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Research Article

Applications Of Artificial Intelligence (AI) Represent A Modern Trend In Enhancing The Competitiveness Of Sports Institutions

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ABSTRACT

Artificial intelligence (AI) is penetrating into various aspects of modern life to the extent that it has become inseparable from human existence in many cases. It is no longer confined to the realm of electronic games and high-tech fantasy movies but has extended into the field of sports. Many sports institutions around the world are adopting AI technologies as part of their competitive strategies. This study aims to highlight the key requirements, applications, and contributions of AI in enhancing the competitiveness of sports institutions.

Keywords: Artificial intelligence, Expert systems, Genetic algorithms, Competitive advantage.

Introduction and Problem Statement:

If we were to characterize our world today, it would undoubtedly be described as a world dominated by technology, given its significant impact on various aspects of life. The world has witnessed a major technological revolution over a considerable period, with rapid and unprecedented advancements in computing, electronics, and digitization. This has led to the emergence of highly innovative technological inventions, utilizing high-level technology, in areas such as computation, electronics, and digitization. On one hand, the rise of creative innovations in technology, coupled with the readiness of global societies to embrace such monumental digital advancements, has led to the emergence of artificial intelligence (AI) as one of the most important technological advancements of the fourth industrial revolution.

Artificial intelligence (AI) technologies are among the modern strategic technologies that focus on producing knowledge by acquiring, storing, processing, interpreting, and leveraging it to solve problems and provide new services. They seek greater efficiency and new opportunities to achieve competitive advantage, enabling organizations to accomplish tasks in less time through the support of modern applications (expert systems, artificial neural networks, fuzzy logic systems, genetic algorithms) for decision-making, especially managerial decisions. To fully benefit from AI, organizations need expertise in creating and managing AI solutions on a wide scale. Moreover, AI projects require more than just employing data scientists. It is the responsibility of organizations to implement the tools, processes, and management strategies to ensure the success of AI technology in achieving its goals (**Hadjer, 2019).**

Artificial intelligence is known as a branch of computer science through which computer programs can be found and designed to simulate human intelligence. This enables computers to perform tasks that require thinking, understanding, speaking, and moving in a logical manner, tasks typically associated with human intelligence (**Al-Sharqaoui, 2011**).

Artificial intelligence (AI) has permeated most aspects of modern life to the extent that it has become inseparable from human existence. AI algorithms facilitate and manage various life processes, guiding them to automate operations, make decisions, and perform tasks instead of humans. Furthermore, AI technologies contribute to significant changes and transformations in the fundamentals and details of every field they touch upon.

One of the most pressing needs for AI technologies emerged in the management and administration of various institutions after the COVID-19 pandemic. The measures imposed to mitigate its risks, such as social distancing and remote work, had a profound impact on economies, particularly on traditionally managed

institutions that did not rely on automation. Organizing remote work through smart systems and desktop remote programs prompted many to contemplate how to avoid similar negative impacts in the future on their workflows and products. According to Khalid and Bouzerb (2020), since the emergence of this pandemic in late 2019, it has caused several negative repercussions across various fields, prompting several countries to consider how to confront them. Among the measures adopted by several countries is the reliance on artificial intelligence applications.

Sports institutions are facing challenges and threats arising from the changes that have reshaped the world, creating a new global system that relies primarily on science and rapid technological advancement. This leaves no room for hesitation in initiating comprehensive programs to develop and update systems, policies, and practices deeply rooted in sports institution management. Such initiatives ensure that sports institutions have the ability to overcome their problems and address their weaknesses. Most sports institutions are striving for development and progress as they cannot interact or deal with the data of this era and its challenges without resorting to artificial intelligence. It represents a completely new and different management paradigm due to its unique and indispensable capabilities. Most administrations now rely on using modern technology in all their administrative tasks, from planning, organizing, directing, to electronically supervising them.

Sports institutions today operate in a highly competitive environment, with technology advancing rapidly. Sports institutions that lag behind in developing themselves and keeping up with technological changes will not continue in the market. Investing in technology is the key factor for the success of sports institutions in the future. Scientific research confirms the importance of investing in technology to provide services based on modern technology.

The problem of this study lies in the intense competition facing sports institutions locally and internationally. Therefore, these sports institutions must expand their use of artificial intelligence technologies in their various operations. Expanding the applications of artificial intelligence and others enables sports institutions to achieve competitive advantages by reducing the cost of service, enhancing its quality, increasing market share, and thus contributing to higher profits and enhancing their ability to compete locally and internationally.

Based on the above, this study will answer the following questions, which express the problem of the study:

- How can artificial intelligence enhance the competitive advantage of sports institutions?

- Where can we pose some sub-questions :

- What is meant by artificial intelligence? And what are its main characteristics?
- What are the main methods and applications of artificial intelligence?
- What is the relationship between artificial intelligence and the competitive advantage of sports institutions?

Importance of the Study:

The importance of this study lies in its attempt to uncover the role of artificial intelligence technologies in enhancing the competitiveness of sports institutions. The significance of the study is evident as it is relatively new in the field of artificial intelligence studies. Therefore, it may contribute to enriching the Arabic library and open up broad prospects for researchers to address this topic from various aspects, thus supporting theoretical literature in general.

Study Objectives:

The study aims to identify the contribution of artificial intelligence to achieving the competitive advantage of sports institutions.

Study Methodology:

We adopted the descriptive-analytical approach through describing and analyzing all concepts related to artificial intelligence and its various applications, as well as its role in achieving the competitive advantage of sports institutions.

First: Characteristics and Concept of Artificial Intelligence:

The subject of artificial intelligence and its characteristics and novelty have garnered significant attention worldwide. The concept, characteristics, and importance of artificial intelligence can be highlighted through the following points:

1- Definition of Artificial Intelligence:

Definitions of artificial intelligence vary. Some see it as the ability of a computer program to solve a problem or make a decision in a certain situation based on a description of that situation, with the program itself finding the method to solve the problem or reach the decision by referring to various inference processes.

This represents a significant turning point beyond what is known as information technology, where the inference process is carried out by humans. The primary reason for using computers lies in their exceptional speed **(Mohammed Al-Sharif Nasseri & Salwa Khashaimi, 2021, p. 234).**
Artificial intelligence (AI) is defined as the intelligence exhibited by machines and software that mimics human mental abilities and work patterns, such as learning, inference, and reacting to situations not programmed into the machine. Prominent researchers define artificial intelligence as "the study and design of intelligent systems that accommodate their environment and take actions to increase their chances of success**" (Hadhli Fouaz, Houdjaira Cheikh: 2022, p. 848).** The term artificial intelligence (AI) refers to systems or devices that emulate human intelligence to perform tasks and can improve themselves based on the information they gather. It relates to the capability for advanced reasoning and data analysis more than to a specific form or function **(Al-Dalahmah, 2019, p. 183).**

Artificial intelligence (AI) is utilized in a variety of tasks, including:
- Chat bots: These utilize natural language processing to understand customer inquiries, allowing them to ask questions and obtain information. These chat bots can also learn over time to enhance customer interactions.
- Rapid understanding of customer issues and providing more efficient responses.
- AI operators use it to analyze significant information from large sets of textual data for improved scheduling.

In essence, artificial intelligence is a term describing how computer programs or machines can mimic various types of human behavior and thinking, such as movement, speech, and the ability to execute acquired intelligence to perform various tasks with minimal human intervention. Experts define artificial intelligence as a field that makes things smart, including robots and natural language.

2- The characteristics of artificial intelligence include:
- Using intelligence to solve problems in the absence of complete information.
- The ability to think and perceive similarly to humans.
- Acquiring knowledge and applying it to problem-solving.
- Learning and understanding from previous experiences and experiments.
- Utilizing previous expertise and applying it in new contexts.
- Using trial and error to discover solutions.
- Quick responsiveness to new situations and circumstances.
- Handling difficult and complex situations.
- Dealing with ambiguous situations in the absence of information.
- Prioritizing tasks and providing information to support decision-making.

Applications of artificial intelligence operate at a consistent scientific and consultative level, requiring the representation of vast amounts of knowledge in a specific field. They process non-numeric symbolic data through analysis and logical comparison, aiming to simulate human thought and style, and are concerned with generating new ideas leading to innovation.

3- The importance and objectives of artificial intelligence, as outlined by Al-Lami (2009, pp. 58-59),

3-1-The importance of artificial intelligence for institutions and organizations lies in the following:
- Preserving expertise that may be lost due to retirement, disuse, or death.
- Storing information to create a knowledge base for multiple users or to serve as learning databases.
- Creating technology unrelated to human emotions, such as stress and fatigue, which can be useful in business for consulting purposes.
- Eliminating routine and non-value-added tasks.
- Enhancing the organization's knowledge base by proposing solutions to specific and complex problems, which humans can analyze briefly.
- Assisting in solving complex problems with multiple solution paths or those without a known solution method using traditional software and storing them for future use.

3-2- Its objectives:
Artificial intelligence has a set of objectives that we will try to summarize as follows:
- Developing new methods for extracting information from sensors.
- Enhancing the necessary methods for building and innovating information, and preserving stored information in the knowledge base.
- Empowering machines to process information more closely to the human way of solving problems.
- Better understanding the nature of human intelligence through simulation methods that the human mind cannot perform.

4- Prominent applications of artificial intelligence:

1- Expert Systems:

Expert systems: are one of the well-known applications of artificial intelligence, belonging to the field of knowledge-based systems, of which expert systems are an example. They are computer programs that mimic the procedures of experts in solving difficult problems. They are described as knowledge-based information systems that use expertise about specific and complex applications to function as consulting experts for end-users. These are specialized informational programs aimed at simulating human expert logic in a particular cognitive domain. This definition consists of two important aspects: firstly, the value of informational programs, which ensures the effectiveness of the larger system, is one of the concerns of computer scientists. Secondly, expertise in the fields that need to be controlled. Expert systems are based on the concept of modeling existing knowledge of human experts, programming it, and storing it in a knowledge base for an information system linked to a specialized field, and with a specific pattern of activities so that the system can replace the human expert and perform its role in solving complex administrative problems for the end-user**. (Al-Chaouabka, 2017, p. 83)**

2- Neural Networks Systems:

These are networks based on distributed knowledge rules across a package of systems and programs that operate through a large number of processors in a parallel processing manner. Neural networks rely on knowledge rules, and their design simulates the structure and performance of the human brain by internally connecting processors in a parallel and dynamically interacting manner between patterns and relationships existing in the data they process **(Al-Sheikh, 2016, p. 145).**

They are also called artificial neural networks, which attempt to mimic the functioning of the human brain. **Kenji (2013, p. 25)** argues that neural networks operate on a simplistic view of neurons, as neurons are organized into levels forming a large network, with the network's function being learning and communications.

This system has the ability to learn and derive meaning from complex data, and to create complex models and trends that are difficult to discern by either humans or ordinary computers. They provide us with multiple projects by providing answers to questions **(Sigsons & Stergioun, 1996:60).**

It is a model that simulates the natural (biological) neural network and uses several basic methods used in natural neural systems with the help of simulation software and parallel processing methods. Neural networks are one of the fields of artificial intelligence that have made significant advances in mechanizing human thinking. The idea of neural networks revolves around simulating the brain using a computer.

3- Fuzzy Logic Systems (vagueness):

Also known as fuzzy logic or vagueness, it relies on perception and mimics the human element's way of estimating values through fuzzy data. The fuzzy logic technique consists of a diverse set that includes concepts and techniques of expressing or inferring uncertain, variable, or not entirely embodied knowledge in reality. Fuzzy logic can form a set of rules for a subject matter that does not tolerate non-criminal values, incomplete data, or vague facts. Unlike classical logic used by traditional computer programs, which operates on the principles of binary logic, the new logic explores intermediate or other cases, meaning searching for the gray area between the contrasting colors black and white.

4-Genetic Algorithms

(GAs) are attempts to simulate on a computer the processes performed by natural selection, applying them to solve business and research problems. An algorithm is a set of instructions repeated to solve a problem, and the term "genetic" refers to the behavior of algorithms that can resemble the biological processes of evolution. According to **Breien'O (2000:340-339**), they are defined as methods that help create solutions to specific problems using approaches compatible with their environment. They are programmed to work in a way that solves problems by changing and reorganizing component parts using means such as reproduction, mutation, and natural selection. Hence, they provide us with methods for searching for all possible combinations of numbers to determine the non-numeric digital mutations that represent the best possible structure for the problem. They are useful in cases where thousands of solutions are possible and need to be evaluated to produce the optimal solution. **Phillips & Baltzan (2008:44)** view it as a system that attempts to find the combination of inputs that yield the best results. It is suitable for making decisions in environments where hundreds of possible solutions are found and evaluated with multiple capabilities faster than humans.

Secondly: Competitive Advantage

1- Concept of Competitive Advantage:

The concept of competitive advantage has varied among authors and researchers. We will first review a range of definitions provided by different scholars to arrive at a general definition of this term.

According to Charles Hill and Gareth Jones, we say that "an organization possesses a competitive advantage when its profit rate is higher than the prevailing industry average." This definition focuses on profitability, meaning that competitive advantage is related to the organization's ability to achieve profits usually higher than the industry average over a relatively long period. (**Charles Hill; Gareth Jones, 2008, p. 183**)
Porter defines the competitive advantage of a firm as: "It primarily arises from the value that the firm has been able to create for its customers, which may take the form of lower prices for customers with equal benefits, or by providing unique benefits in the product that compensate for the increased price imposed." **(Michael Porter, 1999, p. 8)**
Ali Al-Salmi defines competitive advantage as "the skill, technique, or distinctive resource that enables the organization to produce values and benefits for customers that exceed what competitors offer. It emphasizes its distinctiveness and differentiation from competitors from the perspective of customers who accept this difference and distinctiveness." (**Ali Al-Salmi, 2001, p. 104)**
Hill and Jones (1989) identified four basic factors that demonstrate competitive advantage: efficiency, quality, customer responsiveness, and innovation. Any organization can adopt these factors regardless of its type of activity or offered product, and all these elements are integrated with each other.

2- Characteristics of Competitive Advantage (Bani Hamdan, Idris, 2007, p. 256):
The characteristics and attributes of competitive advantage can be clarified as follows:

- ❖ It is relative, achieved through comparison rather than absolute.
- ❖ It leads to achieving superiority and advantage over competitors.
- ❖ It stems from within the organization and brings value to it.
- ❖ It is reflected in the organization's efficiency in performing its activities or in the value it provides to buyers or both.
- ❖ It influences buyers and their perception of the organization's superiority in what it offers, motivating them to purchase from it.
- ❖ It is achieved for a long time and does not disappear quickly when developed and renewed.

3- Objectives of Competitive Advantage:
- Creating new marketing opportunities, which means enabling the organization to enter new competitive fields and deal with new types of goods and services.
- Forming a new future vision for the goals that the organization aims to achieve and the significant opportunities it seeks to seize. This is to maintain and develop the competitive advantage, avoid imitation by competitors, and create value for customers because it is the basis for achieving quality.
- Occupying a competitive position in the market and gaining new markets, thereby achieving growth, development, and renewal. **(Qouidar Louiza, 2007, p. 107)**

4-The importance of competitive advantage lies in the following elements:
- Creating value for customers that meets their needs and ensures their loyalty, supporting and enhancing the reputation and image of the organization in their minds.
- Achieving strategic differentiation from competitors in the goods and services provided to customers, with the possibility of differentiation in resources, capabilities, and strategies pursued in a highly competitive environment.
- Achieving market share for the organization as well as high profitability to stay and continue in the market.
- Competitive advantage is the strategic concept that reflects the good and continuous competitive position of an organization against its competitors.
- Excellent performance of internal resources, strategic capabilities within various systems, strategies, activities, and operations of the organization**. (Morsi Nabil Khalil, 1996, p. 49)**

Thirdly, the role of artificial intelligence (AI) applications in achieving competitive advantage for sports organizations can be understood as follows:
- Innovation and Creativity: According to Porter, competitive advantage involves discovering more effective, innovative, and novel ways of producing and delivering goods and services compared to competitors, ultimately enhancing value for customers. Therefore, AI can become a competitive advantage for many sports organizations by leveraging new technologies.

- **Optimal Utilization and Market Leadership:** Leveraging AI optimally enables sports organizations to adapt to rapid transformations and become leaders in their field, achieving superior performance compared to their counterparts.

- **Deep Learning Algorithms:** AI techniques such as deep learning algorithms can analyze customer preferences and behaviors to provide targeted recommendations and customized marketing campaigns, thereby enhancing customer loyalty and gaining a competitive edge.

- **Expert Systems:** AI-powered expert systems simulate human expertise to provide decision-making recommendations, aiding in sales processes and service delivery.
- Smart Systems for Data Collection and Resource Planning: Smart AI systems can collect and transform data into actionable insights, continuously identify customer needs, and streamline resource planning, contributing to competitive advantage.

- **Learning and Adaptation:** AI can learn from available data and past interactions to improve organizational performance and skills over time.
- Efficiency Enhancement and Cost Reduction: Automating repetitive tasks through AI technologies increases efficiency, reduces errors, simplifies processes, and ultimately provides a competitive advantage.
- Data Analysis for Market Trends and Customer Preferences: AI algorithms can analyze market trends, customer preferences, and competitor strategies to help sports organizations identify new opportunities and stay ahead in the competition.

- **Utilization of Customer Data for Personalized Marketing**: By analyzing vast amounts of customer data, including browsing history, purchasing behavior, and social media interactions, sports organizations can gain valuable insights into customer preferences and needs, allowing for personalized marketing campaigns tailored to individual customers.

- **Sustainability of Competitive Advantage:** Sustaining competitive advantage in a highly competitive environment depends on the organization's ability to innovate and keep pace with rapid technological advancements, such as AI applications, which bring additional value to the organization.

In summary, the integration of AI applications in sports organizations can lead to various benefits, including enhanced efficiency, improved customer experience, and the ability to stay ahead of competitors in the market, ultimately contributing to achieving and sustaining competitive advantage.

Conclusion:

it can be said that adopting modern technology and artificial intelligence applications has become essential for sports organizations aiming to stay competitive and expand their market. In an era heavily reliant on digital technology, sports organizations that fail to adapt to and leverage technology are at risk of falling behind.

Through research, it becomes clear that sports organizations are obligated to integrate and adapt to artificial intelligence and modern technology applications in order to enhance their ability to manage and organize their activities effectively, thus strengthening their competitiveness compared to their competitors. In the current era of digital and technological revolution, sports organizations cannot achieve a competitive advantage without fully leveraging these technologies and incorporating them into their overall strategies.

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