanced Monitoring: Modern devices can track heart rate changes, oxygen saturation, hydration levels and mass muscle movement patterns, and based on this, the training regimen of players can be improved.

 Injury Prevention: By analyzing a player's body movement patterns and fatigue levels, wearables can predict potential injuries and enable the player to take steps to prevent injuries.

 Performance Improvement: By measuring and analyzing a player's body composition and muscle strength, it helps players modify tactics, improve performance and reduce recovery time.

Technology has transformed sports and the way games are played and watched, from increasing fan participation to reducing the potential for error. With more technological innovations expected in the future, the sports industry will continue to evolve and improve the experience for both players and spectators.

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**Innovation and Sports Research:**

• Motion Analysis in Sport (Dominic F L Southgate, Joe A I Prinold and Robert A Weinert-Aplin)

• Sports Innovation in the Journey Towards Rowing Gold: Improving Performance and Well-Being (Alison H McGregor)

• The Relationship Between Equipment and Player Performance in Racquet Sports: A Cricketing Story (Theofano Eftaxiopoulou, Victor Chaillot and Anthony M J Bull)

• Study and Prevention of Ankle Sprains (Daniel Tik-Pui Fong)

• Active Armour for the Sporting Goods Market (Daniel Plant)

• Architectural Urbanism and Sporting Ecologies: Defining the Neighbourhood Level (Tarsha Finney)

***Recent Trends in Sports Technology***

**1. Ever-Present Sports Arena Technology:**

Devices such as smart watches, fitness trackers, GPS watches and tracking devices, heart rate monitors have become very popular in the last few years. has become popular and the number of people using it is continuously increasing. There are many devices and options available to suit the needs of a health-conscious person. Which provides the player with complete information about the distance covered or steps taken. The player decides his next strategy with the data provided by such devices. Which is also benefiting the professionals associated with this device and its technology.

**2. Fashion and sportswear:**

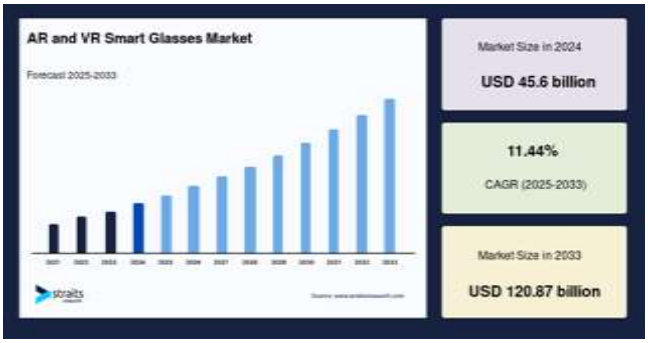
If you look at the sports competitions of 30-40 years ago, it is seen that the players, regardless of the sport, were seen in the same clothes and boots. But in today's sports competitions, every player In competitions, players are seen in clothes and boots specially designed for each sport, which not only provide statistical information about the player's movement data, his speed, distance covered, etc., but also control the temperature inside his body. Such clothes and devices have developed a very big business.

• Current Market Trends

Integration of Artificial Intelligence and Machine Learning into AR/VR

• The integration of artificial intelligence and machine learning is transforming AR/VR smart glasses, improving object recognition, real-time context analysis and a convenient user interface. The European Commission is actively promoting the adoption of innovative technologies, including artificial intelligence (AI) and the Internet of Things (IoT), in EU enterprises.

• For example, according to Eurostat, in 2022, 8% of EU enterprises used AI technology and 29% of enterprises used IoT, which directly impacts use cases related to immersive training and maintenance.




This figure shows the forecast for the AR and VR Smart Glasses Market (2025–2033). Future of AR and VR Smart Glasses Market: Research-Based Analysis

According to the latest data, the AR (Augmented Reality) and VR (Virtual Reality) smart glasses market is set to witness significant growth in the coming years. The market was valued at US$ 45.6 billion in 2024, while it is expected to reach US$ 120.87 billion by 2033. This growth rate (CAGR) will be 11.44% (2025–2033), reflecting the increasing popularity of AR/VR technology and its widespread adoption across various industries.

## Key Growth Factors:

**1. Integration of Artificial Intelligence (AI) and Machine Learning:**

Improvement in object recognition, real-time data analysis, and user-friendly interface features in smart glasses.

**2. Immersive Training and Maintenance:**

Widespread use of AR/VR for training in sectors such as healthcare, manufacturing and defence.

**3. European Union Efforts:**

The European Commission continues to encourage the adoption of innovative technologies such as AI and the Internet of Things (IoT). In 2022, 8% of EU enterprises adopted AI technology, while 29% of enterprises used IoT, further strengthening the path for immersive applications.

Interpretation for the research paper:

These figures show that the AR and VR smart glasses market is not limited to gaming and entertainment, but will also revolutionize education, healthcare, industry training and smart working solutions. Researchers need to conduct more in-depth studies on the adoption process, user experience and market dynamics of new technologies in this area.

## Recommendations

Some recommendations can be made for the use of modern technologies in games as follows.

1. Artificial Intelligence (AI) Development in Sports: With the aim of enabling players to develop themselves through self-training, such devices and their applications should be developed in which players can improve their sports performance and avoid injuries in sports.

2. Widespread use of wearable technology:

Increase the use of wearable devices such as smart watches, fitness bands, GPS systems so that the health and sports performance of the player can be monitored.

3. Give importance to research in sports.

Financial assistance should be provided by the government or other private firms to individuals or organizations working in sports research.

4. Increase fan engagement through AR/VR technology:

Focus should be on increasing the participation of sports fans through virtual stadium tours, 3D sports experiences and digital platforms.

5. To make the guides and referees aware of the modern trends: To increase the knowledge of the guides and referees through seminars, conferences or refreshment courses, to provide them with training, which will benefit the players.

## Conclusion

The use of modern technology in the sports sector has had a profound and positive impact on the performance, training, health and popularity of the sport of the players. Innovative technologies such as computer-based data analysis, AI coaching, smartphone applications, wearable devices, augmented reality (AR) and virtual reality (VR) have made the sports sector more scientific, accurate and transparent.

With the use of technology:

• The fitness, health and injury prevention of the players have improved.

• Training methods have become personalized and continuous monitoring of performance has become possible.

• Strategy development, data analysis and prediction of future results have become easier.

• Fans have got new opportunities for virtual experience and live participation.

As a result, the sports industry has become more professional, technology-driven and globally competitive. With the continuous development of technology in the future, there is a possibility of more innovation, transparency and quality in the sports sector.

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