

THE RELATIONSHIP BETWEEN ARTIFICIAL INTELLIGENCE AND SUSTAINABILITY BY MEDIATING WOMEN'S ATHLETIC PERFORMANCE: AN EXPLORATORY STUDY OF THE OPINIONS OF A SAMPLE OF WOMEN'S SPORTS IN THE UNITED ARAB EMIRATES

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Abstract

The incorporation of AI into sport has ushered in a new era of performance enhancement and innovation in the UAE, this paradigm shift in technology is poised to redefine not only the performance of female athletes but also the sustainability of their endeavors. This research examines the intersection of artificial intelligence, women's athletic performance, and sustainability in the United Arab Emirates, with the aim of revealing the untapped potential at the crossroads of these fields. To achieve the aim of the research, a survey was conducted by distributing a questionnaire to (400) Emirati athletes. (385) questionnaires were retrieved, of which the validity of the statistical analysis was (368) questionnaires that were analyzed by the statistical program Smart PLS V.4. The results of the research indicate a positive effect. For sports performance in the relationship between artificial intelligence and sustainability in the United Arab Emirates. Women's participation in sports has seen significant growth in the UAE, but it is still necessary to address the unique challenges that sport faces. Leveraging artificial intelligence, this research seeks to unlock tailored training strategies, injury prevention protocols, and holistic wellbeing support that align with the distinct physiological and psychological needs of female athletes. By harnessing data-driven insights, an artificial intelligence can act as a catalyst to push women's athletic performance to unprecedented levels.

The UAE's unwavering commitment to sustainability is echoed in various sectors, including sports. AI-based solutions optimize resource use, reduce environmental impact, and promote environmentally conscious behaviors among sports. The study examines how artificial intelligence can be harnessed to reduce energy consumption, reduce waste, and increase the overall sustainability of women's sports activities. As the UAE seeks to position itself as a global beacon for innovation, gender empowerment and sustainability, this Search roadmap. It portrays artificial intelligence as a catalyst for holistic development, where women's sport performance is seamlessly intertwined with environmental stewardship. By exposing the complexities of AI's role in achieving sustainability through the performance of female athletes, this research ushers in a new dawn as technology becomes a conduit for empowerment, equality, and a greener future.

An introduction

In the recent years, the topics of artificial intelligence and sustainability have received a lot of attention,

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particularly in the context of sports performance. This paper delves into the intriguing relationship between AI and sustainability in sport, with a particular focus on the UAE. By exploring how AI-driven developments enhance sports performance while contributing to sustainable practices, this study aims to shed light on the innovative ways in which technology is shaping the future of sport and promoting environmental balance in the UAE. Gordon, 2017 asserts that improving athletic performance remains an attractive and complex challenge that coaches, athletes, and support staff must grapple with on a daily basis as professionals seek to uncover the foundations of performance. Athletic performance requires athletes to maintain high levels of physical and technical skills. and psychological.

Measuring aspects of performance over time can reduce injury risk, prevent overtraining, and monitor the effectiveness of training programs, increasing performance as an end goal (Shepherd & Biomedical, 2018) Athletic performance is the result of a complex and challenging combination of many factors. Athletic trainers and national governing bodies for sport are beginning to realize that the most effective way to prepare athletes for competition is one that relies on proven scientific methods rather than judgments of trial and error. Such a response contradicts many of the traditional training methods adopted. Until recently, most athletic trainers treated the idea of support from the world of sports with cynicism. However, today it is becoming more popular for individual athletes and team athletes, who are looking to achieve superior optimal performance, and their coaches and advisors to national government agencies, to obtain input from sports scientists so that these athletes can achieve their full potential Cooper, (2006).

Sport as strength has helped the UAE, position itself on the international stage, and gain more recognition and attention from other countries. Countries with small sizes consider sport as a means of basic strength that helps achieve international recognition and increases the level of tourism, which has political, social and economic advantages.

Country branding and soft power strategies, as components of sporting political tools, are essential for small countries because they help put these countries on the international stage and attract citizens of other countries to visit by improving their reputation. According to theoretical studies of small states, small lands are vulnerable because their small population and territory limit their power in areas such as military power. As a result, these states seek political strategies to increase their international recognition, which in turn serves as a guarantee of national security.

For these reasons, the UAE has successfully used sport as a means of power. Additional analyzes show that the Emirati leadership views sport as a means of power, and that the use of sport is primarily through soft power and the country's brand. The government of the United Arab Emirates has invested in sports, and has established sports infrastructure, schools and various sports academies, which benefits the national policy by improving the health of citizens, improving athletic prowess, and increasing national interest in sports in general. Moreover, these benefits also improve the UAE's image among other countries in international power politics. It has become the host of global sports competitions investing in iconic sports clubs in order to create soft power and government brands is a successful example of how small countries can use sports to become more visible and gain international recognition Galeeva, (2017).

The role of women in Emirati society lies between the traditional values of the patriarchal culture and the national efforts towards gender equality. The UAE government has implemented various initiatives to ensure that women enjoy equal rights. The country needs women's contributions to society.

(Story & Marschlich, 2022). Gender equality is also important to the national brand.

The UAE has tried to distinguish itself from other Arab countries and enhance its competitiveness at the international level (Allagui & Najjar, 2018). However, the status of women in Emirati society is not only determined by formal laws but also by the social and cultural beliefs ingrained in Emirati society and women themselves (Aloraimi, 2011).

Mirror sport in the United Arab Emirates

Women's participation in sports in the UAE has witnessed a steady increase over the years, thanks to various initiatives and efforts to promote gender equality encouraging women's participation in sports. Here are some of the salient aspects of esports in the UAE:

The Government Initiatives: The government of the United Arab Emirates is actively promoting women's participation in sports. The National Olympic Committee of the United Arab Emirates and many sports federations participated in supporting and sponsoring sports.

The Women's Sports Committees: Many sports organizations in the UAE have established women's sports committees dedicated to developing and promoting the role of women in sports. These committees create opportunities

for women in various sports disciplines.

The Sports Federations: The UAE has women participating in a wide range of sports, including football, basketball, volleyball, tennis, golf, and more. Women's football, in particular, has seen a huge growth in participation and popularity.

The Sports achievements: Emirati women athletes have achieved remarkable success in various regional and international competitions. Their achievements have inspired other girls and women to take up the sport as a serious endeavor.

Representation in Leadership: Apart from being an athlete, Emirati women have made great strides in leadership roles within sports organizations and federations.

This representation helps shape policies and initiatives that promote gender equality in sport.

Promoting physical activity: In addition to competitive sports, there are initiatives focusing on promoting physical activity and healthy lifestyles among women. Fitness clubs and health centers are encouraged community events encourage women to engage in physical activities regardless of their skill level.

Sports events: The UAE hosts many sports events and tournaments that include women's categories. These events provide platforms for women to showcase their talent and dedication to the sport.

Cultural and religious considerations: In recent years, there has been a growing understanding and acceptance of women's participation in sport while respecting cultural and religious considerations. This shift has contributed to increasing opportunities for women in sports.

Role models: As more women excel in sports, they become role models for younger generations, motivating them to pursue their sporting aspirations. Appearance and representation play an important role in encouraging girls to play sports.

International Participation: Emirati female athletes have represented the country in international tournaments, including the Olympics, the Asian Games, and various regional and continental tournaments. While progress has been made, challenges such as cultural norms, lack of infrastructure, and access to training facilities remain. However, the UAE's commitment to promoting an inclusive sports culture for both men and women continues to bring about positive changes in the landscape of women's participation in sports.

Research problem

While the UAE has made great strides in promoting women's participation in sports and embracing sustainability, there is an urgent need to explore and harness the potential of artificial intelligence to enhance women's sports performance while simultaneously promoting sustainability. Despite the progress made, sports face unique challenges related to gender-responsive training, facilities, data-driven training and support. At the same time, the UAE's commitment to sustainability requires an innovative approach to reduce the environmental impact of sporting activities. Addressing these challenges requires strategic integration of artificial intelligence to empower women athletes, improve training systems, and enhance resource efficiency, which ultimately contributes to a comprehensive model for sustainable women sports performance.

The main challenges include:

Gender-responsive performance improvement: The current athletic landscape may not fully meet the physiological and psychological needs of female athletes, thus hindering their performance potential. Integration of AI can help develop customized training plans and support mechanisms that meet the distinct demands of female athletes, ensuring equitable performance improvement.

Limited data-driven insights: The lack of comprehensive data collection and analysis tailored to mathematics hinders the development of effective training strategies. AI can provide data-driven insights into performance trends, injury prevention, and recovery strategies, enhancing the competitiveness of female athletes.

Awareness of Sustainability: While the UAE is committed to sustainability, embedding environmentally friendly practices in women's sports remains a challenge. Artificial intelligence offers the potential to improve the use of resources in training facilities, reduce carbon emissions from sporting events, and promote sustainable behaviors among sports.

Technology Integration and Access: Unequal access to AI technology and resources can lead to disparities in the development of women athletes. Ensuring equitable access to AI-driven tools and platforms is vital to empowering athletes across different skill levels and areas.

Ethical considerations: While AI can greatly benefit the training and performance of sports, ethical concerns such as data privacy, consent and fairness must be handled carefully to ensure that technology acts as an enabler rather than interference.

In light of these challenges, the central issue is to effectively harness the potential of AI to empower female athletes, and enhance its sustainable performance, and contribute to the overall sustainability goals of the United Arab Emirates. Addressing these challenges requires a multidisciplinary approach that integrates AI expertise, sports science, gender principles, and sustainability initiatives.

By doing so, the UAE can pave the way for an innovative, inclusive and environmentally responsible sports environment that celebrates the achievements of women athletes and their contribution to a greener future.

Cultural and societal norms: Gender stereotypes and societal norms may influence the participation of women athletes in some sports disciplines. AI can provide data-backed insights that challenge these norms, promoting inclusivity and diverse participation.

Research objectives

The current research aims to achieve a set of goals regarding the impact of artificial intelligence in achieving sustainability through the performance of female athletes in the United Arab Emirates:

Recognize the potential of AI to provide customized training plans, injury prevention strategies, and mental health support for female athletes.

Evaluate the potential long-term impact of integrating AI into women's sports on athletes' performance, development, and well-being.

Analyze how AI-led sustainability initiatives contribute to the broader sustainability agenda for the UAE.

Suggest strategies for integrating AI into training, education, injury prevention, and resource management in women's sports.

Synthesize the findings into practical recommendations for sports organizations, policymakers and stakeholders for the effective implementation of AI-based initiatives in women's sport.

Propose guidelines for collaboration, stakeholder engagement, and the ethical use of AI technologies in the context of women's sports sustainability.

The research questions

The current research attempts to answer a set of questions as follows:

How can artificial intelligence be applied in training programs and customized strategies that enhance the performance of women athletes in various disciplines?

What sports-specific physiological and psychological factors should AI training plans consider?

What strategies can be used to promote sustainable behaviors among sports, coaches, and fans through AI applications?

What role can AI play in bridging the technology gap between sports from diverse backgrounds?

What strategies can be used to engage female athletes, coaches and sports officials in designing and implementing AI solutions that meet their needs?

What is the potential far-reaching impact that AI integration could have on the sustainable development of women's sports in the UAE?

Literature review theoretical framework

This section will deal with the theoretical framework of the research, as it will present the most prominent studies that have dealt with the variables of the current research, which are (artificial intelligence, sports performance, and sustainability), as well as identifying methods for measuring each variable in a manner consistent with the objectives of the research.

Artificial Intelligence and Sustainability

Understanding the role of AI is critical to contributing to sustainable development including fundamental challenges for our society, such as climate change, healthy living, and inclusive economic growth. Based on the body of literature, promising research has been found in diverse fields that confirm the great potential of AI in achieving sustainability (Schoormann et al. al, 2021). The term artificial intelligence is used to describe computer capabilities to solve problems and achieve goals. This ability can be regrouped into three categories:

Dimensions of artificial intelligence

The dimensions of artificial intelligence are determined in line with the research objectives, which are:

Understanding and learning from external data (Kaplan & Haenlein, 2019).

AI systems attempt to mimic human cognitive functions such as vision and speech (Russell & Norvig, 2016).

Artificial intelligence systems address the complexities of human thinking and feelings ((Martinez-Miranda & Aldea, 2005) in 1987, the concept of sustainability gained traction when the Brundtland Commission envisioned it as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Nishant et al, 2020) The following components are identified as the three interrelated dimensions that contribute to achieving sustainability (KOÇAK et al, 2015).

Dimensions of sustainability

The dimensions of sustainability are determined in line with the research objectives, namely.

Individual Sustainability: The process of shaping long-term changes in the attitudes, talent or behavior of individuals through participation in sport.

Social Sustainability: It is the process of creating with the generalization of sport in terms of health and changing social behavior in society.

Organizational Sustainability: It is the process of fulfilling the duties of the institutions responsible for popularizing sport in society.

Sustainability of institutions: It is the process of making appropriate arrangements with sports policies and practices, and changes in economic and environmental conditions by taking a comprehensive approach in terms of sports programs.

Human activities are the greatest threats to sustainability. It is believed (Nishant et al, 2020) that artificial intelligence provides an opportunity to build intelligence systems that will generate the knowledge needed to sustain life. But for AI to deliver a fraction of the potential benefits of sustainability, new ways to take advantage of AI must be explored. Artificial intelligence cannot be a panacea for all complex sustainability problems. New technologies promise to solve immediate problems, but over time they prove to be unsustainable. Therefore, we must realize the limitations of this innovation, Explore ways to overcome some of the limitations and conceptualize new ways to leverage AI. Therefore, this relationship will be analyzed based on the following hypothesis.

Hypothesis 1: There is a positive relationship between AI and sustainability

Artificial intelligence and mathematical performance

The development of the human action recognition system is gaining importance due to the high computing power of modern computers, the availability of big data and the improvement of deep learning algorithms. Some human action recognition systems are used in the monitoring system to reduce manpower to provide security for citizens such as public safety and crime prevention, Pool view is one example, It is a new proactive and interactive software and hardware system to detect possible drowning incidents in swimming pools. In his research, Fok et al. (2018) used deep learning networks using recurrent neural networks with long-term memory to analyze the dynamic video motion of sporting events and classify different types of actions and their performance.

They can be used in sports performance and safety analysis. In 1995, Lapham & Bartlett described artificial intelligence as the ability to support and improve decision-making in sports performance and to speed up the analytical process to save experts time and resources. Since then, the use of machine learning has been advocated for building decision support systems (Robertson, 2020). Machine learning can be applied to sports performance to achieve many benefits including automating or semi-automating data collection, before processing data into meaningful information, understanding what information is related to health and performance, and finally, helping coaches and athletes make complex decisions. Elite coaches and athletes frequently use their experience, knowledge, and intuition to make successful decisions. However, some critical decisions are very difficult because of the number of factors that must be considered and their interactions are very complex. When the right kind of data is available, machine learning methods can be used to create models that can support complex decision-making (Dwyer et al, 2022).

AI in Sports Performance Analysis provides a holistic perspective in an innovative approach that points to practical applications for both academics and practitioners in the fields of coaching, sports analysis, and sport science (Araújo et al, 2012). This relationship will be analyzed based on the following hypothesis. The second hypothesis: There is a positive relationship between artificial intelligence and athletic performance.

Sport Performance and Sustainability

Sport is the optimal platform for raising awareness about sustainability There is a need to determine if the sporting activity and context of sport can change the target market's view of sustainable behaviors and influence potential future behaviours. It is assumed that female sustainable behaviors stem from their care and concern for the intersection of future generations with the environment. This assumption was expanded using multiple dimensions of the impact of gender on sport, including proximity to nature, Focusing on sustainability, the right to resources, means and opportunities to exploit resources and adopt sustainable practices. Scientists argue that women are biologically, socially, materially and ideologically closer to nature (Casper et al, 2021).

Malchrowicz-Mo et al, (2019) assert that the status of women in sports depends on many social and cultural factors. For example, in Muslim countries there are many opportunities for Muslim women to participate in sports and the barriers they face in competitive sports as well as in sports for all. Although there has been an increase in the number of female athletes from Muslim countries in the past decades, Muslim women are still a small minority among competitors in international sporting events such as the Olympic Games. In many Muslim countries, many girls and women do not have access to physical activities and physical education.

The status of women and women's sport varies across countries, cultures, social backgrounds, and religious orientations. Usually not Islam per se, but traditions, environments, and socio-economic conditions may prevent girls and women from participating in competitive and sport-for-all. There is some evidence to suggest that rights holders of international sporting events, for example FIFA, are willing to make changes to accommodate Islamic beliefs and values regarding matters such as public displays of religion and worship, respect for the Islamic calendar, important dates, dress codes and general consumption of alcohol, in order to ensure hosting of sporting events. organization in Islamic countries. It is important that individuals and organizations participating in major international sporting events become more culturally aware, Thus ensuring that they can anticipate the challenges caused by the local traditions, customs, beliefs and lifestyles of the host communities. In their study of high performance and sustainability, Barker et al. (2014) argue that success in sports performance is given a high level of attention when lucrative contracts, sponsorship deals, and opportunities for celebrity status are weighed against the large amount of time spent training and the high chance of failure.

And as pressure increases on athletes to make the most of their sporting "investments," the chance of losing their future well-being by exploiting their bodies for short-term gains increases. Sustainability science is an emerging field that seeks to preserve the well-being of the planet and those around it by exploring the potential of nature and culture without compromising the future resource base. She specializes in developing holistic perspectives, considering multiple time scales, improving existing systems without compromising the carrying capacity of the land, but also questioning the values and principles that dominate current ways of producing and consuming. The science of sustainability recognizes that we live in a rapidly changing world characterized by high levels of complexity and uncertainty. Therefore, it is suggested that exploring sustainability perspectives could be useful in rethinking and reorienting the principles of competitive sport. This relationship will be analyzed based on the following hypothesis.

The third hypothesis: There is a positive relationship between women's sports performance and sustainability.

The mediating role of athletic performance:

Sports performance was measured in different ways depending on the purpose of the research and its suitability, for example, as the sports performance variable was dealt with as a dependent variable and from these studies (Nikolenko et al, 2011; Palmer, 2012; Fok et al, 2018; Gueli et al, 2019). Ahmad et al, 2019; Wagner, 2010; and with regard to the objectives of the current research, (Dwyer et al, 2022) dealt with the result of artificial intelligence, as the study dealt with a group of articles, each article representing a valuable advance in machine learning in sports.

Collectively, the results of the articles improve how raw data is processed, clarify which variables are the most important indicators of performance and provide prediction models that can be used to support complex decision-making. The application of machine learning in sports was justified based on what would be available for the sport. I came to the conclusion that sports offer something of unique value to machine learning. Sport can provide rich, high-quality datasets about many different human behaviors (eg movement, actions, performance, interactions, health, etc.) from a variety of different contexts. Athletes' behavior and performance are governed by clearly defined rules and trained experts can establish key facts to support supervised machine learning.

On the other hand, other researchers (Marwat et al, 2014; Yamak et al, 2015; Verner-Filion et al, 2017; Skarbalius et al, 2019; Chen & Meggs, 2021; Lucia et al, 2023) dealt with sports performance as an independent variable. The study of Harita et al, 2022 dealt with sports performance as an independent variable that contributes to a decrease in cognitive and physical anxiety accompanied by an increase in self-confidence, and thus psychological well-being is a result of sports performance, and this is consistent with the hypotheses of the current research.

Despite the scarcity of studies that dealt with sports performance as a mediating variable, there are a number of studies that support the employment of operational performance as a mediating variable, including the study (Anuar et al, 2017), as the relationship between lean management practices and sustainability was examined, as the study assumes the mediating effect of operational performance on the relationship between Lean healthcare practices and sustainability.

The results of the study determined that operational performance was a partial mediator between lean healthcare practices and sustainability in private hospitals. While the study (Grugan, 2018) dealt with athletic performance as a mediating variable, the study revealed that perfectionism directed towards the other shares a positive relationship with antisocial actions during competition through angry reactions to a teammate's poor performance. Therefore, the study provides more support for the idea that athletes who They display high levels of other-oriented perfectionism They will become frustrated in situations where they perceive their teammates to perform poorly with the result that athletes who display high levels of other-oriented perfectionism are more likely to react to this scenario with angry feelings and prompt expressions of anger using Verbal and physical aggressive behaviour.

This finding thus extends research that previously demonstrated positive associations between perfectionism and angry reactions by mediating poor athletic performance. This relationship will be analyzed based on the following hypothesis.

Hypothesis 4: Athletic performance mediates the relationship between artificial intelligence and sustainability

Study Form

A conceptual model is proposed to explain the relationship between the research variables. This model was developed based on a review of the literature. The model consists of the independent variable represented by artificial intelligence, the mediating variable, sports performance, and the dependent variable, sustainability. The research took women's sports in the United Arab Emirates as a place to apply the study. (Figure 1) Research form

The methodology

A prospective study was conducted in the United Arab Emirates, where a questionnaire was designed based on various previous relevant studies to examine the relationship between artificial intelligence and sustainability through sports performance. (Table 1) shows the main sources of research measures.

Prepared by the researcher

Data collection and response rate

The simple random sample was used to represent the target population. The researcher decided to use the structural equation model using the PLS-SEM molecular least squares method. The collected data will be analyzed using SmartPLS 4.0 to verify the relationships between the research variables. (Table 2) shows the response rate.

Prepared by the researcher

Analysis and discussion of the data

Evaluation of the measurement model

PLS-SEM structural modeling involves two basic steps: a) evaluation of the measurement model; b) Structural model evaluation. This part will deal with the evaluation of the measurement model, including the construction of measurement models for the study variables and the conduct of the factor analysis, as well as the tests of validity and reliability represented by the compound stability tests, Alfa Cronbach and the average variance extracted.

Criteria for evaluating the measurement model

(Table 3) reviews the three criteria for evaluating the measurement model according to the structural equation modeling using the PLS-SEM partial least squares method, as follows:

Source: Prepared by the researcher based on:

Hair J, Hult T, Ringle C. & Sarstedt M. (2017) A primer on partial least squares structural equation modeling (PLS-SEM). Los Angeles: Sage.

Prepared by the researcher according to the outputs of SmartPLS V.4

The results of the evaluation of the measurement model for the research variables shown in (Table 4) showed that all dimensions achieved the required values of Cronbach alpha, composite stability, and extracted average variance (AVE).

Structural Model Evaluation

After completing the first step of modeling the structural equation using the PLS-SEM partial least squares method, the second step is represented in evaluating the structural model, which includes finding path coefficients through which direct effects can be measured, in addition to extracting the value of the interpretation coefficient R2, which is used to determine the extent of the interpretation of the variable. Independent of the dependent variable.

Criteria for evaluating the structural model

The criteria for evaluating the structural model according to the PLS-SEM least squares modeling method include four criteria, as shown in (Table 5). The following is an illustration of these four criteria:

Hair J., Hult T., Ringle C. & Sarstedt, M (2017) A primer on partial least squares

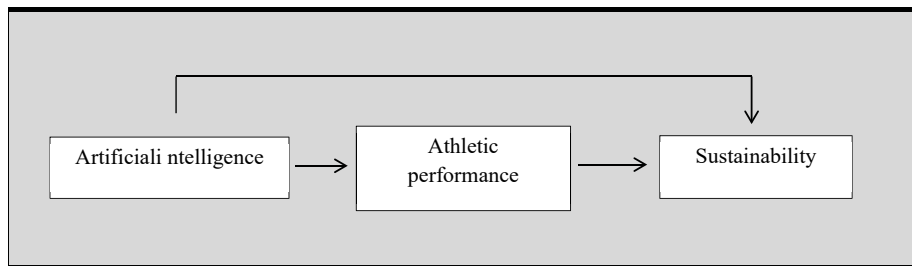


Figure 1. The research form.

Table 1. Research criteria.

Variable	Dimensions	No. of items	References
artificial intelligence	Understanding and learning from external data	3	Kaplan & Haenlein, 2019 Russell & Norvig, 2016 Martinez-Miranda & Aldea, 2005
	Mimicking human cognitive functions	3	
	Addressing the complexities of human thinking and feelings	3	
athletic performance	one-dimensional	10	Hill et al, 2016
Sustainability	individual sustainability	3	KOÇAK et al, 2015
	social sustainability	3	
	organizational sustainability	3	
	Institutional sustainability	3	

Table 2. Response rate.

The details	Repetition	Rate
The number of distributed questionnaires	400	100%
The number of retrieved questionnaires	385	96%
Number of questionnaires not valid for statistical analysis	17	04%
The number of valid questionnaires for statistical analysis	368	92%

Table 3. Criteria for evaluating the measurement model.

Standard	Acceptable limit
The stability of the internal consistency	composite stability ≥ 0.60 ; Cronbach alpha ≥ 0.70
pointer stability	Standard saturation for the index ≥ 0.70
Asymptotic honesty	Average extracted variance (AVE) ≥ 0.50

Table 4. Test measurement model for research variables.

Standard	SRMR < 0.08
Model matching quality	Contrast magnification factor, VIF < 5
Linear correlation assessment	t-value > 1.96; p value < 0.05
Significant path coefficients	0.25, 0.50, 0.75 indicates a small, medium, or large effect
coefficient of determination R2	0.02, 0.15, 0.35 indicates small, medium or large effect
effect size f2	SRMR < 0.08

Table 5. PLS-SEM least squares modeling standards.

The dimension	Paragraphs	Saturations	Cronbach Alpha	Composite stability	AVE
Understanding and learning from external data	X1-1	0.717	0.737	0.779	0.578
	X1-2	0.737			
	X1-3	0.78			
Mimicking human cognitive functions	X2-1	0.764	0.768	0.806	0.615
	X2-2	0.762			
	X2-3	0.844			
Addressing the complexities of human thinking and feelings	X3-1	0.758	0.749	0.787	0.487
	X3-2	0.849			
	X3-3	0.725			
Sport performance	M1	0.8	0.64	0.8	0.57
	M2	0.78			
	M3	0.71			
	M4	0.06			
	M5	0.73			
	M6	0.81			
	M7	0.53			
	M8	0.86			
	M9	0.79			
	M10	0.75			
individual sustainability	Y1-1	0.745	0.79	0.89	0.57
	Y1-2	0.84			
	Y1-3	0.88			
social sustainability	Y2-1	0.79	0.76	0.85	0.59
	Y2-2	0.74			
	Y2-3	0.84			
organizational sustainability	Y3-1	0.79	0.74	0.80	0.66
	Y3-2	0.86			
	Y3-3	0.88			
Enterprise sustainability	Y4-1	0.84	0.76	0.86	0.67
	Y4-2	0.75			

structural equation modeling (PLS-SEM. Los Angeles: Sage.

The results presented in (Table 6) showed that artificial intelligence positively affects sustainability (Path = 0.295, t-value = 2.848) at a significance level of $p < 0.05$, which indicates that the first hypothesis is acceptable. The second hypothesis, which assumed that artificial intelligence positively affects athletic performance (Path = 0.711, t-value = 8.039), is also accepted at the significance level $p < 0.01$. The results also confirmed that sports performance positively affects sustainability (Path = 0.575, t-value = 6.063) at a significance

level of $p < 0.001$, therefore, the third hypothesis is accepted. Finally, the fourth hypothesis positing a mediating effect of athletic performance on the relationship between AI and sustainability (Path = 0.409, t-value = 4.548) was accepted at the significance level $p < 0.05$.

Discussion

In this section, the results of testing research hypotheses will be discussed in order to benefit from the relationship between its variables, as follows:

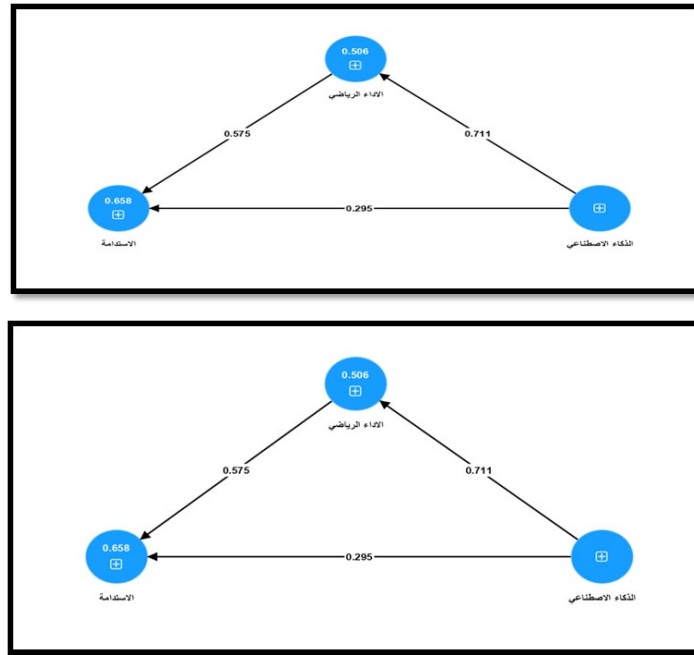


Figure 2 (a and b). Testing the Intermediate (Indirect) Effect Hypothesis.

Table 6. Structural model test results.

Matching quality SRMR	Hypothesis	Path	VIF	Path	Coefficient	t Value	p Value	Decision	Effect size f2	Determination coefficient R2	Modified R2
0.063	first	X-Y	1.347	0.295	2.848	0.017	X-Y	Accepted	0.014	0.658	0.598
	second	X-M	1.76	0.711	8.039	0.000	X-M		0.384		
	Third	M-Y	1.43	0.575	6.063	0.001	M-Y		0.44		
	Fourth	X-M-Y	1.893	0.409	4.548	0.019	X-M-Y	Accepted	0.846		

Objective 1: There is a positive relationship between artificial intelligence and sustainability. In general, all institutions around the world seek to achieve sustainability, so artificial intelligence emerges as a rising force that can contribute to achieving this goal, and this is in line with what (Gupta et al, 2021) went to in his study, as it confirms that the final driver of artificial intelligence is a vision. A globally shared positivity based on equal benefits for all.

Although they seem idealistic, there are real-world examples of shared visions that have led to positive changes in the past: the invention of democracy, the scientific, industrial and computer revolutions, free health care, free higher education, Taking the Sustainable Development Goals as the baseline, may the global vision of AI go beyond and aspire to prosperity for all, knowledge through AI, AI for science, climate saving with AI, cure for cancer with AI, and health for all. Therefore, the result undoubtedly indicates that AI has a significant impact towards sustainability in sports organizations in the UAE and that organizations that rely on AI are likely to achieve greater sustainability.

The second objective: There is a positive relationship between artificial intelligence and athletic performance

As stated in the study (Dwyer et al, 2022), which emphasized that the relatively recent expansion of technology in sports contributed to an explosion in the amount of data collected, as well as the range and diversity of attributes that are measured and recorded. This tsunami of data has created both a burden and an opportunity to answer some very important questions that coaches and athletes face. How can I train more effectively, how can I be more competitive and how can I avoid injury? In many cases, the applicability of traditional statistical techniques has been exhausted and machine learning methods have been applied, adapted and developed for mathematical data analysis. From the foregoing, it can be emphasized that there is a positive relationship between artificial intelligence and sports performance in sports institutions in the United Arab Emirates, as the adoption of artificial intelligence contributes to raising sports performance.

The third objective: There is a positive relationship between women's sports performance and sustainability

The result of this hypothesis indicates that sports performance has a positive relationship towards sustainability in the United Arab Emirates. It is expected

that sports performance will lead to an improvement in sustainability, and this was confirmed by a study conducted by (Marwat et al, 2014) in which he confirms that there is a global agreement, especially in the Islamic world, that sport in general is a male-oriented activity and is dominated by males, while females face a number of the restrictions and obstacles on the way to participate in sports. But after overcoming many restrictions and obstacles, Muslim women in particular have recorded an impressive record of performance in international competition and have won gold medals for their countries in various international sports competitions such as Olympic Games, World Championships, Commonwealth Games, Asian Games, etc. Although Arab women have recently started participating in various international sports competitions, they have proven their presence by recording their outstanding performance.

The public's awareness in this regard is expanding in an advanced way, and the level of Muslim women's participation in sports is achieving remarkable progress. As Muslim women have the required level and level of talent required to compete on the international sports scene and to control performance. An athletic performance to achieve sustainability over a short period is the hardest part as it usually takes time and effort to progress towards its goals and to be truly sustainable (Ling et al, 2012). I don't think sustainability was everyone's responsibility because sustainability is a national agenda and we must thrive to achieve it with collaboration between leaders and society as a whole. The results of the research confirm the positive relationship between sports performance and sustainability, which in previous results also indicate that both variables were clearly affected by artificial intelligence and socio-technical aspects. Therefore, it can be concluded from the above discussion that athletic performance is a vital component in driving sustainability in the UAE.

Goal 4: Athletic performance mediates the relationship between AI and sustainability

The current research hypothesizes that there is a mediating effect of athletic performance in the relationship between artificial intelligence and sustainability. As expected, the results of the research identified that athletic performance plays a partial mediating role between AI and sustainability in the UAE.

Despite the limited studies that dealt with sports performance as a mediator in general and did not exist in the United Arab Emirates, the results of previous studies, although scarce in relation to the mediating effect of sports performance in the relationship between artificial intelligence and sustainability, it is surprising that these studies provided a beneficial result for institutions Sports in the United Arab Emirates, including a study (Anuar et al, 2017), which confirmed that performance can play a mediating role between agile management and sustainability, as well as a study (Grugan, 2018).

It is worth noting that it has been proven that the UAE sports institutions already emphasize sports performance, which includes the adoption of artificial intelligence in order to achieve sustainability. This also later showed that AI systems must be adopted for sports performance to ensure that the level of sustainability can be raised.

A future plan for women's sports using technology and sports innovation in the UAE

The current section represents a plan through which to take advantage of the use of artificial intelligence to develop women's sports in the United Arab Emirates:

Performance Analysis: The AI can analyze player performance data to provide insights into strengths, weaknesses, and areas for improvement.

This can be used by trainers to design training programs and strategies.

Injury Prevention: AI-powered wearables can monitor player movements and detect signs of possible injuries. Coaches and medical staff can receive timely alerts, allowing for timely intervention and prevention.

Virtual Training: AI-powered Virtual Reality (VR) and Augmented Reality (AR) platforms can provide meaningful training experiences, allowing athletes to practice and hone their skills in a controlled virtual environment.

Fan Engagement: AI can personalize fan experiences by providing relevant content, interactive features, and behind-the-scenes insights.

Chatbots and virtual assistants can interact with fans, answer questions, and provide updates.

Recruitment and Talent Identification: AI can assist in identifying and recruiting promising talent by analyzing performance metrics, comparing them to set standards, and predicting potential success in various sports.

Data-Driven Strategies: Coaches and managers can use insights generated by AI to create strategies based on opponent analysis, historical data and real-time match statistics.

Smart Equipment: AI-powered equipment and devices can enhance training by providing real-time feedback on technique and form, and help athletes hone their skills.

Translation: If the UAE aims to attract international athletes, AI-based language translation tools can bridge communication gaps and create a more inclusive environment.

Sponsorship and Marketing: Artificial intelligence can analyze fan preferences and behavior to help design sponsorship and marketing strategies, ensuring a better match between brands and audiences for women's sports. 5.5 A future plan for women's sports using technology and sports innovation in the UAE

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Athlete Wellbeing: AI-driven mental health and recovery applications can provide athletes with resources to manage stress and performance anxiety and maintain a healthy work-life balance.

By strategically implementing these AI-based initiatives, the UAE can create a sustainable ecosystem for the development of women's sports, promoting talent, participation and inclusivity.

Conclusion

In conclusion, the incorporation of AI to enhance sustainability through the performance of female athletes in the UAE presents a transformative opportunity to advance both sport and gender equality. By harnessing the power of artificial intelligence, the UAE can create a dynamic ecosystem that not only enhances women's sporting achievements, but also fosters an environment that aligns with the country's sustainability goals. Through personalized training plans, injury prevention strategies, mental health support, and gender-responsive facilities, AI can revolutionize the way female athletes train, compete, and heal. The intersection of AI and women's sports not only promotes performance excellence, but also addresses unique physiological needs, promoting holistic well-being. Moreover, AI-based platforms can facilitate community participation, mentorship, and experience sharing, and create a supportive network that empowers female athletes from various sports disciplines. By highlighting the achievements of women athletes through media coverage powered by artificial intelligence, the UAE can inspire the next generation of female athletes to confidently pursue their passions.

The application of AI for sustainability is crucial. Integrating green practices into AI solutions can promote resource optimization and environmental responsibility, in line with the UAE's commitment to sustainable development. As AI improves facility management, energy consumption and event planning, it can reduce the environmental footprint of sporting activities while enhancing the overall experience. Driven by AI and women's sports, this holistic approach to sustainability can transcend regional boundaries and serve as a model for other countries to emulate. The UAE's dedication to innovation, equality, and environmental stewardship is demonstrated by its commitment to integrating artificial intelligence into the sports landscape, and fostering a culture that embraces technology to improve the lives of all. Essentially, the convergence of AI, women's sports performance, and sustainability is a catalyst for transformation. It signifies the UAE's vision of a future where sports serve as a channel for gender empowerment, technological advancement, and environmental responsibility. By pursuing this vision, the UAE can set an inspiring precedent and create a lasting legacy that resonates not only in sports but also throughout society, demonstrating the limitless potential of AI to drive positive change.

Recommendations

Here are some recommendations designed to use AI to achieve sustainability through the performance of female athletes in the UAE:

Gender Responsive AI Solutions:

The AI solutions developed to improve the performance of female athletes are designed with a gender-sensitive approach. It should take into account the specific needs, challenges and aspirations of mathematics in the UAE.

Comprehensive data collection: Collect diverse and comprehensive data representing the performance, health, and training patterns of female athletes. This data must span a range of mathematical disciplines and skill levels to enable AI algorithms to provide accurate insights.

Injury Prevention and Recovery: By using artificial intelligence algorithms to analyze data and identify patterns that can help prevent injuries and improve recovery strategies for female athletes. Timely interventions can contribute to long-term athletic success.

Optimizing Nutrition and Hydration: Implement AI-driven tools that provide personalized nutritional and hydration recommendations to female athletes,

taking into account their specific nutritional needs and performance goals.

Mental Health Support: Utilize chatbots or AI-powered applications that provide mental health support and stress management strategies for female athletes. Mental health is crucial to sustained athletic performance.

Remote Monitoring and Coaching: AI-based wearable technologies that enable remote monitoring of women athlete performance and provide real-time feedback from coaches should be explored. This can be especially useful for outback athletes.

Community Engagement: Create online communities and platforms that connect Athletes, Coaches and Mentors. AI-powered discussion forums and networking opportunities can foster a supportive environment for sharing experiences and advice.

Gender Equal Facilities: Using artificial intelligence to improve the design and management of sports facilities to ensure they are gender inclusive and equitable, and provide equal access and facilities to female athletes.

Partnerships with Women's Organizations: Collaborate with women's organizations and advocacy groups to ensure AI initiatives align with the needs and preferences of sports in the UAE.

Setting Role Models: Using artificial intelligence to identify and showcase successful female athletes as role models. This can inspire younger generations of girls to play sports and reach their full potential.

Sustainability Initiatives: Incorporate sustainability practices into AI-based solutions for mathematics. This can include optimizing the use of resources during training and events and promoting environmentally friendly behaviors.

Education and Empowerment: Provide workshops and training programs to educate female players about the benefits of artificial intelligence and how it can be used to improve their performance and well-being. 5.7.2 Personalized Training Plans: Develop AI-powered platforms that create customized training plans for mathematics. These plans should take into account physiological differences, menstrual cycles, and other factors that are unique to women's bodies.

Longitudinal Studies: Conduct longitudinal studies using AI analytics to track the progress and impact of women's participation in sport over time. This can guide policy decisions and future initiatives.

Visibility and Media Coverage: Collaborate with the media to ensure fair coverage of female athletes and their achievements. Artificial intelligence can help analyze and enhance stories that highlight women's achievements.

By implementing these recommendations, the UAE can harness the potential of artificial intelligence to empower female athletes and raise their level of performance while promoting gender equality and sustainability in the field of sport.

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