European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

Digital transformation and its impact on economic growth of indian sports and physical education

Dr. Yogendra Sharma (Assistant Professor)
Lakshmibai National Institute of Physical Education - North East Regional Centre, Guwahati, Assam

Dr. Yash Chandra Gangwar, Assistant Professor[2]
Nihal Shyam College, Bareilly, U.P.

Prof. Brij Bhushan Singh (Professor)
Department of Physical Education, Aligarh Muslim University, Aligarh (Utter Pradesh)

Abstract-
India ranks as a third one largest country globally, and its current growth in the digital sports market is impression. This information highlighted in the 2024 report on India's digital economy. Over the past decade, the digital transformation in India has had substantial impact on various industries, particularly in sports and physical education. The incorporation of cutting-edge technologies such as artificial intelligence, big data analysis, virtual reality and wearable tech has transferred training techniques, performance evaluation and sports management. This research explores the economic growth driven by digital transformation in sports and physical education, understanding its importance in encouraging growth and innovation.

Keywords: Digital Transformation, Sports technology, Physical Education, Artificial intelligence in Sports, Indian.

Introduction-

In the last decade, India achieves the remarkable digitalizing in the economic growth and it is one of the popular and reaches sports and physical education country in the modern era. According to the state of India's digital economy reports 2024, it is the third largest digitalized country in the world in terms of economy-wide digitalization, and 12th among the G20 countries in the level of digitalization of individual users[1].

The continuing of digital technology has transformed the landscape of the physical education and sports in the Indian contingents. From the data-driven training programs to smart sports infrastructure, digital advancements have enabled athletes and students to enhance their sports skills and performance. This research examines the role economic growth of digital transformation in sports and physical education, emphasizing its significance of fostering growth and innovation.

Wearable technology: The use of wearable technology such as devices, fitness bands, costumes of various sports (Swimming, wrestling, weight and power lifting, boxing etc.), smarts watches, and biometric sensors has provided athletes with real-time performance data. (Smith & Jones, 2021) indicated that these devices like Smart watch help in monitoring heart rate, oxygen levels, movement efficiency, and sports injury prevention, thereby improving overall athletic performances.

Artificial intelligence: According the (Brown, 2020) artificial intelligence (AI) sports coaching and big data analytics have enabled personalized various training programs. Advanced algorithms analyze player movements; suggest corrective actions, and optimizing strategies, contributing to improved game performance.

Virtual and Augmented reality technologies: (Patel & Sharma, 2022) advocated about the Virtual reality (VR) and Augmented reality (AR) technologies are being used for immersive training experiences. Athletes can simulate real-game scenarios, enhance decision-making skills, and practice in a controlled environment without the risk of Injuries**.**

E-learning platform: Digital e-learning platform offer in the sports interactive courses and virtual tanning session, making physical education accessible across different Indian regions. Aspiring athletes and students can learn from expert trainers through online classes (Kumar et al., 2021).

Digital Technology: The integration of smart boards, motion sensors, and game playing elements in physical education curriculums has made learning more engaging and effective. (Gupta & Singh, 2023) supported through his study that digital game that encourages physical activity help students develop motor skills and improve fitness levels.

Digital Tools: As evidence proven (Desai, 2019), advancement in sports sciences, aided by digital tools, have led to better injury prevention and rehabilitation methods. Motion analysis, physiotherapy apps, and AI-driven diagnostics play a crucial role in athlete recovery and fitness maintenance.

Challenge of Digital Transformation-

- **Advanced technologies have more costs in relation Indian market (Rao, 2020):** In the Indian sports market, advanced technologies often come with high costs, making accessibility and widespread adoption a challenge. Some examples are - Hawk-Eye Technology (Cricket and Tennis), VAR (Video Assistant Referee) in Football, Motion Sensor-Based Training Systems (Weightlifting and Athletics), Wearable Performance Trackers (Kabaddi and Hockey), and Automated Bowling Machines (Cricket and Badminton).
- **Security of data and privacy concerns (Sharma & Iyer, 2022):** In the sports industry, data security and privacy concerns have become increasingly significant due to the rise of digital technologies like Biometric Data in Cricket (IPL and BCCI Analytics), Smart Wearables in Kabaddi (Pro Kabaddi League), Fan Data in Ticketing & Apps (ISL and IPL Online Platforms), AI-Powered Coaching Systems in Weightlifting & Athletics, and VAR and Hawk-Eye Systems (Football and Tennis).
- **Lack of literacy rate is the major issues among the athletes as well as coaches, trainers, and instructors (Verma, 2021):** A low literacy rate among athletes, coaches, trainers, and instructors can impact their understanding of modern training methods, injury prevention, and sports science like Traditional Wrestling (Kushti), Weightlifting (Grassroots Level), Kabaddi (Local and Pro Levels), Athletics (Track and Field), Cricket (Domestic and Grassroots Coaching).
- **Minimum accessibility of the resources in the ruler area of the India (Mehta, 2019):** Limited access to sports resources in rural India affects athlete development and overall sports

growth. Some suitable sports examples include: Athletics (Track and Field), Weightlifting, Wrestling (Kushti), Football, Cricket.

Upcoming visions-

The future of the digital transformation in sports field especially in the India is promising. Government takes the initiatives, collaborations with tech companies (Tech companies frequently collaborate for various reasons, including strategic alliances, innovation, and market expansion, often involving sharing resources, technology, and expertise.), and increased investment in the field of sports technology will further enhance the sector rate. (Choudhary, 2023) through in his research that implementation of artificial intelligence and block-chain in sports management is expected to modernize and enhance the athletes' top performance.

Conclusion-

The landscape of sports and physical education in India has been transformed by digital advancements, which have brought about new tools and approaches. Although there are hurdles to overcome, continuous technological progress and well-planned initiatives will sustain the sector's development, enhancing the efficiency and inclusivity of sports training and physical education.

References-

1. https://static.pib.gov.in/WriteReadData/specificdocs/documents/2025/jan/doc2025128491801.pdf
2. Brown, A. (2020). Big Data in Sports Training. *Journal of Sports Analytics*, 12(3), 45-59.
3. Choudhary, M. (2023). Future of AI in Sports Management. *International Journal of Sports Technology*, 18(2), 100-115.
4. Desai, P. (2019). Advances in Sports Science and Digital Technologies. *Sports Medicine Review*, 14(4), 221-234.
5. Gupta, R., & Singh, V. (2023). Gamification in Physical Education. *Education and Technology Journal*, 9(1), 55-70.
6. Kumar, N., Patel, S., & Sharma, R. (2021). E-Learning in Sports Education. *Indian Journal of Digital Learning*, 7(2), 88-102.
7. Mehta, A. (2019). The Digital Divide in Sports Technology. *Indian Journal of Rural Development*, 6(3), 33-47.
8. Patel, L., & Sharma, T. (2022). Virtual Reality in Athletic Training. *VR & Sports Technology*, 11(2), 150-167.
9. Rao, K. (2020). Cost Implications of Digital Transformation in Sports. *Economic Review of Sports*, 5(4), 99-113.
10. Sharma, A., & Iyer, P. (2022). Data Security in Digital Sports. *Journal of Cybersecurity in Athletics*, 13(3), 75-90.
11. Smith, J., & Jones, L. (2021). Wearable Technology and Athlete Performance. *Sports Science Review*, 16(1), 30-44.
12. Verma, D. (2021). Digital Literacy Among Coaches and Trainers. *Journal of Sports Education*, 10(2), 125-139.