Designing a Pattern for the Application of Artificial Intelligence in the Sports Goods Market

ABSTRACT

Purpose: The main focus of this research is to identify the dimensions and advancements of artificial intelligence in the sports goods market.

Methodology: This research is applied in nature; in terms of strategy, it is qualitative and of the thematic analysis type. The data have been examined using inductive coding and line-by-line analysis. This method helps discover meaningful patterns and relationships in the data, providing a deeper understanding of the subject. This research was conducted using an inductive approach, extensive literature review, and semi-structured qualitative interviews with 15 experts in the fields of sports industry and technology through purposive sampling.

Findings: The results showed that the components of artificial intelligence in the sports goods market include 9 main dimensions and 35 sub-dimensions in the artificial intelligence model theme. The most important identified components are routine artificial intelligence for intensive tasks, the development of software related to sports goods, value proposition, smart sports equipment, training and development, market researcher and analyst, human resources manager, development of improvement strategies, and business intelligence.

Originality: Advancements in artificial intelligence have far-reaching impacts on the sports goods market. This research identifies the dimensions, components, and advancements of artificial intelligence in the sports goods market, contributing to new knowledge and insights in this field. By using qualitative analysis and semi-structured interviews, new findings are presented, showing how artificial intelligence can improve various processes in the sports goods market and focus on market share. Additionally, the challenges of automation for routine jobs and the need to transition individuals to new roles are examined. This research provides a practical and comprehensive model of artificial intelligence that aids strategic decision-making in the sports goods market, emphasizing the social and ethical implications of these advancements.

Keywords: sport economy; labor market; sports goods market; new technology; artificial intelligence

طراحی الگوی کاربرد هوش مصنوعی در بازار کالاهای ورزشی

چکیده

هدف: تمرکز اصلی این تحقیق بر شناسایی ابعاد و پیشرفت‌های هوش مصنوعی در بازار کالاهای ورزشی است.

روش: این تحقیق از نظر رویکرد، کاربردی؛ از نظر راهبرد، کیفی و از نوع تحلیل مضمون است. داده‌ها با استفاده از کدگذاری استقرایی و تحلیل خط به خط بررسی شده‌اند. این روش به کشف الگوها و روابط معنادار در داده‌ها کمک کرده و درک عمیق‌تری از موضوع را فراهم می‌آورد. این تحقیق با استفاده از رویکرد استقرایی و مرور گسترده ادبیات موجود و مصاحبه‌های کیفی نیمه ساختاریافته با 15 نفر از خبرگان در حوزه‌های صنعت ورزش و فناوری با استفاده از نمونه‌گیری هدفمند انجام شده است.

یافته‌ها: نتایج نشان داد که مؤلفه‌های هوش مصنوعی در بازار کالاهای ورزشی شامل 9 بعد اصلی و 35 بعد فرعی در مضمون الگوی هوش مصنوعی می‌باشد. مهم‌ترین مؤلفه‌های شناسایی شده عبارت‌اند از هوش مصنوعی روتین برای وظایف فشرده، توسعه نرم‌افزارهای مرتبط با کالاهای ورزشی، ارزش پیشنهادی، تجهیزات ورزشی هوشمند، آموزش و توسعه، محقق و تحلیل‌گر بازار، مدیر منابع انسانی، توسعه استراتژی‌های بهبود و هوش تجاری می‌باشند.

اصالت و ابتکار مقاله: پیشرفت‌های هوش مصنوعی تأثیرات گسترده‌ای بر بازار کالاهای ورزشی دارند، این تحقیق به شناسایی ابعاد، اجزاء و پیشرفت‌های هوش مصنوعی در بازار کالاهای ورزشی می‌پردازد و به دانش و بینش جدیدی در این زمینه کمک می‌کند. با استفاده از تحلیل کیفی و مصاحبه‌های نیمه‌ساختاریافته، یافته‌های جدیدی ارائه شده که نشان می‌دهد چگونه هوش مصنوعی می‌تواند به بهبود فرآیندهای مختلف در بازار کالاهای ورزشی و توجه به سهم بازار کمک کند. همچنین، چالش‌های اتوماسیون برای مشاغل روتین و نیاز به انتقال افراد به نقش‌های جدید بررسی می‌شود. این تحقیق یک مدل کاربردی و جامع از هوش مصنوعی ارائه می‌دهد که به تصمیم‌گیری استراتژیک در بازار کالاهای ورزشی کمک می‌کند و تأکید بر پیامدهای اجتماعی و اخلاقی این پیشرفت‌ها دارد.

کلید واژه: اقتصاد ورزش، بازار کار، بازار کالاهای ورزشی، فناوری نوین، هوش مصنوعی

1. Introduction

The term "artificial" denotes something crafted by humans that closely resembles reality but is not naturally occurring. Intelligence refers to the capacity to solve problems through logic, utilize knowledge to enhance abilities, learn, and apply understanding to achieve desired outcomes and other cognitive skills (Goertzel, 2014). Artificial intelligence (AI) is a human-created system using digital technology, encompassing hardware, software, and human input. Rooted in computer science and information theory, AI aims to replicate, develop, and extend human intelligence. Research in AI applications can enhance brain function, broaden the scope of human intelligence, and accelerate technological innovations and comprehensive reforms (Dinca-Panaitescu, 2022; Pottala, 2018). AI has limitless applications in business, education, and therapy due to its ability to emulate human intelligence. Humans can feel, observe, analyze, preserve, and listen. The growth of digital technology from data processing to text, image, voice, and video has created an opportunity to build digital systems that can create artificial systems that help humans in research and development, business, and personal decision-making. That's not to say that artificial intelligence will be more powerful than the human mind. The system will have capacity but is limited in capabilities because humans have designed systems to perform specific tasks (Ahmed & Ahmed, 2023).

Artificial Intelligence (AI) systems are designed by humans to perform specific tasks, enhancing human capabilities in business decision-making, management, and performing tasks necessary to achieve company goals. Although businesses are aware of AI, the costs of development and implementation hinder the integration of this intelligent technology into businesses. The commercialization of processing, storage, and communication technologies has led to the growth of AI technologies. This technology helps companies grow, and due to this growth, new technologies are discovered that improve customer solutions. AI technologies have unlimited growth potential due to their unique learning capabilities. Humans develop AI technology that can be used to design newer and stronger systems. This is a growth cycle; human intelligence creates AI, which helps humans develop newer and stronger systems. AI and human intelligence (HI) mutually enhance each other's development. The advancement of AI systems stems from the evolution of technologies like computing speed, capacity, capability, and storage. All systems, including AI, are built on the basic principles of input, process, and output. Intelligent systems function according to rules, and AI, with its learning abilities, stands at the pinnacles of the hierarchy of the intelligent system (Ahmed & Ahmed, 2023). Artificial Intelligence (AI) is a key driver of modern development, boosting productivity and economic growth (Graetz & Michaels, 2015). The rise of the internet, big data, and cloud computing has sparked a technological revolution through AI, potentially transforming social structures and values. In 2017, China announced plans to become a global AI leader by 2030 (Zhou et al., 2019). In 2022, the software segment led the global AI in sports market and is expected to maintain its dominance due to rising demand for AI solutions. However, the services segment is projected to grow the fastest, as businesses provide various

products and services to support the sports sector, driving market growth (AlliedMarketResearch, 2024).

In today's world, artificial intelligence (AI) stands as one of the most advanced and innovative technologies, reshaping various industries. The sports goods market is no exception, with AI playing a significant role in improving processes, increasing efficiency and productivity, and fostering new innovations in this sector (Rashid & Kausik, 2024). However, the implementation of AI in the sports goods market faces challenges and obstacles. The development and implementation costs of this technology are one of the main barriers preventing the integration of AI into businesses (AlliedMarketResearch, 2024). Additionally, the shortage of skilled experts in AI and data analysis is another fundamental challenge that must be addressed (Keshkar & Karegar, 2022).

On the other hand, AI can have profound impacts on existing jobs in the sports industry. The automation of processes and the replacement of routine jobs with intelligent systems necessitate the transition of individuals to new roles requiring specialized skills in AI and data analysis (Autor, 2015). These changes can have social and ethical implications that require comprehensive evaluation and appropriate management (Brynjolfsson & McAfee, 2014).

The post-Covid-19 pandemic era and artificial intelligence have simultaneously created fundamental changes in the sporting goods market and helped manufacturers to increase their productivity (Keshkar & Karegar, 2022; Li & Huang, 2021). The AI in sports market was valued at \$2.2 billion in 2022 and is expected to reach \$29.7 billion by 2032, at a CAGR of 30.1%. The increasing demand for monitoring and the need for chatbots and virtual assistants are the main factors in the growth of the artificial intelligence market in sports. Also, current information analysis helps market development. However, the lack of skilled experts and high costs limit the development of the market. Increasing demand for artificial intelligence in the future will provide a profitable opportunity for market expansion (AlliedMarketResearch, 2024).

The extensive advancements in artificial intelligence (AI) have had profound impacts on various industries, including the sports goods market. This research derives its necessity and importance from several aspects. Firstly, AI's unparalleled capabilities in data processing and analysis create unprecedented opportunities for improving performance and productivity in companies, enabling process optimization and efficiency enhancement. Secondly, the use of AI in the sports goods market can improve customer interactions and increase their satisfaction through personalized services and consumer behavior analysis. Additionally, predictive AI analytics can help companies forecast and manage market changes and assist in strategic decision-making. This research also addresses the challenges associated with the automation of routine jobs and the need to transition employees to new roles, contributing to a better understanding and management of the social and ethical implications of these transformations. Ultimately, this study, by providing a comprehensive and practical model of the dimensions and components of AI, aids in strategic decision-making in

the sports industry and contributes to the development of new knowledge and insights in this field, enhancing the progress and competitiveness of the industry.

2. Theoretical background

(Glebova et al., 2024) by examining the impact of the development and diffusion of artificial intelligence in the labor market of the sports industry, the characteristics are undergoing changes with the automation of artificial intelligence. (Desta & Amantie, 2024) with evidence from examining the vital scientific role of artificial intelligence in increasing market performance through improved sales, customer satisfaction, usage forecasting, price optimization, risk reduction, and decision-making processes. (Lv & Song, 2020) by combining artificial intelligence and the sports industry showed that the efficiency that artificial intelligence can create in the sports industry is very limited. Various studies show that what makes artificial intelligence affect the market is three factors: influential, influential and the impact of new technologies. The substitution effect is expected to decrease due to the replacement of labor with artificial intelligence. In contrast, new technologies and complements can increase capacities and create jobs (Autor, 2015; Bakhshi et al., 2017; Bloom, McKenna, & Prettner, 2018). (Aghion & Howitt, 1994) examine two competition effects on unemployment. They believe that investing in technology will pay off and create jobs, thereby reducing unemployment and creative destruction. (Autor, 2015) explains why artificial intelligence has eliminated most jobs. By using these methods, there are better alternatives and it can be used, but its effect on increasing productivity and using it to increase productivity can be. Also, it strengthens people's advantages in solving problems, adaptability and creativity. (Autor, Dorn, & Hanson, 2015) examining the effects of trade and technology on the US labor market found that computerization has caused occupational polarization but has reduced the total.

Although the industries in the market are comprehensively affected by AI deployment, they may show different impacts to different economic degrees and different measures of knowledge and technology. (Brynjolfsson & McAfee, 2014) point out that digitization is the fastest growing opportunity for groups with specific skills and higher education levels, but has occupied the living space of low-skilled work. (Frey & Osborne, 2017) study the rate of replacement of jobs by computers. Through levels that describe the level of cognition and performance, creativity, and social intelligence, they estimate the probability that 702 jobs will be replaced by computerization and find that 47% of jobs will be replaced. The probability of replacement of each job is completely different and decreases with increasing salary and level of education. Existing reviews show that the research conducted on the effects of artificial intelligence is underdeveloped and therefore under-researched. Also, artificial intelligence on jobs is different in different industries and each industry will have different experiences depending on its own conditions and factors. By using a comprehensive study, you can better understand the potential of artificial intelligence on the labor market of the sports industry and develop strategies to deal with this tool. This will help you use artificial intelligence.

The research questions are as follows:

1. How has the advancement of AI affected the demand and job roles in the sports goods market?
2. What new job opportunities have emerged in the sports goods market following the advancement of AI?
3. What skills and knowledge are required for the new job roles created by AI technology in the sports goods market?
4. How has AI technology displaced existing job roles in the sports goods market, and what are the consequences of this displacement?
5. What impact will the future of AI in the sports industry have on the sports goods market?

Using qualitative interviews with experts in the sports industry and artificial intelligence technology, this research investigates the impact of artificial intelligence on the labor market of the sports industry (Huang & Zhang, 2022). The main purpose of this study is to identify the dimensions of artificial intelligence in the sports goods market and provide deep insights into the dynamics and changes of the labor market in the sports industry.

3. Methodology

3.1. Data collection and sample

The theoretical framework of technological determinism offers a valuable lens to explore how artificial intelligence advances the sporting goods market. Data analysis was conducted using inductive coding and line-by-line analysis. For this research, qualitative data from interviews were analyzed using (Braun & Clarke, 2006) six-step theme analysis process: 1- Familiarizing with the data 2- Generating initial codes 3- Searching for themes 4- Reviewing themes 5- Defining and naming themes 6- Producing the report.

We sampled data from a diverse group of professionals in sports, sports goods production and sales, and technology. The criteria for selection included:
1. Over five years of full-time professional experience in the sports industry
2. A job role related to innovation, or technological transformation in the sports industry

These criteria ensure that interviewees have substantial first-hand experience and knowledge. To maintain ethical standards, the identities of the interviewees are kept anonymous. The selection criteria align with the research objectives and theoretical framework.

Between March and May 2024, we engaged with over thirty specialists and experts, ultimately collecting 15 written interviews. Each interviewee spent an average of 50 minutes answering our questions and provided written consent for the use of their information. They also reviewed the article's abstract before final approval. This

qualitative approach enabled us to gain deep insights and generate new concepts through data synthesis and analysis.

3.2. Sampling and characteristics of interviewees

Using purposeful and snowball sampling, we conducted semi-structured interviews with expert approval. The interview process continued until theoretical saturation was reached, with no new items identified after the 12th to 15th interviews, leading to the conclusion of the interviews. Max QDA 24 software was utilized for analysis. The characteristics of the interviewees, focusing on AI's role in improving the sports goods market, are detailed in Table (1).

Table 1. Profile of the Interviewees.

Code	Education	Current Position	Field of Expertise	Relevant Industry	Years of Experience
P_1	Bachelor's in Computer Science	Chief Technology Officer at Sports Tech Innovations	Technology	Sports Technology	6
P_2	PhD in Data Science	Data Specialist at Sports Analytics	Sports Analytics	Sports Analytics	7
P_3	Master's in Sports Management	HR Manager at Sports Management Inc	Sports Management	Sports Industry	6
P_4	Master's in Human Resources	HR Manager at Sports Business	Human Resources	Sports Business	8
P_5	PhD in Sports Management	University faculty member	Sports Management	Sports Industry	10
P_6	PhD in Marketing	Marketing Lead at Sports Goods	Sports Marketing	Sports Goods	15
P_7	PhD in Business	Faculty Member of Sports Business	Sports Business	Sports Analytics	12
P_8	Master's in Sports Engineering	Senior Engineer at Sports Tech Engineering	Sports Engineering	Sports Technology	5
P_9	Bachelor's in Business Administration	Strategy Manager at Global Sports Ventures	Business Strategy	Sports Business	5
P_{10}	Bachelor's in Industrial Design	Innovation Manager at Sports Equipment	Innovation	Sports Industry	7
P_{11}	Bachelor's in Human Resources Management	HR Consultant in Sports Management	Human Resources	Sports Business	9
P_{12}	Master's in Artificial Intelligence	AI Specialist at Smart Sports Equipment	AI Development	Sports Equipment	6
P_{13}	Master's in Computer Science	Research Lead at Sports AI Research Center	AI Research	Sports Technology	13
P_{14}	Bachelor's in Information Technology	Tech Lead at Advanced Sports Goods	Technology	Sports Goods	8
P_{15}	Master's in AI Technology	Innovation Lead at AI Sports Tech	AI Technology	Sports Technology	5

3.3. Validity and reliability

To determine validity and enhance the quality of the research, three key points were considered: using multiple sources, involving multiple analysts, and employing multiple methods. In this study, participants were selected from a diverse range of

sports business owners, academic professors, and experts. For qualitative data analysis, assistance was sought from three interviewees, two PhD students, and three university professors familiar with qualitative methods and data analysis. To ensure the transferability of the research results, multiple reviews of the interviews were conducted, and non-repetitive content was maximally extracted. For confirmability and reliability, the research details and notes were meticulously recorded and documented. To ensure the reliability of the interviews, both the test-retest method and intra-coder agreement were used. For test-retest reliability, some interviews were coded twice within a short time frame, and the codes from both instances were compared. The method for calculating reliability between the coding done by the researcher at two different time intervals is as follows:

$$\text{Test} - \text{retest reliability percentage} = \frac{\times\ 2\text{number of agreements}}{\text{total number of codes}} \times 100$$

Formula (1). Method for Calculating Test-Retest Reliability Percentage

To calculate test-retest reliability, three interviews were selected and each was coded twice by the researcher with a 30-day interval between codings. The results of these codings are presented in Table (2).

Table 2. Calculation of Test-Retest Reliability.

Row	Interview Title	Total Number of Codes	Number of agreements	Lack of agreements	Test-Retest Reliability
1	Interview 4	21	9	3	85.71
2	Interview 8	16	7	2	82.5
3	Interview 12	22	9	4	81.82
	Total	59	25	9	84.75

The findings in Table (2) indicate that the total coding over two thirty-day intervals amounted to 59. Among these, there were 25 agreements and 9 disagreements across the three interviews. Consequently, the test-retest reliability findings show that the result, using the specified formula, is 84.75 percent. Since reliability above 60 percent is considered acceptable, it can be concluded that the coding demonstrates appropriate reliability (sayrs, 1998).

To calculate the reliability of the interview using the intra-subject agreement method with two coders, a researcher in the field of sports management (with a PhD) and familiar with thematic analysis was invited to participate as a secondary coder. Subsequently, the researcher and this colleague coded three interviews, and the intra-subject agreement percentage, used as an index of analysis reliability, was calculated using the following formula:

$$\text{Percentage Agreement} = \frac{\times\ 2\text{number of agreements}}{\text{total number of codes}} \times 100$$

Formula (2). Method for calculating the reliability percentage between two coders

In this research, to assess reliability between two coders, three interviews were chosen and each was coded twice by the researcher with a 30-day gap between codings. The results are shown in Table (3).

Table 3. Calculation of reliability between two coders.

Row	Interview Title	Total Number of Codes	Number of agreements	Lack of agreements	Test-Retest Reliability
1	Interview 6	14	6	2	75
2	Interview 7	11	5	1	90.91
3	Interview 14	25	10	5	80
	Total	50	21	8	84

The findings in Table (3) show that the researcher and their colleague recorded 50 codes, with 21 agreements and 8 disagreements. The inter-coder reliability was calculated to be 84 percent. Since a reliability above 60 percent is considered acceptable, it can be concluded that the coding demonstrates appropriate reliability (sayrs, 1998).

4. Results

4.1. Verbal Statements

After the interviews, thematic analysis method was used to analyze the data. All the information provided by the interviewees were extracted in the form of text and concepts. In the next step, a more comprehensive classification was done than the previous step, which were classified in the form of categories. In the final stage, the categories were systematically related to each other and formed themes. Table (4) mentions some examples of verbal statements of the interviewees.

Table 4. Verbal statements of the interviewees.

Verbal Statements	Initial cods
Advancements in AI have significantly transformed roles in the sports industry. AI systems now handle many repetitive tasks previously done by humans, allowing for a focus on strategic tasks and leading to improved efficiency and accuracy in sports operations.	Reducing repetitive tasks
Using artificial intelligence and machine learning tools, a large amount of data can be processed and analyzed quickly.	High analysis speed
AI and automation handle many repetitive and time-consuming tasks automatically. Accurate, up-to-date data analysis helps identify weaknesses and opportunities, leading to smarter decision-making.	Accurate, up-to-date data analysis
Using technological tools and systems to improve and facilitate daily activities	facilitate daily activities
AI can analyze customers' buying patterns for sporting goods and offer detailed suggestions, enhancing customer satisfaction and improving the shopping experience.	enhancing customer satisfaction
AI provides quick, accurate answers, manages daily tasks, and offers personalized suggestions, helping users optimize their time and resources. By analyzing data and behavior patterns, AI predicts users' needs and preferences, delivering a unique and efficient experience.	analyzing data and behavior patterns
AI enhances your shopping experience for sports goods by helping you find the best products quickly and at the lowest cost.	enhances your shopping experience
AI serves as your guide to achieving sports goals, your training companion, optimizing performance, and assisting you in reaching your best version.	optimizing performance

Smart solutions for resource management, economic strategies for success, and smart investments for a sustainable future are key to thriving in a competitive market.	key to thriving in a competitive market
Security, transparency and sustainable growth, more productivity with advanced technology, a new way to invest in the modern world	a new way to invest in the modern world
We leverage innovation and advanced technologies to offer high-quality, uniquely designed products that meet customer needs and expectations. Our goal is to create a unique, satisfying experience, making customers feel valued and more satisfied with each purchase.	making customers feel valued and more satisfied
We prioritize customer needs by offering high-quality products and exceptional services. Our goal is to build stable, trusting relationships, making customers feel valued and satisfied. We listen to their feedback and strive to exceed their expectations with every interaction.	strive to exceed their expectations with every interaction
We use advanced technologies and smart sensors to offer clothing and equipment that accurately monitor and improve your performance. These high-quality, ergonomically designed products provide a comfortable and efficient experience. Our goal is to innovate in your daily life and enhance your health and performance.	high-quality, ergonomically designed products
We use advanced technologies and exceptional service to create an unforgettable experience for athletes and spectators. Our goal is to enhance athlete performance and boost spectator enjoyment and excitement.	create an unforgettable experience
Using modern teaching methods and practical examples, we present the concepts of algorithms in a simple and understandable language.	modern teaching methods
We enhance the production process using advanced technologies and new management methods. Our goal is to provide high-quality services and focus on customer needs and expectations, ensuring a satisfactory experience.	advanced technologies in production
We use new technologies and predictive models to provide businesses with accurate, timely information for strategic decisions, keeping them ahead in the competitive market.	Demand in the market
Focusing on quality, innovation, and customer satisfaction creates a powerful, reliable product that meets and exceeds customer expectations.	creates a powerful, reliable product
Using market data and customer feedback, we continuously improve our products and services and gain a deep understanding of the market by carefully analyzing customer needs and preferences.	gain a deep understanding of the market
We develop effective market growth strategies by analyzing the market and identifying new opportunities. Our goals are to attract new customers, strengthen relationships with existing ones, and improve our product's market position using new technologies, creative marketing methods, and added value for customers.	identifying new opportunities
We aim to create an environment where people can maximize their skills and engage in challenging projects, focusing on professional development and personal growth. We're building a strong team to achieve long-term goals.	Supportive environment
We offer solutions to maximize business profitability and efficiency through accurate cost management. By reducing unnecessary costs and improving financial processes, we aim to achieve greater success.	Cost optimization
Optimizing processes by optimizing internal processes, customer feedback by collecting and analyzing by identifying weaknesses	analyzing customer feedback
We should use advanced technologies and analysis tools for quicker, more accurate data analysis. Clear decision-making structures simplify and speed up processes. Training and empowering employees is also crucial.	quicker, more accurate data analysis
By establishing clear protocols and continuously monitoring their implementation, we can use robots and AI to automate dangerous tasks, ensuring employee health and safety.	use robots and AI to automate dangerous tasks
By formulating and implementing long-term strategic plans, we can determine the path of market growth and development.	formulating long-term strategic plans

4.2. concepts and sub-themes

The results of theme analysis show that artificial intelligence for improving the sports goods market consists of 35 main dimensions and 9 sub-dimensions. Also, the

description of the concepts and how to achieve the sub-themes is briefly presented in Table (5).

Table 5. Extracting selective concepts and sub-themes.

Row	Interviewee	Description of Concept	Description of the sub-theme
1	$P_4,P_5,P_7,P_8,P_{11},P_{12},P_{14},P_{15}$	Changing Human Roles	Routine AI for intensive tasks
2	P_7,P_{12},P_{15}	Big Data Management	
3	P_1,P_{10},P_{13},P_{15}	Cost Reduction and increasing productivity	
4	P_{14},P_{15}	Customer Data Analysis	
5	P_4,P_5,P_8,P_{14}	Technology Interaction	
6	P_{12},P_{13}	Automation of Repetitive Tasks and Processes	
7	P_4,P_5,P_{12},P_{13}	Interaction assistant, especially in the field of purchase	Development of software related to sports goods
8	$P_2,P_7,P_9,P_{13},P_{14}$	Digital assistant equipped with artificial intelligence	
9	P_1,P_4,P_8,P_{12}	Significant improvement in sales and customer experience	
10	$P_1,P_5,P_7,P_8,P_9,P_{11},P_{14}$	Applications, programs, and virtual coaching	
11	$P_2,P_7,P_{10},P_{11},P_{15}$	Cost Efficiency	Value proposition
12	P_3,P_{12}	Digital Assets	
13	$P_2,P_3,P_6,P_{10},P_{12}$	Creativity in Delivering High-Quality Products	
14	$P_2,P_3,P_5,P_7,P_{10},P_{11},P_{12},P_{15}$	Attention to Customer Needs and Retention	
15	$P_2,P_3,P_6,P_9,P_{10},P_{11},P_{14}$	Clothing and equipment containing sensors	Smart sports equipment
16	P_1,P_6,P_{10},P_{11}	Improving the experience for athletes and spectators	
17	$P_2,P_5,P_6,P_9,P_{10},P_{11},P_{14}$	Market expansion using new equipment	
18	$P_4,P_8,P_9,P_{10},P_{14}$	Training in the field of algorithms	Training and development
19	P_2,P_8,P_{12},P_{15}	Artificial intelligence algorithm developers	
20	P_4,P_{14}	Ethical supervision of artificial intelligence	
21	P_2,P_9,P_{10},P_{13}	Improving production processes and customer service	
22	P_1,P_3,P_4,P_7,P_{13}	Forecasting supply and demand trends in the market	Market researcher and analyst
23	P_{12},P_{13},P_{15}	Brand power	
24	P_7,P_{13}	Customer needs and preferences for a deep understanding of the market	
25	P_5,P_6,P_{12},P_{13}	Strategy for market growth and development	
26	$P_5,P_7,P_9,P_{12},P_{14},P_{15}$	Attracting expert people with IT infrastructure	Human Resources Manager
27	P_2,P_5,P_7	DBA and MBA training	
28	$P_6,P_9,P_{12},P_{14},P_{15}$	HRBP Developers or HR Business Partner	
29	P_1,P_4,P_8,P_9,P_{10}	Different cost structure	Develop improvement strategies
30	P_1,P_5,P_9	New strategies for expansion and more market share	
31	P_6,P_8	Increasing productivity and service quality	
32	P_1,P_5,P_{11}	Process and workflow improvement	Business Intelligence
33	P_2,P_{13}	Accelerate decision making	
34	P_{11}	Performing risky, dangerous tasks	
35	P_2,P_3	Improving strategic decision-making and enhancing performance	

4.2. Main Themes

In Table (6), the final summary of the interviews was addressed. The identified sub-themes are listed in nine rows, and the importance of each component was identified based on frequency. The main themes were also extracted, and the final research model was derived according to Figure (1).

Table 6. Extraction of Main Themes.

Row	Description of the sub-theme	Code of interviewees	Frequency
1	Routine AI for intensive tasks	$P_1,P_3,P_4,P_5,P_7,P_8,P_{10},P_{11},P_{12},P_{13},P_{14},P_{15}$	23
2	Development of software related to sports goods	$P_1,P_4,P_5,P_7,P_8,P_9,P_{11},P_{12},P_{13},P_{14}$	20
3	Value proposition	$P_2,P_3,P_5,P_6,P_7,P_{10},P_{11},P_{12},P_{15}$	20
4	Smart sports equipment	$P_1,P_2,P_3,P_5,P_6,P_9,P_{10},P_{11},P_{14}$	18
5	Training and development	$P_2,P_4,P_8,P_9,P_{10},P_{12},P_{13},P_{14},P_{15}$	15
6	Market researcher and analyst	$P_1,P_3,P_4,P_5,P_6,P_7,P_{12},P_{13},P_{15}$	14
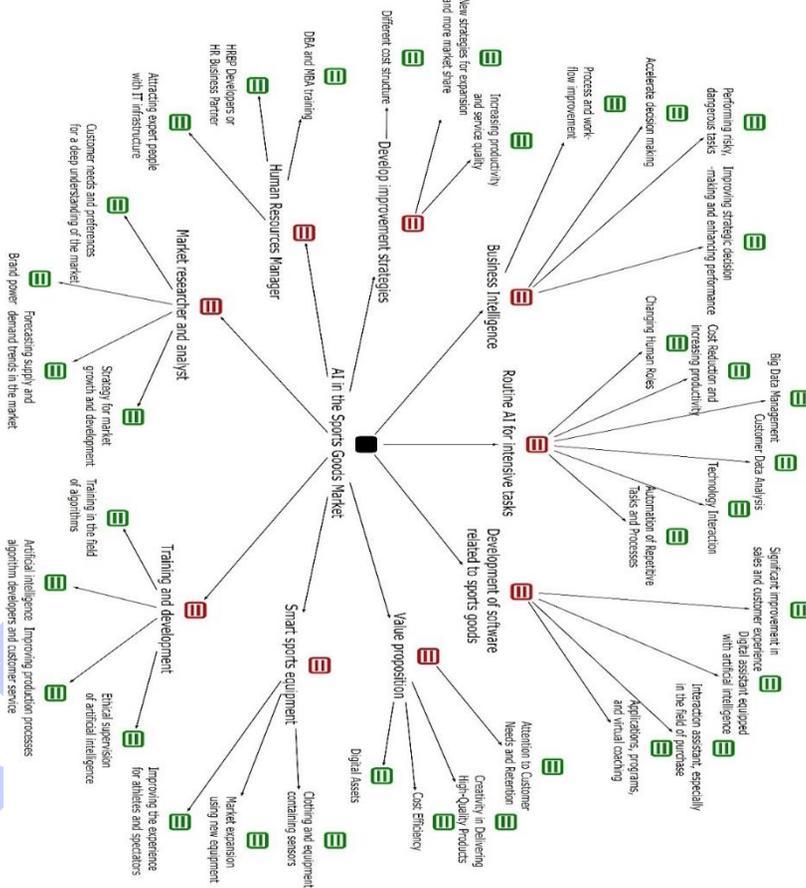
Figure 1. The final research Pattern.

5. Discussion and Conclusion

Today, developing countries equate industrialization with becoming independent, and civilized, and a factor in gaining global credibility. Therefore, these countries pay a lot of attention to the industrial sector. In developing countries, economic policymakers use industrial development as a lever for development to achieve greater welfare and meet the needs of people's lives (Khodadad, 2015), and our country, Iran, is no exception. Industrial organization or industrial economics is one of the most important branches of economics that studies the relationships between structure, conduct, and performance, and its pattern (SCP) is one of the most important areas of market analysis (Dehghani, 2014). Studies on the market are a topic that has been less conducted in Iran (Naeini, 2014). The structure of a market means the arrangement of different components of a whole together. According to this research, routine artificial intelligence for intensive tasks, the development of software related to sports goods, value proposition, smart sports equipment, training and development, market research and analysis, human resources management, development of improvement strategies, and business intelligence are among the factors that can improve the sports goods market and gain a larger market share.

The AI model in the sports goods market must answer one question: How can the identification of AI dimensions focus on the sports goods market and gain a larger market share? The answer to this question is possible by identifying the dimensions of AI. Every market needs to be identified and reviewed to gain a larger market share, and on the other hand, factors that can improve the sports goods market through AI must be identified. Therefore, this research aims to identify the dimensions of AI in the sports goods market. The results of qualitative data analysis reveal that this market comprises 9 main dimensions and 35 sub-dimensions, all within a single theme. These components are detailed in Figure 2, which provides an in-depth discussion of each one.

Figure 2. Final Pattern.

In 2023, the sports goods market faced challenges such as rising costs, persistent inflation, and regional conflicts that led to a decline in consumer confidence. Companies also continued to struggle with inventory issues, particularly adding inventory due to mismatched demand forecasts. However, the market showed resilience. Revenue growth in 2023 reached 6% (compared to 2% in 2022) and performed stronger in various regions. As we enter 2024, this year's report reveals a renewed sense of resilience within the industry. This resilience underscores opportunities stemming from an improved market environment and evolving consumer preferences. Additionally, following recent supply and demand imbalances, companies are now engaging in integrated business planning and joint analysis to

better navigate busier periods. Meanwhile, the sports ecosystem and sustainability needs present potential for innovation. With these considerations in mind, this year's sports goods report portrays an industry at a pivotal moment, facing both challenges and opportunities for sustainable growth (WFSGI, 2024). According to the results obtained from qualitative data analysis, the most important identified components for AI advancement in improving the sports goods market include routine AI for intensive tasks, development of sports goods-related software, value proposition, smart sports equipment, training and development, market researcher and analyst, human resources manager, strategy improvement development, and business intelligence. Other researchers such as (Ahmed & Ahmed, 2023; Andreff, 2006; Ding, 2019; Glebova et al., 2024; Zhou et al., 2019) have considered AI as the beginning of a transformation in the sports goods market, with its nature differing in some indicators.

The integration of routine AI for intensive tasks signifies a pivotal advancement in customer data analysis, fundamentally transforming human roles, technological interactions, and consumer experiences within the sports goods market. By leveraging AI, companies can enhance customer experiences through natural language interactions with technology, encompassing typing, speaking, and unstructured expression while receiving coherent and meaningful responses. This innovation transcends the sports goods sector, fundamentally altering societal contracts and global engagement.

In this context, (Zhou et al., 2019) conducted a comprehensive analysis of the impact of AI on the Chinese labor market. Their study estimated the potential for AI to replace various jobs across different industries. The findings indicated that AI disproportionately affects jobs held by women, older individuals, those with lower education levels, and low-income workers. The study also projected the number of workers in each industry who would be replaced by AI. By 2049, it is expected that AI will replace approximately 278 million workers in China, with the range varying from 201 to 333 million depending on the adoption rates of AI technology. This accounts for 35.8% of the current employment in China, aligning with the study's findings.

The implications of this transformation are vast. As AI continues to develop and become more integrated into various industries, it will undoubtedly bring about significant changes in the workforce. Jobs that involve repetitive and routine tasks are most at risk of being automated. However, this shift also opens up new opportunities for jobs that require specialized skills in AI and data analysis. The challenge for society will be to manage this transition in a way that maximizes the benefits of AI while minimizing its adverse effects on employment.

Furthermore, the use of AI in customer data analysis within the sports goods market can provide companies with valuable insights into customer preferences and behavior. This allows for more targeted marketing strategies and improved customer satisfaction. The ability to analyze large datasets quickly and accurately means that companies can respond to market trends and consumer needs more effectively.

As AI technology continues to evolve, its potential applications within the sports goods market will expand. From optimizing supply chains to enhancing product

development and customer service, the possibilities are vast. However, it is crucial to address the ethical considerations and potential societal impacts of widespread AI adoption. Ensuring that AI technologies are used responsibly and ethically will be key to harnessing their full potential and achieving sustainable growth in the sports goods market.

Overall, the integration of AI into the sports goods market represents a transformative shift that has the potential to enhance efficiency, improve customer experiences, and drive innovation. As companies continue to embrace AI, they will need to navigate the challenges and opportunities it presents to stay competitive in an increasingly digital world.

The development of software related to sports goods is another dimension of AI advancement, particularly in interaction assistants, AI-equipped digital assistants, and significant improvements in sales and customer experience, applications, programs, and virtual coaching. With the development of AI technologies, new possibilities are available for individuals seeking physical activity and using applications and virtual coaching. Currently, achieving greater health and well-being requires a change in mindset and fundamental actions from the individual. Although human needs, according to Max-Neef's theory, remain constant, the methods of responding to them are evolving. Today, starting a healthy lifestyle requires a deep understanding of an individual's physical abilities and limitations, necessitating numerous tests and evaluations. It is essential to determine the ideal environment for exercise, select appropriate equipment and clothing for safety and style, and carefully plan diet and rest. Technological advancements now allow us to manage these needs with the press of a button. These technologies can assist with all aspects of health and well-being, including weight loss, increased energy, or achieving other health goals. Envision a virtual assistant capable of scheduling daily activities, managing dietary plans, organizing training regimens, and selecting sports equipment tailored to individual needs, all at a highly cost-effective rate. This efficiency parallels the internet's revolution of content distribution, with generative AI transforming creativity. Such an assistant redefines interactions, particularly in shopping and sports, through novel tools, representing a significant change. In this context, the research conducted by (Glebova et al., 2024) on the development and dissemination of AI in the sports industry aligns with these findings.

The value proposition, as a critical dimension of artificial intelligence (AI), encompasses cost efficiency, digital assets, creativity in high-quality products, attention to customer needs, and strategies for attracting and retaining customers. Consumers are increasingly driven by value, and creating value for customers lays the foundation for sustainable wealth creation in sports businesses. This approach leads to customer attraction and retention, thereby maintaining and enhancing the business's position in the sports market. (Kiron & Spindel, 2019) highlights that managers should understand and cater to customer needs by providing unique value. When technology offers the same value at a lower cost, it disrupts traditional cost structures and reduces the need for individual support. This shift creates a new consumer interface and a

different cost structure, providing significant emotional and financial value. This transformation is currently happening.

Smart sports equipment, including sensor-equipped clothing and gear, enhances the experience for athletes and spectators while expanding the market. Generative AI, virtual reality, and Web 3.0 are transforming the sports and health ecosystem, making health and fitness journeys more user-friendly, customized, and personalized. These advancements allow individuals to focus on exercise, nutrition, and self-improvement, rather than planning and research, all at reasonable costs.

The text emphasizes that while virtual assistants can be customized to individual preferences, they primarily reduce routine tasks, enabling people to focus on self-improvement and enhancing experiences for athletes and spectators. New equipment driven by AI technology helps companies expand their business, attract new customers, increase revenue, and build relationships. (Zhang & Zhu, 2022) support these findings, highlighting the practical applicability of AI in sports goods.

Another identified impact is training and development, which includes conducting theoretical courses and online content in the form of training packages, training in algorithms, AI algorithm developers, ethical oversight of AI, and improving production processes and customer services. In this context, it can be stated that training and development in AI are crucial factors for the advancement and growth of this technology. These training courses help developers gain a better understanding of AI-related algorithms and contribute to their improvement and development. Additionally, given the importance of ethics in the use of AI, training courses can help developers use this technology better and more ethically. AI can help improve customer service. For example, AI can be used to automate responses to customer inquiries or predict what types of products or services might be attractive to customers. AI can help analyze data to improve decision-making in organizations. By leveraging data analysis, future opportunities and challenges can be identified, enabling better planning. Consequently, training and development in AI are crucial for advancing this technology and improving sports goods. Additionally, it helps developers maximize the potential of this technology. In this regard, the research by (Glebova et al., 2024) introduced ethical oversight of AI and AI developers as components of training and development, which aligns with the research findings. Additionally, (UNESCO, 2021) reported that training and development in the field of AI can help produce goods and services, enabling developers to make the best use of this technology and improve their performance, which aligns with the research findings. According to the results, using AI can optimize production processes. For instance, machine learning algorithms can be employed to analyze production processes, identifying opportunities to enhance efficiency and reduce costs. AI training courses can help developers create new products and services using AI. This can include advanced software programs or physical products with smart capabilities.

AI researcher and analyst as the sixth dimension involves predicting supply and demand trends in the market, brand strength, customer needs and preferences for a deep understanding of the market, and strategies for market growth and development. These analyses enable marketers to optimize their strategies by accurately predicting

market trends, resulting in greater success in the market. Artificial Intelligence (AI) involves techniques that enable machines to perform cognitive functions requiring human intelligence, such as learning, reasoning, and interacting with the environment. Machine Learning (ML) and Deep Learning are two prominent AI techniques that can personalize brand experiences, enhancing user engagement and loyalty. Marketers utilize language-based AI as sales tools, payment processors, and interaction managers to improve user experiences. This technology is rapidly advancing, learning from past interactions, and optimizing itself to provide better experiences over time. AI helps marketers identify relevant content that users want to read and enables content personalization through observation, data collection, and analysis. In digital marketing, AI maximizes results in email campaigns and highlights data analysis as a key advantage. Marketers use AI to evaluate consumer behaviors and patterns, predict future outcomes, and adjust advertisements accordingly. By leveraging data, statistical algorithms, and advanced technology, AI predicts future trends and improves its results through continuous data examination. In the future, marketers can harness AI to create personalized experiences for customers and develop advanced marketing analysis techniques to target potential customers. Every interaction a customer has with a product or service is recorded and used to enhance future offerings. Now is an opportune time for marketers to experiment with AI strategies to create highly personalized customer experiences. As AI continues to grow across all industries, marketers should invest time and resources in testing strategies to ensure their marketing organizations are prepared for ongoing success. In this regard, the research by (Haleem et al., 2022) on AI applications showed that the results of this research are consistent.

Other dimensions of AI include human resource management, which refers to attracting specialists with IT infrastructure, DBA and MBA training, and HRBP or Human Resource Business Partner developers. Digital innovation continues to transform businesses, and companies have adjusted their strategic direction to embrace digital technologies, especially AI. Companies can leverage AI in human resource management to gain a strategic advantage in attracting and retaining talent. Human resources are now considered a trusted advisor, helping companies navigate the phase created by disruptive technologies. Integrating AI into HR functions enhances employee experience by providing more capabilities and insights, offering more accurate information for managing people. AI analytical solutions assist in recruitment, selection, learning, growth, and retention in HR. These technologies help build capabilities and make companies competitive, resulting in companies that win in the market. With increased technology adoption, HRM performance has become a critical partner. By adopting algorithmic technologies, human resource management has moved towards data-driven approaches. Technical advancements have led to significant changes in the economic environment. Today, businesses recognize the importance of innovative and creative employees with skills, as their intellectual capital is not easily imitable by competitors and creates a sustainable competitive advantage. In this regard, the research by (Cheng & Hackett, 2021; Kaur & Gandolfi,

2023; Manuti & Palma, 2018) aligns with the findings of this research, considering the business partner, attraction, nurturing, and retention of talents.

With the advancement of AI, the dimension of developing improvement strategies refers to a different cost structure, new strategies for expansion greater market share, and increased productivity and service quality. AI advancements play a crucial role in developing improvement strategies for the sports goods market. This technology helps optimize cost structures and create innovative strategies for expansion and increased market share by reducing costs, increasing productivity, and improving service quality. AI can accurately identify the psychological needs of consumers, enabling the sports industry to respond quickly and effectively to these needs. Through big data analysis and the use of advanced algorithms, AI can help improve customer experience and customize services based on specific consumer needs. Additionally, AI can provide innovative tools for developing new products and services in the sports industry. For example, live virtual reality broadcasts, smart virtual events, and smart device platform competitions are examples of these innovations that can enhance the work experience and create added value. These innovations require the involvement of AI engineers in product development, system maintenance, and other related activities. Integrating AI with sports goods markets not only helps improve efficiency and service quality but also leads to faster and better development of this industry. This integration can enable the sports goods market to more effectively meet the needs of modern society and create new business models that lead to increased revenue and optimal resource utilization. Developing improvement strategies using AI for the sports goods market requires attention to various aspects, including data analysis, innovation in products and services, and the involvement of specialized engineers. These strategies can lead to improved customer experience, increased productivity and service quality, and greater added value for the sports industry. The results align with the research by (Lv & Song, 2020).

AI can enhance business intelligence (BI) in several ways to improve the sports goods market. By reducing human error through the use of AI-equipped computers, which, if properly programmed, will have zero error probability, automating repetitive tasks and processes, AI can automate repetitive tasks and processes. AI can easily manage massive data, quickly understanding and extracting relevant data. It speeds up decision-making by significantly increasing the collection of reliable and valuable data. AI-powered digital assistants, such as AI-based chatbots, reduce the need for customer service staff. AI can perform hazardous, dangerous tasks, replacing human labor. AI helps companies carry out their tasks more efficiently by improving processes and workflows. In terms of business intelligence, improving product quality through customer data analysis allows companies to better understand their customers' needs and preferences and design products that meet those needs. Identifying customer purchasing patterns enables companies to optimize their sales strategies and increase sales. By identifying new opportunities, companies can optimize costs and achieve greater profitability, leading to improved profitability.

As AI integrates into the sports industry, its awareness and use are rapidly growing. Millions of software engineers are exploring AI, marking a significant transformation. For sports companies aiming for success, key trends include:

1. Revisiting Business Models: Assess industry impacts, redesign customer journeys, and decide on personalized services or ecosystem integration. Brand positioning is crucial for building strong customer connections.
2. Essential Considerations: Address data management, IT infrastructure, risk, and change management. A robust framework for integrating multiple technologies is essential.
3. Brand Strength: A strong, trusted, and likable brand helps companies stand out in a tech-reliant world.

Recent research indicates that the impact of AI advancements on improving the sports goods market is a complex issue and cannot be easily determined. Multiple factors influence this area, and generalizing research results from different regions with varying conditions to Iran can lead to errors. Even if the development of these technologies coincides with weak employment growth during a certain period, it does not necessarily imply a meaningful correlation between the two. For instance, in the United States and many other countries, the productivity index had an unprecedently low growth rate between 2010 and 2020, and weak employment growth was due to weak economic growth, not job losses due to technology. It is crucial to note that if AI can ultimately create economic opportunities and capacities for future generations, society and government must act appropriately. Otherwise, technological innovations will lead to an even more unequal distribution of economic benefits. Technological advancements are rapidly disrupting the balance of tasks between humans and machines, and global labor markets are undergoing significant transformations. If these changes are managed wisely, their impact on employment will be positive. This will lead to market concentration and capture a large share of the sports goods market, making AI an omnipresent and essential tool.

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