

# Digital technologies in sports: Opportunities, challenges, and strategies for safeguarding athlete wellbeing and competitive integrity in the digital era

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<https://doi.org/10.1016/j.techvsoc.2024.102499>

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## Highlights

- Sports tech transforms operations; ethical risks need evaluation.
- Analytics adoption shows benefits, but hurdles remain.
- Responsible integration of innovations prioritizes impact assessment.
- Mixed methodology analyzes tech adoption, challenges, values.
- Strategic tech planning crucial for competitive advantage.

## Abstract

Digital technologies are revolutionizing operations across various industries, including the sports sector. This study employed a **mixed methods** approach to investigate technology adoption rates and assess the perceived impacts on performance, injuries, operations, and fan experience in 21 sports organizations. Furthermore, semi-structured interviews were conducted with 17 industry experts, providing information on decision drivers, implementation challenges, emerging innovations, and ethical considerations associated with responsible technology integration. The survey findings revealed extensive usage of **analytics**, **wearables**, **management information systems**, and **fan engagement platforms** among the sports organizations under investigation. Notably, **analytics and statistics tools**, along with **management information systems**, were identified as having the most significant influence on enhancing organizational performance and efficiency. **Wearable technologies** emerged as crucial tools for injury prevention through the monitoring of athlete health metrics. Insights gleaned from the expert interviews underscored the potential of emerging technologies, such as **augmented reality**, **athlete tracking**, **predictive analytics**, **robotics**, and **AI coaching**, in the sports industry. However, experts also highlighted implementation challenges, including financial considerations, skills gaps, resistance to change, uncertainties surrounding **return on investment** demonstration, and ethical risks that necessitate mitigation measures. The study results indicated that data-driven systems have the capacity to improve operations and athlete outcomes; however, an over-reliance on such systems may diminish the significance of human expertise. It is imperative that responsible integration of these technologies aligns with organizational goals and values. By investigating current trends in technology adoption, assessing perceived impacts, and considering stakeholder viewpoints through an integrated methodology, this study aimed to provide evidence-based guidance for maximizing the benefits of digital transformation in a responsible manner.

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