On Taiwan's Readiness and Response to the Olympic AI Agenda

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1. Introduction

Artificial Intelligence (AI) has a significant impact on society and is increasingly reshaping various aspects, such as education (Huang et al., 2025), sports training, and physical education (Huang & Shimizu, 2024). Acknowledging AI's transformative potential, the International Olympic Committee (IOC) introduced the Olympic AI Agenda, a strategic framework designed to integrate AI efficiently and ethically into the Olympic Movement (International Olympic Committee [IOC], 2024). The application of AI in sports ranges from athlete performance analysis and athlete well-being to event arrangement and fan engagement, fundamentally transforming the Olympic and global sports landscape.

As a leading technological hub, Taiwan has proactively embraced AI-powered innovations in both sports (Chinese Taipei Olympic Committee [CTOC], 2024b) and education (Ministry of Education, 2024). The CTOC and the Taiwanese government have taken significant steps to align with the IOC Olympic AI Agenda, leveraging AI to enhance athletic training, physical education, and competition management (CTOC, 2024a, 2024b). This review critically examines Taiwan's responses to the IOC Olympic AI Agenda and explores the potential of AI to further contribute to the future of sports and physical education in Taiwan.

(1) Research Context

Despite AI's opportunities to optimize sports performance and education, its adoption raises ethical, accessibility, and governance challenges. Taiwan's integration of AI into sports training and physical education requires a thorough estimation to determine its effectiveness, identify challenges, and propose areas for betterment.

This review provides valuable insights into how Taiwan's AI policies and practices align with the IOC's AI-powered initiatives. Additionally, it explores potential strategies for maximizing AI's impact in sports, ensuring that AI integration remains an educational sustainable development goal for all (United Nations, 2015). It

also aims to provide a detailed step-by-step analysis of Taiwan’ s response in relation to each of the five key focus areas of the Olympic AI agenda, highlighting alignments and identifying gaps.

(2) Research Goals

This essay serves as a commentary and review of Taiwan’ s engagement with the Olympic AI Agenda, aiming to (1) Analyze the Olympic AI Agenda and its key focus areas. (2) Evaluate Taiwan’ s adoption of AI in sports training, physical education, and Olympic preparation. (3) Identify challenges and ethical considerations in AI implementation in this field. (4) Recommend aligning Taiwan’ s AI initiatives with IOC standards.

By analyzing Taiwan’ s AI strategies within the Olympic Movement, this study contributes to the discourse on AI’ s role in sports education, training, and competition at local, national, and international levels.

2. Olympic AI Agenda

The Olympic AI Agenda is a strategic framework introduced by the IOC to harness the transformative power of AI in sports. Building on previous initiatives such as Olympic Agenda 2020 and Olympic Agenda 2020+5, this agenda aims to integrate AI responsibly and ethically, ensuring alignment with Olympic values and human-centric principles (IOC, 2024; UNESCO, 2024). AI’ s impact on sports is growing rapidly, enhancing areas such as athlete training, competition management, athlete well-being, and global audience engagement. By implementing AI-driven strategies, the IOC seeks to improve operational efficiency while safeguarding fairness, inclusivity, and sustainability in sports.

(1) Key Focus Areas of the Olympic AI Agenda

The Olympic AI Agenda is a response to the increasing influence of AI in sports and society. It outlines five key focus areas. First, Supporting Athletes, Clean Competition, and Safe Sports: AI is crucial in talent identification, performance optimization, and injury prevention. Additionally, AI-driven monitoring systems help protect athletes from harassment, doping violations, and unethical practices, guaranteeing a fair and safe competitive environment (IOC, 2024).

Second, Ensuring Equal Access to the Benefits of AI: To prevent unevenness between well-resourced and underprivileged nations, the IOC promotes universal access to AI technologies in sports. This initiative aims to bridge technological gaps,

ensuring athletes and coaches from all regions can leverage AI for global training and performance enhancement equally.

Third, Optimizing Olympic and Paralympic Games Operations with a Focus on Sustainability: AI is revolutionizing event management by improving logistics, reducing waste, and enhancing sustainability. AI-driven predictive analytics and automation contribute to efficient resource utilization, making the Olympic Games more sustainable and resilient for aligning sustainable development goals (SDGs) (IOC, 2024; United Nations, 2015).

Fourth, Growing Engagement with Global Audiences: AI enhances fan engagement by offering personalized experiences, automated content generation, and interactive digital platforms. By leveraging AI-driven insights, broadcasters and event organizers can create tailored content that deepens audience engagement and strengthens their connection to the Olympic Games (Jang et al., 2025).

Fifth, Driving Efficiency in IOC and Sports Administration: AI streamlines administrative operations, optimizing decision-making, resource allocation, and data management within the IOC and various sports organizations, ensuring increased efficiency in managing global sporting events and meetings.

(2) Practical Implementation of the Olympic AI Agenda

The principles of the Olympic AI Agenda were actively implemented at the Paris 2024 Olympic Games, demonstrating how AI can enhance efficiency, sustainability, and the overall Olympic experience. Several key AI applications are introduced below. First, Athlete Performance and Training: AI-driven motion analysis technologies monitored and evaluated athletes' real-time movements. The China Olympic Diving Team used AI-powered tracking systems to analyze divers' techniques, generating insights beyond traditional video analysis (China Daily, 2024). Such AI-based coaching tools help refine techniques and reduce injury risks.

Second, Event Planning and Sustainability: Digital twins-AI-generated virtual replicas of physical venues-enabled precise event planning and logistical optimization. Organizers simulated different scenarios to enhance crowd control, security, and venue sustainability, reducing the need for excessive on-site assessments (AVIXA Xchange, 2024; Rooney, 2023).

Third, Broadcasting and Fan Engagement: AI transformed Olympic event broadcasting. Olympic Broadcasting Services (OBS) collaborated with AI partners to integrate AI-powered motion tracking, allowing commentators to provide real-

time data on athletes' positions during sprints, rowing, and sailing competitions-this enriched storytelling by offering spectators a more immersive viewing experience for the audience.

Fourth, Security and Crowd Management: AI-powered video surveillance and facial recognition systems were deployed to monitor crowd movements, detect security threats, and prevent unauthorized access. These technologies significantly enhanced real-time responsiveness, ensuring a safer Olympic environment for all stakeholders (Le Monde, 2024).

Fifth, Timekeeping and Performance Analysis: As the official Olympic timekeeper, Omega introduced AI-driven timing systems capable of measuring performance down to the millionth of a second. This level of precision provided unparalleled accuracy in event timing, offering athletes and coaches detailed performance metrics (Glasbey, 2024).

Sixth, AI-Driven Energy Efficiency Initiatives: A groundbreaking AI-driven energy optimization initiative at Paris 2024 repurposed waste heat from data centers to warm Olympic facilities, including the Olympic Aquatics Center. This demonstrated how AI and environmental responsibility coexist in large-scale sporting events (Data Center Knowledge, 2024).

In short, the Olympic AI Agenda is a future-oriented initiative that balances technological innovation with Olympic values. By adopting AI efficiently, ethically, and responsibly, the IOC ensures that AI advances sports performance, education, and engagement while maintaining principles of fairness, inclusivity, and human-centered development. The Olympic AI Agenda is a response to the increasing influence of AI in sports and society. It outlines five key focus areas. First, Supporting Athletes, Clean Competition, and Safe Sports: AI is crucial in talent identification, performance optimization, and injury prevention. Additionally, AI-driven monitoring systems help protect athletes from harassment, doping violations, and unethical practices, guaranteeing a fair and safe competitive environment (IOC, 2024). Moreover, algorithm transparency should be addressed during implementing AI for Olympic activities. Algorithm transparency refers to the ability of stakeholders to understand how AI models and algorithms are making decisions, especially when these affect athlete performance evaluation and competition fairness. Practically, this involves disclosing the criteria and data sources used by AI tools, allowing independent verification and promoting trust among users. The IOC encourages the use of explainable AI (XAI) to enable athletes and coaches to understand how decisions are reached, especially in contexts of injury risk or selection for events.

3. Taiwan's Response to the Olympic AI Agenda

The global integration of AI in sports and physical education has significantly influenced Taiwan's educational and athletic landscape (CTOC, 2024b; Ministry of Education, 2024). As an AI technological leader, such as TSMC, Taiwan has embraced AI-driven innovations to enhance athletic performance, improve physical education, and align with the IOC Olympic AI Agenda.

First, AI in Olympic and Physical Education Policy in Taiwan: Taiwan's Olympic organizations have actively responded to the IOC's Olympic AI Agenda by prioritizing AI accessibility, awareness, and implementation in sports education. The CTOC has translated and disseminated the latest Olympic AI Agenda on its official website, ensuring that athletes, teachers, students, researchers, and the general public stay informed about AI advancements in sports training and physical education (CTOC, 2024a).

Furthermore, AI-related topics were a key focus at the 2024 Athletes Forum in Taiwan, where discussions covered Generative AI and its impact on sports training, Ethical considerations for AI-integrated performance tracking, Digital bullying in sports, and AI-driven mental health solutions for athletes (CTOC, 2024b). These discussions demonstrate Taiwan's commitment to aligning its sports training and physical education strategies with IOC Olympic AI standards. However, for protecting data privacy and security for athletes, a need for training programs to enhance AI literacy among administrators and coaches and a comprehensive legislation are recommended.

Second, Technological Innovations in Taiwan's Sports Training and Physical Education: As a global leader in semiconductor manufacturing and AI innovation, such as TSMC ranking in the top 9 world companies (CompaniesMarketCap, 2025), Taiwan has actively promoted collaborations between universities, research organizations, and the sports industry to enhance AI applications in sports science (Huang & Shimizu, 2024). AI-powered solutions optimize athlete training, prevent injuries, and enhance performance assessment, aligning with Taiwan's broader digital innovative strategies.

One notable example of AI integration in education is automated assessment and feedback systems to enhance student learning outcomes in physical education. Hsia et al. (2023) demonstrated that AI-facilitated methods improved students' yoga learning

performance by providing instant feedback and personalized recommendations. Moreover, at the elite level, AI and sports technology are transforming athlete training in Taiwan. As noted by Taiwan Panorama (2021), modern Olympic competitions are about athletic skill and technological superiority.

Taiwan’s Ministry of Science and Technology has supported the development of CoachAI, an AI-driven sports training system, to address this shift. CoachAI incorporates data visualization for performance tracking, machine learning for personalized training adjustments, connected training auxiliary devices to enhance technique, and augmented reality (AR) and virtual reality (VR) for immersive training simulations (Hsu et al., 2020). These innovations provide real-time analytics, biomechanical analysis, and interactive training environments, giving Taiwanese athletes a competitive advantage on the global stage.

Third, Challenges and Ethical Considerations: Despite the transformative role of AI in sports training and physical education, maintaining a human-centered approach remains crucial to ensuring ethical alignment with educational values. The UNESCO (2024) AI Competency Framework emphasizes that AI applications must prioritize human well-being, fairness, and inclusivity. While AI can enhance sports training, it should complement rather than replace the human aspects of coaching, mentorship, and decision-making. Hsu and Kohe (2014) argue that while AI enhances athletic performance and learning outcomes, Olympic values-such as teamwork, discipline, and ethical decision-making-remain irreplaceable. Ensuring that AI-driven sports training remains ethically grounded and socially responsible is a core role for sustaining these values.

In short, Taiwan’s response to the Olympic AI Agenda reflects a strong commitment to leveraging AI for sports training and physical education. While Taiwan’s AI technological advancements have demonstrated it as a potential global leader in AI-driven sports innovation, ethical considerations, accessibility, and the preservation of human-centered coaching remain key challenges. By balancing AI innovation with sports values, Taiwan could further enhance its role in shaping the future of AI applications in Olympic innovation. The feedback from athletes could provide precious insight to enhance AI Olympic Agenda in Taiwan.

4. Critical Discussion and Recommendations

Integrating AI in sports training, physical education, and the Olympic Movement has demonstrated transformative potential. However, as Taiwan advances AI adoption, it is essential to analyze broader implications, existing challenges, and areas for further

innovation.

First, Taiwan’ s proactive stance in incorporating AI into sports aligns with global technological trends and the Olympic AI Agenda. Taiwan’ s approach has several key strengths and opportunities.

(a) Taiwan has developed cutting-edge AI solutions to improve athlete training. For example, CoachAI, an AI-driven sports training system that integrates machine learning algorithms to refine performance, AR/VR simulations for realistic training environments, and real-time data analytics to optimize athlete biomechanics (Hsu et al., 2020). These AI-driven techniques contribute to injury prevention, performance optimization, and personalized training programs.

(b) The adoption of AI-powered learning tools, such as automated assessment systems for physical education, has improved student learning outcomes. Hsia et al. (2023) demonstrated how AI-assisted yoga training enhances students’ learning performance through instant feedback and personalized coaching. By integrating AI into national curricula, as the Ministry of Education (2024) expected, Taiwan can bridge the gap between elite sports training and general physical education, ensuring that AI benefits students of all skill levels.

(c) As a global semiconductor powerhouse, Taiwan is well-positioned to lead international collaborations in AI-driven sports innovations. The country’ s technological expertise strengthens its competitiveness in Olympic AI research and policy development (Huang & Shimizu, 2024). By expanding international partnerships and collaborations with sports organizations, Taiwan can play a leading role in shaping the future of AI-driven sports technology.

Second, despite Taiwan’ s advancements, several challenges must be addressed to ensure that AI in sports and education is ethically implemented, accessible, and aligned with Olympic values. (a) The increasing use of AI in sports performance tracking raises concerns about athlete data privacy and security. AI-driven performance analytics collect sensitive biometric data, which, if misused, could lead to legal and ethical issues (UNESCO, 2024). Taiwan must implement specific data protection practices, including encrypted data storage, auditable access logs, and consent-based data collection. The government should set clear AI governance policies for data protection, ensure algorithm transparency, and develop ethical guidelines for AI use in sports training and education.

(b) Although AI offers powerful tools for training and teaching, disparities exist

in resource availability between elite training centers and public institutions. AI-driven training tools are often limited to national teams, while local public school physical education programs lack access to advanced AI technologies. Thus, expanding government funding and policy support is necessary to bridge this accessibility gap (CTOC, 2024a).

(c) While AI provides powerful analytical tools, it should complement, rather than replace, human-centered coaching and mentorship to align with the human-centered policy of UNESCO (2024). Taiwan's sports education system must preserve Olympic values like teamwork, discipline, and ethical competition (Hsu & Kohe, 2014). Coaches and educators need specialized training on how to ethically integrate AI, ensuring it reinforces rather than erodes the human element in sports.

Third, several key recommendations are proposed to ensure that Taiwan's AI advancements in sports and education align with global best practices. (a) Taiwan's policymakers should establish comprehensive AI governance frameworks prioritizing athlete data protection, algorithm transparency, and ethical AI use. Align Taiwan's AI-driven sports initiatives with IOC's ethical AI standards and UNESCO's AI competency frameworks. (b) Taiwan's government must expand AI-supported sports education in public schools, ensuring institutions receive funding for AI-based training tools. Specific implementation strategies including state-funded grants for AI equipment in public school, national AI training centers for teachers, an AI-enhanced performance platform for local teams, and the partnerships between universities, sports federations, and AI firms to increase access to AI-enhanced coaching. (c) Taiwan's government leaders could encourage collaborative AI research in sports science, biomechanics, and virtual coaching platforms. Invest in AI-driven injury prevention and rehabilitation research to enhance athlete safety and career longevity. (d) Taiwan's authorities have to ensure that AI applications in coaching and training preserve the human element of mentorship, ethical decision-making, and teamwork. Develop educational programs for coaches and athletes on the responsible use of AI in training.

In conclusion, supported by advanced AI industries, Taiwan's strategic adoption of AI in sports and physical education aligns with the IOC's Olympic AI Agenda, positioning the country as a leader in AI-driven sports innovation. However, ensuring that AI applications remain ethical, inclusive, and effectively integrated into sports training and physical education is a critical challenge. By setting strong AI governance policies, expanding accessibility, and preserving Olympic values, Taiwan can further enhance its AI ecosystem, contributing to local and international advancements in AI for sports. Continued interdisciplinary collaboration and responsible AI integration will be key to sustaining Taiwan's leadership in the AI-powered Olympic Movement.

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