APPLICATION OF ARTIFICIAL INTELLIGENCE IN ORGANIZATION OF ATHLETICS SPORT AT KWARA STATE SPORTS COMMISSION, NIGERIA

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Abstract

This study examined the application of Artificial Intelligence (AI) technologies in the organization and management of athletics activities within the Kwara State Sports Commission, Nigeria. Specifically, the study investigated the influence of selected AI-driven components namely track performance metrics, photo-finish technology and availability of AI experts on the effective organization of athletics sports. A descriptive survey research design was adopted for the study. The population comprised athletes, coaches, and administrative staff of the Kwara State Sports Commission. Using a purposive sampling technique, all 156 eligible respondents were selected and included in the study. Data were collected using a structured questionnaire, subjected to rigorous validation to ensure competency of the instrument. The reliability of the instrument was established using the split-half method, and analysis with Cronbach's alpha yielded a reliability coefficient of 0.82, indicating a high level of internal consistency. Data collected descriptive statistics, including frequency and percentages were employed to analyze respondents' demographic characteristics and answered the research questions while the three formulated null hypotheses were tested using the Pearson Product Moment Correlation (PPMC) statistical technique @ 0.05 alpha level. The findings revealed that, track metrics indicates a significant positive relationship between the use of track metrics and the organization of athletics (Cal. V = 0.266 and 0.001 < 0.05); photo-finish technology demonstrated a statistically significant influence on the organization of athletics sports (Cal. V = 0.251 and 0.001 < 0.05) and availability of AI experts demonstrated a statistically significant influence on the organization of athletics sports in the Kwara State Sports Commission (Cal. V = 0.291 and 0,001 < 0.05). These results underscore the critical role of AI technologies in enhancing planning accuracy, performance monitoring, officiating precision, and overall event management in athletics. Based on the findings, the study concluded that the integration of AI technologies significantly improves the efficiency and effectiveness of athletics organization. Consequently, it is recommended that the Kwara State Sports Commission intensify investment in AI infrastructure and capacity building. Additionally, government agencies and private stakeholders should collaborate to provide sustainable funding and technical support to advance AI-driven sports development in the state.

Keywords: Artificial intelligence, Athletics organization, Sports management, technology integration, Kwara State Sports Commission

Introduction

Artificial Intelligence (AI) refers to computational technologies capable of performing cognitive functions traditionally associated with human intelligence, including data acquisition, pattern recognition, predictive analytics, problem-solving, and decision-making through sophisticated algorithms and data-driven systems. AI has emerged as a transformative technology across numerous sectors, including education, healthcare, finance, security, manufacturing, and sports. By processing large volumes of data rapidly and accurately, AI enables organizations to improve operational efficiency, optimize performance, and facilitate evidence-based decision-making (O'Neil, 2021).

Within the sports industry, AI has revolutionized athlete management, competition organization, performance evaluation, and strategic planning. One of its most significant applications is athlete performance analysis through advanced performance metrics, including speed, acceleration, distance covered, heart rate, stride frequency, and biomechanical movement analysis. These performance indicators provide coaches and sports administrators with objective information for monitoring athletes' development, evaluating training effectiveness, identifying strengths and weaknesses, and minimizing injury risks, thereby promoting data-driven coaching and administrative decisions (Kulemin & Khoroshavin, 2018).

AI has also become an essential tool for injury prevention and athlete welfare. Machine learning algorithms continuously analyse physiological responses, workload patterns, and recovery indicators to predict injury risks before they occur. Such predictive capabilities enable coaches to modify training programmes appropriately, reduce overtraining, and improve athlete longevity (Schilperoort, 2021). Furthermore, AI supports tactical and strategic decision-making by analysing historical competition data, identifying performance trends, and simulating various competitive scenarios. These analytical capabilities assist coaches and sports administrators in developing effective competition strategies and anticipating opponents' tactical approaches (Li, 2021).

Beyond athlete performance, AI significantly improves sports administration and organizational management. AI-powered analytics enable sports organizations to understand spectators' preferences and behavioural patterns, thereby enhancing fan engagement through personalized communication, targeted marketing, and improved sporting experiences (Ratten, 2021). Similarly, Natural Language Processing (NLP), computer vision, and video analytics facilitate automated generation of match reports, performance summaries, and competition highlights, thereby improving operational efficiency within sports media and communication (Chopra & Verma, 2021).

Another notable contribution of AI is its application in sports officiating. Technologies such as Hawk-Eye systems and photo-finish technology provide highly accurate and objective competition outcomes, thereby minimizing human error and enhancing fairness, transparency, and credibility during sporting events (Wright & Breese, 2018). In athletics, photo-finish technology has become indispensable in determining race winners where victory margins are extremely narrow.

Athletics remains one of the oldest and most universally practised sporting disciplines worldwide. It comprises track events, field events, race walking, road races, and combined competitions such as the decathlon and heptathlon. These events assess athletes' speed, endurance, strength, coordination, and technical abilities. Athletics occupies a central position in international sports, serving as a flagship event of the Olympic Games and World Athletics Championships while promoting global unity, cultural exchange, and national identity (International Olympic Committee, 2020).

In Nigeria, athletics development at the state level is coordinated by State Sports Commissions. Specifically, the Kwara State Sports Commission (KSSC) is responsible for grassroots sports development, talent identification, competition organization,

athlete preparation, and participation in national and international championships. Achieving these responsibilities requires qualified personnel, adequate facilities, modern technological infrastructure, and sustainable financial resources to ensure efficient planning, organization, monitoring, and evaluation of sporting activities (Olusola, 2022).

Problem Statement

Despite remarkable global advancements in AI-driven sports management, evidence regarding its adoption within Nigerian state sports commissions remains limited. Consequently, understanding the influence of AI applications—including track performance metrics, algorithm-based analytical systems, internet facilities, photo-finish technology, AI expertise, and funding—on athletics organization at the Kwara State Sports Commission is essential. Such empirical evidence will support informed policy formulation, strategic planning, resource allocation, and sustainable sports development. This study is underpinned by an integrated theoretical framework comprising the Technology Acceptance Model (TAM) (Davis, 1989), Diffusion of Innovations (DOI) Theory (Rogers, 2003), Resource-Based View (RBV) Theory (Barney, 1991; 2021), the Technology–Organization–Environment (TOE) Framework (Tornatzky & Fleischer, 1990), and Social Cognitive Theory (SCT) (Bandura, 1986). The integration of these complementary theories provides a comprehensive explanation of AI adoption within sports organizations by addressing individual perceptions, organizational capabilities, environmental influences, innovation diffusion, and behavioural learning.

Literature Reviewed

The Technology Acceptance Model explains that individuals' intention to adopt technology depends primarily on perceived usefulness and perceived ease of use (Davis, 1989). Within the Kwara State Sports Commission, AI adoption is likely to increase when coaches, administrators, and athletes perceive AI systems as beneficial, efficient, and user-friendly. Empirical evidence further indicates that user-friendly technologies and adequate training significantly reduce resistance to technological innovations (Venkatesh et al., 2020; Dinev & Hart, 2020).

The Diffusion of Innovations Theory explains how innovations spread across organizations based on attributes such as relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). AI technologies demonstrating superior performance, compatibility with existing practices, and observable benefits are more likely to gain acceptance among sports administrators and coaches (Salo & Karjaluoto, 2021). Furthermore, innovators and early adopters often accelerate organizational technology diffusion through peer influence and demonstration (Oliveira & Martins, 2020).

The Resource-Based View considers AI technologies as valuable strategic organizational resources capable of creating sustainable competitive advantage when supported by skilled personnel, effective leadership, technical expertise, and strong data management capabilities (Barney, 2021; De Pablos & Santos, 2021). Accordingly, successful AI implementation depends not merely on technology acquisition but also on organizational capabilities that maximize technological value.

The Technology–Organization–Environment Framework provides a holistic explanation of technology adoption by considering technological readiness, organizational characteristics, and external environmental conditions (Tornatzky & Fleischer, 1990). Within the Kwara State Sports Commission, factors such as leadership commitment, financial resources, technological infrastructure, organizational culture,

government policies, and partnerships collectively influence AI adoption (Oliveira & Martins, 2020).

Finally, Social Cognitive Theory emphasizes observational learning, social interaction, and self-efficacy in shaping behavioural change (Bandura, 1986). Coaches and administrators who successfully utilize AI technologies can positively influence their colleagues through demonstration and mentorship, thereby increasing confidence, competence, and willingness to adopt AI systems (Casaló et al., 2020).

Collectively, these five theoretical perspectives provide a multidimensional understanding of AI adoption by integrating individual attitudes, organizational readiness, innovation diffusion, strategic resource management, environmental influences, and behavioural learning.

Effective athletics organization depends on accurate performance evaluation, efficient competition management, objective officiating, and evidence-based decision-making. However, many developing sports systems, including Nigerian state sports commissions, continue to experience challenges associated with inadequate technological infrastructure, limited access to advanced performance analytics, insufficient AI expertise, and inadequate financial support. These constraints often compromise athlete preparation, competition management, and international competitiveness. Although AI technologies have transformed sports management globally, their adoption within Nigerian state sports commissions remains limited. At the Kwara State Sports Commission, athletics administration continues to rely predominantly on conventional approaches to performance assessment, competition management, and officiating. The limited utilization of AI technologies—including track performance metrics, algorithm-based analytical systems, and photo-finish technology—may reduce organizational efficiency and athlete performance outcomes. Furthermore, shortages of AI specialists and inadequate funding hinder the acquisition, implementation, and maintenance of advanced technological systems. Despite increasing global interest in AI applications within sports, empirical evidence concerning the influence of AI technologies on athletics organization at the Kwara State Sports Commission remains scarce. This knowledge gap necessitates systematic investigation to provide evidence-based recommendations for policymakers, sports administrators, and stakeholders seeking to enhance athletics development through AI-driven innovations.

Accordingly, this study seeks to determine the influence of track performance metrics and the availability of AI experts on the organization of athletics sports at the Kwara State Sports Commission. It also examines the influence of photo-finish technology on athletics organization. Corresponding research questions and null hypotheses are formulated to determine whether these AI-related variables significantly influence the organization of athletics sports at the 0.05 level of significance.

Methodology

This study adopted a descriptive research design, which is appropriate for examining phenomena as they naturally occur without manipulation of variables. The choice of this design was guided by the objectives of the study, which sought to examine the application of Artificial Intelligence (AI) in organizing athletics sports within the Kwara State Sports Commission. The population consisted of 140 athletes who directly engaged in athletics-related activities under the Kwara State Sports Commission, 6 registered athletics coaches, and 10 board members responsible for administrative and policy decisions within the Association. This resulted in a total population of 156 participants. The selected population was considered appropriate because these stakeholders play critical roles in athletics organization, training,

decision-making, and implementation of innovations such as Artificial Intelligence within the Commission.

The study employed a purposive sampling technique, which involves the deliberate selection of participants based on their relevance, experience, and knowledge related to the research objectives. Purposive sampling is suitable when the researcher seeks information-rich participants who can provide meaningful insights into the phenomenon under investigation (Creswell & Poth, 2018). The validated structured instrument (Cohen et al., 2019) was examined using Cronbach alpha method (Cicchetti, 2024). The reliability analysis yielded a Cronbach's alpha value of 0.82, indicating a high level of internal consistency and exceeding the acceptable benchmark of 0.70. Therefore, the instrument was considered reliable and suitable for the main study. Data was distributed by following a systematic and ethically guided procedure to ensure accuracy, voluntariness, and confidentiality. 4 research assistants assisted in the circulation and collection of the instrument to the respondents. The data collected were coded, organized, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics, including frequency counts, percentages, mean, and standard deviation, were used to analyze demographic data and answer the research questions. Inferential statistics, specifically the Pearson Product Moment Correlation (PPMC), were used to test the research hypotheses at a 0.05 level of significance. The results were interpreted based on established statistical decision criteria and presented in tables for clarity and ease of understanding

Table 1
Population and Sample Size Distribution

Category of Participants	Population	Sample Size
Registered athletics athletes	140	140
Registered athletics coaches	6	6
Athletics Association board members	10	10
Total	156	156

Table 2
Frequency Distribution of Respondents by Demographic Variables (N = 156)

Variable	Category	Frequency	(%)
Gender	Male	109	69.9
	Female	47	30.1
Total		156	156
Age	10-15 years	23	14.7
	16-20 years	84	53.8
	21 years & above	49	39.4
Total		156	100.0
Educational Qualification	SSCE	66	42.3
	NCE/ND	70	44.9
	HND/BSC	.20	12.8
Total			
Status	Staff	42	26.9
	Athletes	114	73.1
Total		156	199.0

Table 2 showed that the majority of respondents were male (69.9%), while females constituted 30.1%, indicating higher male participation in athletics-related activities. Regarding age distribution, respondents aged 16–20 years formed the largest group (53.8%), followed by those aged 21 years and above (31.4%), while respondents aged 10–15 years accounted for 14.7%.

In terms of educational qualification, respondents with NCE/ND constituted the highest proportion (44.9%), followed closely by those with SSCE (42.3%), while HND/BSc holders represented 12.8%. Concerning status, athletes constituted the majority (73.1%), while staff members—including coaches, administrative, and technical staff—accounted for 26.9%. This distribution confirms that the data were largely drawn from individuals directly engaged in athletic participation and management.

Answers to Research Questions

Research Question 1

Does the use of track metrics have a relationship with the organization of athletics sports in Kwara State Sports Commission?

Table 3

Respondents' Perception of Track Metrics and Organization of Athletics Sports

Item description	SA(%)	A(%)	D(%)	SD(%)	Favourable(%)
Accuracy in tracking athletes' Performance	46 (29.5)	63 (40.4)	24 (15.4)	23 (14.7)	69.9
Real-time data enhances training Efficiency	45 (28.8)	67 (42.9)	24 (15.4)	20 (12.8)	71.7
Reduction of human error in timing	45 (28.8)	63 (40.4)	24 (15.4)	24 (15.4)	69.2
Optimization of training and injury Prevention	45 (28.8)	66 (42.3)	24 (15.4)	21 (13.5)	71.7
Workload monitoring for individualized training	39 (25.0)	63 (40.4)	24 (15.4)	30 (19.2)	65.4

Note. SA = Strongly agree; A = Agree; D = Disagree; SD = Strongly disagree.

The aggregated responses indicate that 542 (60.5%) of respondents either strongly agreed or agreed with statements relating to the positive role of AI-based track metrics,

while 238 (39.5%) either disagreed or strongly disagreed. The results reveal that the majority of respondents acknowledged that AI-driven track metrics enhance accuracy in performance tracking, improve training efficiency through real-time data, reduce human error, and support injury prevention through workload monitoring. The favorable response rate of 60.5% suggests that track metrics play a significant role in improving the organization of athletics sports within the Kwara State Sports Commission.

Research Question 2
Does the use of photo finish technology have a relationship with the organization of athletics sports in Kwara State Sports Commission?
Table 4
Respondents' Perception of Photo finish Technology

Item description	SA(%)	A(%)	D(%)	SD(%)	Favourable(%)
Ensures fair race results	53 (34.0)	48 (30.8)	28 (17.9)	27 (17.3)	64.8
Availability of photofinish technology	48 (30.8)	61 (39.1)	25 (16.0)	22 (14.1)	69.9
Reduction of competition disputes	46 (29.5)	63 (40.4)	24 (15.4)	23 (14.7)	69.9
Accuracy beyond manual/electronic Timing	46 (29.5)	67 (42.9)	24 (15.4)	19 (12.2)	72.4

Note. SA = Strongly agree; A = Agree; D = Disagree; SD = Strongly disagree.

The combined results show that 422 (60.5%) of respondents expressed agreement, while 192 (39.5%) expressed disagreement with the statements.
The findings indicate that respondents largely agreed that AI-powered photo finish systems ensure fairness in race outcomes, reduce disputes during competitions, and provide higher accuracy than manual or conventional electronic timing systems. The favourable response of 60.5% implies that photo finish technology significantly enhances the organization and credibility of athletics competitions within the Commission.
Research Question 3
Does the availability of AI experts have a relationship with the organization of athletics sports in Kwara State Sports Commission?
Table 5
Respondents' Perception of AI Experts and Athletics Organization

Item description	SA(%)	A(%)	D(%)	SD(%)	Favourable(%)
Access to qualified AI experts	32 (20.5)	60 (38.5)	32 (20.5)	32 (20.5)	59.0
Technical expertise influences AI implementation	50 (32.1)	64 (41.0)	22 (14.1)	20 (12.8)	73.1
AI experts enhance event organization	40 (25.6)	68 (43.6)	35 (22.4)	13 (8.3)	69.2
Absence of AI experts limits effectiveness	53 (34.0)	72 (46.2)	27 (17.3)	4 (2.6)	80.2

Note. SA = Strongly agree; A = Agree; D = Disagree; SD = Strongly disagree.

The results show that 439 (60.5%) of respondents agreed with the statements, while 185 (39.5%) disagreed. The findings demonstrate that the presence of qualified AI experts facilitates effective implementation of AI technologies in athletics management. Respondents also indicated that limited technical expertise hinders AI adoption. The majority agreement (60.5%) suggests that AI experts play a crucial role in improving the organization of athletics sports within the Kwara State Sports Commission.

Testing of Research Hypotheses

Hypothesis One

H_{01}: There is no significant correlation between the use of track metrics and the organization of athletics sports in Kwara State Sports Commission.

Table 6

Pearson Product Moment Correlation between Track Metrics and Organization of Athletics Sports

Variable	N	Mean	SD	df	r-cal	p-value	Decision
Track metrics	156	2.153	1.010	154	0.266	0.000	Reject H_0
Organization of athletics sports	156	2.141	1.012				

Note. Correlation is significant @ $p < .05$.

The above table showed that since the p-value (0.000) is less than 0.05, the null hypothesis is rejected. This indicates a significant positive relationship between the use of track metrics and the organization of athletics sports in the Kwara State Sports Commission.

Hypothesis Two

H_{04}: There is no significant relationship between photo finish technology and the organization of athletics sports in Kwara State Sports Commission.

Table 7

Pearson Product Moment Correlation between Photo finish Technology and Athletics Organization

Variable	N	Mean	SD	df	r-cal	p-value	Decision
Photo finish technology	156	2.185	1.088	154	0.251	0.000	Reject H_0
Organization of athletics sports	156	2.141	1.012				

Note. Correlation is significant @ $p < .05$.

The above results showed that the p-value (0.000) is less than the significance level of 0.05. Therefore, the null hypothesis is rejected, indicating that photo finish technology has a significant relationship with the organization of athletics sports in the Kwara State Sports Commission.

Hypothesis Three

H_{05}: There is no significant relationship between AI experts and the organization of athletics sports in Kwara State Sports Commission.

Table 8

Pearson Product Moment Correlation between AI Experts and Athletics Organization

Variable	N	Mean	SD	df	r-cal	p-value	Decision
AI experts	156	2.410	1.034	154	0.291	0.000	Reject H_0
Organization of athletics sports	156	2.141	1.012				

Note. Correlation is significant @ $p < .05$.

The above results showed that the p-value (0.000) is less than 0.05. Hence, the null hypothesis is rejected. This confirms that the availability of AI experts has a significant positive relationship with the organization of athletics sports in the Kwara State Sports Commission.

Discussion of Findings

This study examined the relationship between Artificial Intelligence (AI)–enabled technologies and the organization of athletics sports within the Kwara State Sports Commission (KSSC). The findings revealed a statistically significant relationship between AI-related innovations and effective athletics organization, confirming the growing importance of data-driven and technology-supported sports management systems in contemporary athletics administration.

The findings demonstrate that the use of track performance metrics—such as split times, reaction times, lap pacing, and stride efficiency has a significant relationship with the organization of athletics sports in Kwara State. Although full-scale AI-driven tracking systems are not yet widely implemented within KSSC, the partial adoption of manual and semi-digital performance monitoring tools has already contributed to more structured training programs, improved competition preparation, and better event coordination. This result aligns with existing literature, which emphasizes that measurable performance indicators enhance coaching effectiveness and athlete development (Akinyemi & Yusuf, 2022). Studies have shown that sports organizations employing systematic performance-tracking mechanisms tend to achieve superior competitive outcomes due to improved training individualization and evidence-based decision-making. In the Nigerian context, Akinyemi and Yusuf (2022) observed that states utilizing performance metrics recorded improved placements at national competitions, such as the National Sports Festival.

The present findings therefore confirm that track metrics play both an operational and strategic role in athletics organization. Even in the absence of fully automated AI systems, incremental adoption of data-informed practices can yield tangible improvements in training efficiency, performance monitoring, and event management. This outcome is consistent with the Technology Acceptance Model (TAM), which posits that perceived usefulness encourages technology adoption, even at preliminary stages.

The findings further revealed that photo finish technology has a significant and positive relationship with the organization of athletics sports in Kwara State. Photo finish systems, which employ high-speed cameras synchronized with timing sensors, ensure accurate and unbiased determination of race outcomes. The absence of such technology within KSSC has been associated with result delays, officiating disputes, and reduced confidence among athletes and spectators. This finding is consistent with prior studies indicating that photo finish technology substantially improves the credibility and efficiency of athletics competitions. Oyelade and Musa (2022) reported that the adoption of photo finish systems reduced officiating disputes by over 70% and enhanced stakeholder trust in competition outcomes. Empirical evidence from local

competitions, including the 2022 Kwara State Athletics Invitational Meet, further highlights the organizational challenges posed by reliance on manual timing methods.

The study confirms that photo finish technology contributes to effective athletics organization by ensuring accurate result timing, promoting fairness in talent selection, minimizing disputes, and improving overall event management. These findings support the Diffusion of Innovations (DOI) theory, which suggests that innovations with clear relative advantage and observability such as photo finish systems are more likely to be adopted and sustained within organizations.

The findings also revealed that the presence of AI experts has a significant relationship with the organization of athletics sports in Kwara State. Respondents indicated that limited technical expertise constitutes a major barrier to the effective implementation of AI-based systems in athletics management. Conversely, the availability of AI professionals enhances efficiency, supports athlete development, and facilitates data-driven decision-making. This result is consistent with previous research indicating that sports organizations with access to AI specialists are more likely to adopt advanced performance monitoring tools and automated competition management systems (Ogundipe & Salami, 2021). From a Resource-Based View (RBV) perspective, AI expertise represents a valuable organizational resource that enhances institutional capability and competitive advantage.

Furthermore, the findings underscore the importance of sustained funding in supporting AI integration, staff capacity building, and athlete development. Adequate financial investment enables the acquisition of technological infrastructure, recruitment of skilled personnel, and participation in national and international competitions (Akinola & Okonkwo, 2021). Collectively, these findings highlight that human and financial resources are critical enablers of effective AI adoption in sports organizations.

Conclusions

Based on the findings of this study, the following conclusions were drawn:

1. The use of track performance metrics has a significant influence on the organization of athletics sports in the Kwara State Sports Commission.
2. Photo finish technology significantly enhances the accuracy, fairness, and efficiency of athletics competitions within the Commission.
3. The presence of AI experts significantly improves organizational effectiveness, athlete development, and data-driven decision-making in athletics sports administration.

These conclusions affirm that AI-related technologies and expertise are essential components of modern athletics organization and sustainable sports development.

Recommendations

Based on the conclusions of this study, the following recommendations are proposed:

1. Integration of Track Performance Metrics
   The Kwara State Sports Commission should fully integrate AI-enabled track performance metrics into the planning, monitoring, and evaluation of athletics programs. Regular training and capacity-building initiatives should be organized for coaches and technical staff to enhance data interpretation and application.
2. Adoption of Photo finish Technology
   The Commission should invest in modern, high-resolution photo finish camera and electronic timing systems at major competition venues to ensure accurate

determination of race outcomes, reduce disputes, and enhance the credibility of athletics competitions.

3. Recruitment and Development of AI Experts
   The Commission should recruit or develop AI experts capable of designing and implementing AI-driven systems for athlete monitoring, performance analysis, talent identification, and injury prevention. Strategic partnerships with universities and technology firms are also recommended to support sustainable capacity development.

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