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Research Article

The Power of Artificial Intelligence on Sports

Meltem İnce Yenilmez[1]
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Abstract

This article explores the broader role that artificial intelligence (AI) will play in the changing sports industry, focusing on how it will impact areas such as player performance, management, strategy formulation, and access to fans. As demonstrated by technologies such as FIFA sideline technology and video-assisted refereeing (VAR), the fusion of artificial intelligence and sports is driving a redefinition of traditional concepts of justice and human decision-making, resulting in greater reliance on data and objective decision-making processes. The study identifies fundamental issues in the practical and economic elements of sports, including the utilisation of artificial intelligence (AI) and strategic planning. The present study traces the evolution of scientific discourse through a detailed literature analysis of AI in sports from 1975 to 2023. The present study explores the evolution of artificial intelligence applications and their influence on the digital economy. To this end, an investigation is conducted into patterns of academic publications, encyclopedia editions, and collaborative networks. A notable increase in academic demand has also been observed since 2017, suggesting a growing public awareness of AI's revolutionary potential. This study makes a theoretical contribution to the understanding of the integration of AI into the sports ecosystem. It has the potential to assist sports organisations and policymakers in addressing ethical issues and jobs created by the use of AI.

Keywords
Artificial intelligence (ai) in sports, ai-powered fan engagement, athletic performance enhancement, predictive analytics in sports

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Introduction

The sports industry thrives on legendary athletes and rivalries, celebrated in popular culture and historical narratives, like Michael Jordan's iconic basketball career and the ongoing riva transformative effectlry between Ronaldo and Messi. However, the rise of artificial intelligence (AI) technology is significantly transforming the current sports landscape. AI is now seen as an essential component of industry operations, affecting everything from refereeing decisions to player strategy development and fan engagement. No longer just a supplementary tool, AI is increasingly vital in reshaping the dynamics of competitive sports (Barlow and Sriskandarajah, 2019). This technological shift will alter performance aspects and enhance the overall fan experience. It prompts a deeper exploration of AI's intricate capabilities, raising critical questions about its influence on traditional concepts of fairness, judgment, and human involvement in sports. The application of AI in sports decision-making has sparked extensive research, particularly regarding its role in enhancing fairness and minimizing human error. A prominent example is FIFA's implementation of Goal-Line Technology (GLT) during the 2012 World Cup, which was lauded for ensuring accurate refereeing decisions at crucial moments. Funk (2017) notes that these technologies exemplify how AI redefines the conventional limits of human judgment by offering more data-driven and equitable decision-making processes. The field has since broadened to incorporate other technologies, such as the Video Assistant Referee (VAR) system, further embedding AI into the core regulatory framework of football (Naraine and Wanless, 2020). As AI continues to gain traction, the adjudication and perception of sports outcomes may experience a significant transformation. This challenges theoretical frameworks focusing on fairness, accuracy, and human error (Kong, 2020; Chamorro-Atalaya et al., 2023).

Besides officiating, the application of AI in sports management and strategy development is on the rise, transforming perceptions of work and operational efficiency in the sports industry. Artificial intelligence (AI) enhances human expertise by processing vast amounts of data in real-time. By analyzing enormous volumes of data in real-time, artificial intelligence (AI) improves human knowledge. The Tour de France, which uses machine learning to predict performance, is a noteworthy example (Galily, 2018).

Large-scale datasets like as rider biometrics, topography, weather, historical performance, and even real-time race dynamics are analysed by machine learning algorithms in this context. Teams and analysts may forecast individual rider performance, improve tactics, and even foresee possible results throughout the demanding multi-stage cycling race thanks to this study. This application demonstrates how AI goes beyond straightforward data collection to offer predicted insights that have the potential to greatly impact choices in intricate, high-stakes situations.Conversations surrounding human-machine collaboration theory are becoming more significant, particularly regarding the influence of AI on fan engagement and team strategy. As AI increasingly assumes analytical responsibilities, the roles of analysts, coaches, and even athletes are evolving. Human work is now focused on creativity, intuition, and higher-level decision-making. Existing theories on work, strategy, and fan engagement in sports need to be reevaluated to consider the changing interplay between AI and human knowledge (Haenlein and Kaplan, 2019). Therefore, how AI is revolutionising multiple sports, from NBA fan fascination to AI-driven refereeing systems like FIFA's goal-line technology, is examined. This shows that the widespread use of AI in sports has triggered scientific investigations, making it important to map and visualise patterns in this evolving topic, which will be the basis for the methods.

Under these circumstances, bibliographic analysis has emerged as an important tool for methodological research on the development of a scientific discourse on artificial intelligence in sports and sports economics. By tracing the evolution of publications and collaborations from 1975 to 2023, this study aims to provide insights into how scientific interest is keeping up with the technological advances described in the introduction. The techniques used, including keyword analysis and co-author attribution, represent key themes, trends, and research networks that have emerged with the growing role of artificial intelligence in sports. The relationships show how science is changing at the same pace as artificial intelligence is transforming the sports field. This suggests the need for a thorough review of how the scientific literature addresses the application of AI in sports. Bibliographic studies provide an analytical lens to understand how research responds to advancements impacting contemporary sports.

Theoretical contributions

This study expands and refines existing theoretical frameworks that explore the relationship between technology and sport, with a particular emphasis on the growing significance of artificial intelligence (AI). It examines how AI is reshaping various aspects of sports, including refereeing, athlete performance, fan engagement, and strategy formulation. By doing so, it contributes to the ongoing academic discussion about how technological advancements are altering the core dynamics of sports competition. The article sheds light on how AI is redefining established norms in sports, particularly in areas that have traditionally relied on human judgment, such as officiating and strategic planning. A thorough exploration of AI's role in the decision-making process, particularly its incorporation into existing systems, is a crucial element of this research. This article also looks at the application of AI in sports management and officiating, highlighting examples like FIFA's goal-line technology and the NBA's implementation of chatbots. These innovations challenge conventional theories regarding human error, fairness, and the relationship between fans and sports. The study examines how AI influences split-second decision-making in critical situations, offering insights into its emergence as an essential tool for enhancing the fairness and precision of sports results. AI has shown a transformative effect on sports team management and strategy, improving fan experiences through personalised engagement methods and optimising athlete performance. This study provides a comprehensive analysis of the role of AI in developing the commercial and economic aspects of sports and demonstrates how it can improve and streamline these processes.

This paper is crucial for understanding the economic effects of artificial intelligence on the sports industry. One of the most intriguing aspects of this study is how AI is reshaping jobs within the sports sector. The findings show AI has the potential to revolutionise the roles of analysts, coaches, and players by handling repetitive and time-consuming data tasks. Since creativity, intuition, and strategic thinking remain vital to athletic performance, this shift will enable human professionals to concentrate more on these essential areas. It significantly contributes to the discussion about the future of employment in sports, particularly regarding the evolving relationship between human expertise and AI capabilities. This study enhances theoretical concepts surrounding human-machine collaboration, especially in the realm of sports. It sheds light on how human skills and artificial intelligence can complement each

other rather than compete. By illustrating that AI's role is to enhance human judgment rather than replace it, this study fosters a deeper understanding of the collaborative potential between AI-driven data analysis and human intuition in sports decision-making. This theoretical insight aligns with ongoing discussions in behavioural economics, which focus on balancing human decision-making with technological efficiency.

Practical contributions

This study offers valuable insights for athletes, sports organisations, and lawmakers. Examining current trends in AI applications within sports illustrates how technologies like machine learning in cycling and Hawk-Eye in tennis can enhance viewer engagement and sports performance. The research emphasises practical uses of AI, such as minimising human error in game management, enhancing strategic decision-making through real-time data analysis, and improving injury prevention with wearable robots. These examples create a clear pathway for sports companies aiming to incorporate AI into their operations to boost productivity and competitiveness in a data-driven sports landscape. Beyond practical insights, the study also presents actionable recommendations to tackle the ethical and legal challenges of integrating AI into sports. Key issues discussed include privacy concerns, the risk of AI bias, and the potential pitfalls of over-relying on machine algorithms for decision-making. This research equips sports professionals with valuable guidance on how to navigate these challenges while harnessing AI's potential to foster industry innovation by identifying issues and suggesting solutions. These contributions are crucial to ensure that AI's application in sports is not only effective but also ethically sound and sustainable.

Economic Impact of AI on Sports and the Digital Economy

The economic impact of artificial intelligence (AI) on the sports industry and the wider digital economy is substantial, reshaping revenue streams, labour markets, and business models. Incorporating AI in sports has not only enhanced fan engagement and performance but has also yielded considerable economic advantages. Specifically, AI has opened up new markets within the sports sector and fostered the growth of the digital economy. A prime example is the emergence of AI-driven fantasy sports platforms, which have turned a niche market into a global industry valued in the billions. These platforms use AI to deliver real-time data analysis and personalised recommendations, reaching

millions of users worldwide. Companies like DraftKings and FanDuel have established a new digital economy centred on sports entertainment, generating significant revenue and growth through subscriptions, advertising, and partnerships. Another significant economic effect of AI in sports is clear in the media and broadcasting sector, where AI's role in automating and enhancing sports reporting has transformed content production and consumption. AI-powered systems can now quickly generate highlight videos, analyse match statistics in real time, and customise content for various audience segments. This has resulted in a rise in digital sports media companies that harness AI to offer more dynamic and engaging content to fans. A notable instance is WSC Sports, an AI-driven platform that provides automated video highlight services for major leagues like the NBA, La Liga, and MLS. By leveraging AI, these companies can lower production costs while boosting both the quantity and quality of their content, contributing to the growth of the digital economy through new advertising opportunities and subscription models.

AI has significantly changed another vital aspect of the digital economy: sports betting. By utilising AI to predict match outcomes and analyse betting trends, the industry has become more efficient and tailored to consumer needs, leading to the rapid growth of online sports betting. Companies like Bet365 and William Hill have embraced AI technology to enhance their forecasting abilities and optimise their operations, which has resulted in increased sales and market share. The influence of AI in this field not only boosts customer engagement but also helps companies spot trends and manage risks more effectively, contributing to a stronger and more profitable industry. This blend of AI and sports betting shows how technology can transform the economic landscape and create new digital revenue opportunities. The economic effects of AI in sports also extend to job opportunities and employment growth. While there are worries that certain positions in the sports sector, such as data analysts and content creators, may be replaced by AI, it is also generating a demand for new skills and professions. For instance, roles in AI development, data science, and machine learning are becoming increasingly important in sports organisations and media companies. A notable example of this trend is Manchester City's City Football Group, which has made substantial investments in AI to assess player performance and enhance training. This investment has not only led to better on-field performance, but has also created highly skilled positions within the organisation. These changes show AI is not merely displacing jobs but is also fostering the growth of a more specialised workforce in the sports industry.

AI's economic impact on sports also reaches into global sponsorship and partnership agreements. By offering detailed insights into fan behaviour and engagement, AI enables sports organisations to deliver greater value to sponsors, leading to more lucrative, data-driven sponsorship arrangements. For instance, IBM's AI-driven analysis of Wimbledon's social media interactions allowed the tournament to furnish sponsors with real-time insights into fan sentiment and brand visibility, resulting in more focused and effective marketing strategies. These AI-generated insights empower sponsors to optimise their investments and ensure their marketing efforts resonate with audiences, ultimately fostering economic growth within the sports sponsorship landscape. This illustrates how AI is reshaping sports from a technological standpoint and exerting broader economic influences across both sports and the digital economy at large. Researchers are increasingly focusing on bibliometric review studies concerning artificial intelligence in sports. Prahani et al. (2022) conducted a bibliometric analysis of advancements in artificial intelligence in sports over the past decade (2011-2021) using the Scopus database. They gathered relevant information on trending topics through their VOSviewer mapping of 457 publications. Artificial intelligence is becoming increasingly prevalent at all levels of sports. A review of applications used by university students aimed at enhancing sports activities through artificial intelligence examined 210 publications published between 2013 and 2023 (Chamorro-Atalaya et al., 2023).

Due to the potential to improve sports quality, artificial intelligence research is becoming more and more important (Kong, 2020). Through the integration of the various technologies available, this technology allows for the optimisation of instructional approaches. Song and Wang (2020) have produced multiple bibliometric reviews that approach the subject matter from a sports perspective. The application of AI has been explored from various angles in the works that have been generated; however, there aren't many exclusive scientific mapping studies on AI teaching strategies. For this reason, bibliometric features must be investigated to visualise the state of the art and evaluate research propensities. With the use of artificial intelligence (AI), this paper intends to do a bibliometric analysis of the issue of sports approaches. In this sense, the goal is to visualise the entire volume according to the following: the trajectory of scientific production and keywords.

Table 1. Database search query

Variable	Definition
Database	Scopus, WOS, Google Scholar
Data	01.01.1975-31.12.2023
Years	48
Categories	Sports
Language	English
Search equation	TITLE-ABS-KEY (“artificial intelligence”, “sports economics”, “sports education”, “digital economy”, “artificial intelligence technologies”, “e-learning”, “sports performance”, “sports industry”, “sports equality”)
Result	1037
Refine search	
Type of document	Articles
Result	598 (Articles)

This table details a comprehensive literature review methodology conducted in specific academic databases. The study targeted publications covering 1 year between January 1975 and December 31, 2023, spanning 48 years. The search was conducted through peer-reviewed databases such as Scopus and Web of Science (WOS), which index a large portion of the scientific literature, as well as Google Scholar, to scan for more extensive sources. The combined use of these three databases allowed the relevant literature to be captured at maximum levels and provided a comprehensive analytical framework. The search is restricted to publications in the English language and is the main language of this international academic community. Only sports category is used in the research. The search equation used is “artificial intelligence”, “sports economy”, “sports education”, “digital economy”, “artistic intelligence technologies”, “e-learning”, “sports performance”, “sports industry industry, stated in this article; expression As a result of this first query, 1037 documents were obtained, after which these results were filtered according to the "Articles" document type and finally reduced to 598 articles. These 598 articles form the basis of the study's literature review.

Method

The economic impact of artificial intelligence (AI) on the sports industry has led to a significant transformation in areas such as media, publishing, sports betting and fantasy sports. These developments have not only revolutionised traditional sources of income but have also paved the way for the emergence of new digital markets. AI applications from companies such as FanDuel, WSC Sports and DraftKings make significant contributions to the global economy by showcasing the critical convergence of sport, digital economy and AI.

Simultaneously with these economic breakthroughs, academic research into the use of AI in the field of sport has also shown a dramatic increase. Bibliometric research shows that scientific publication output has increased since 2017 and reached a significant peak between 2022 and 2023. This trend coincides with the period when AI-powered sports practices (such as media services and sports betting algorithms) are beginning to have a significant economic impact. The increase in the number of articles on this topic shows that the sports industry is increasingly realising the potential of AI to transform not only fan interaction and sports performance, but also sports-related economic sectors such as the digital economy.

This study adopted a comprehensive bibliometric method to quantitatively analyse the impact of artificial intelligence on the sports economy and trends in the relevant academic literature. Literature review is restricted to English publications covering the 1st year period from January 1975 to December 31, 2023. The data collection process was carried out through Google Scholar databases, which offer more extensive resources with Scopus and Web of Science (WOS), which focus on peer-reviewed publications. Searching for keywords, article titles, abstracts and keywords (TITLE-ABS-KEY) such as "artificial intelligence", "sports economics", "digital economy", "e-learning" has yielded a total of 1037 documents from 1 academic category. These initial results were filtered only by the "Articles" document type, ultimately downgraded to 598 articles, and these articles formed the basis for the analysis.

Several bibliometric techniques, such as publication trends, citation analysis, author and institution analysis, keyword co-formation and common attribution analysis, were applied to the final 598 articles. However, the study has limitations such as potential restrictions on database and search query coverage, language limitation (only in English), and failure to perform in-depth qualitative analysis of content due to the nature of bibliometric analysis. In addition, the fact that the most current data is from the end of 2023 has led to the fact that the latest developments in this rapidly developing field are not fully reflected. Despite these limitations, this analysis provides a solid quantitative basis for understanding the current state of artificial intelligence in the sports economics literature and identifying future research directions.

Result

The findings of the number of publications about sports, AI, and the digital economy are shown in Figure 1. From 1975 to 2023, a total of 598 items were gathered. The first study paper was published in 1979. After a six-year gap, it was continued, and another publication was noted in 1986. One publication was released in 2003, following a three-year break following 1999. A total of twenty-one articles were published between 1986 and 1999. The production volume started to rise in 2017 (11), with 16 documents produced in 2018, and then 21 articles in 2019. The number increases to 48 in 2020, reaches its maximum peak of 183 in 2022 (or 30.6% of all articles), and reaches 197 publications in 2023.

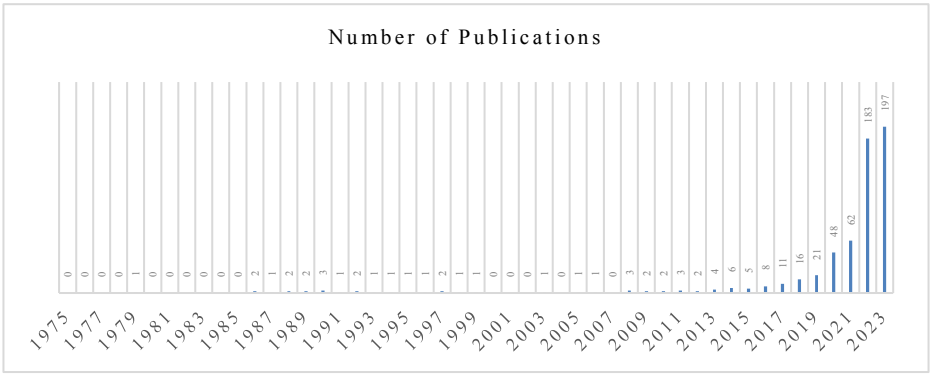

Fig 1. Number of publications per year on AI, digital economy and sports

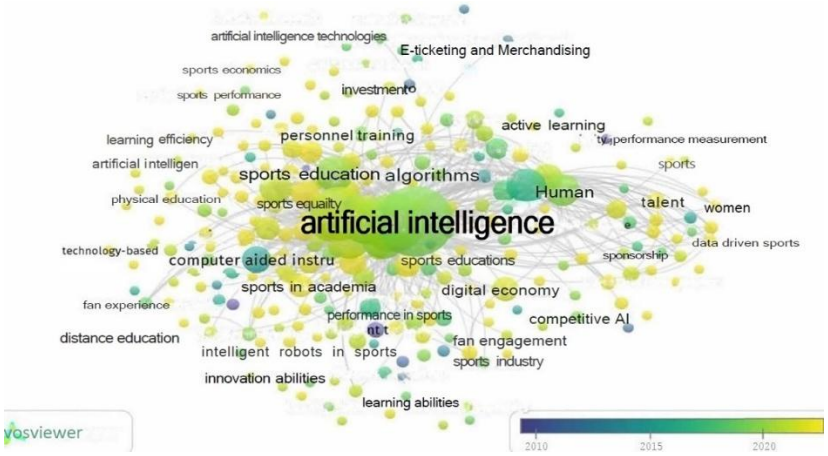

Fig 2. Scientific map of keywords AI and sports between 1975 and 2023

Figure 2 shows the scientific mapping of keywords based on AI and sports. A minimum of three words was set as a criterion, and approximately 3,000 words were identified, of which 598 reached the threshold. The terms showing the highest node magnitude are “sports” (518 times), followed by “artificial intelligence” and “sports economics” (217 and 208 times), another important word “sports education” (119 times); followed by “digital economy” (71 times), “e-learning” (68 times), “artificial intelligence technologies” (64 times), “sports performance” (58 times), “sports industry” (47 times), “competitive AI” (41 times), “sports equality” (37 times). According to the VOSviewer visualization overlay, in 2010 (blue) the themes of “fan engagement”, “sports education”, “active learning”, in 2015 (yellow) “data-driven sports”, “physical education”, “sports in academia”, “personal training” in 2020 (green) the theme of “artificial intelligence” and “artificial intelligence technologies”, appears very strongly and in 2023 the themes that emerge are: “sports education algorithms”, “learning abilities” and “computer aid instructions”.

Conclusion

The integration of artificial intelligence (AI) into the sports industry represents a revolutionary step that will not only transform key areas of operations, management and strategy, but will also change the scope of the economic landscape of sports and digital inclusion. Artificial intelligence has evolved from a tool to become an integral part of sports, helping with decision-making, interacting with fans, and distributing tasks. Technical case studies such as FIFA's Goal Line Technology (GLT) and the Tour de France's machine learning show the impact of AI in reducing human error and increasing accuracy in match decision-making. The impact of this technology on sports is far-reaching, as evidenced by AI-powered platforms changing fan engagement and economic models across fantasy sports, media and advertising.

This study's bibliographic analysis presents an academic approach to the use of artificial intelligence in sports, following the rise of interest in artificial intelligence from the late 1970s to 2023. The significant growth of publications after 2017 reflects the global developments in AI technology across a wide range of fields, highlighting the link between digital innovation and the sports economy. Keywords such as "digital economy," "physical education," and "artificial intelligence" describe the role of artificial intelligence in the sports industry, as well as new markets and career opportunities and business models

will continue to emerge.

This paper contributes to discussions about human-machine collaboration, and artificial intelligence complements rather than replaces human expertise, especially in areas such as sports management and strategic decision-making. The change in the roles of coaches, analysts and athletes shows the need to rethink the traditional methods of work and skills in sports, as artificial intelligence does analytical work, allowing human workers to focus on creativity and imagination. From an economic perspective, artificial intelligence is driving significant changes in sports-related revenue streams and business models. The development of AI platforms in sports betting, fantasy sports, and advertising shows how AI can drive economic growth in the digital economy. These technological advances will also help create jobs in areas such as artificial intelligence development, data science and machine learning, and reinforce the important role of artificial intelligence in creating jobs.

In short, the interaction between artificial intelligence and sports is multifaceted and will continue to evolve. Introducing artificial intelligence will not only improve accuracy and decision-making but also reshape the operational, economic, and strategic aspects of the sports industry. As artificial intelligence continues to replace traditional methods, there is a growing need for interdisciplinary research to ensure that technological advances are viewed within a broad theoretical and methodological framework. The future of sports powered by artificial intelligence is not only about rethinking competition but also about how to understand the workforce, fairness and participation of fans in this rapidly changing environment.

Author contributions

All authors contributed equally to the manuscript's conceptualisation, editing, and finalisation and are worthy of their inclusion as authors. The aspects of the study handled by each author are given below: M.I.Y.: conception, design, supervision, critical review; G.E.: conception, design, fundings, data collection, analysis, literature review, writing and critical review. All authors participated in drafting the manuscript and endorsed the final version.

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Ethnical statement

This article does not contain any studies with human participants performed by any of the authors.

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Research Article

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A Literature Based Mapping Review on the Macroeconomic Impacts of Digital Transformation in Olympic Sports and Mega Events

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Abstract

This study examines the macroeconomic impacts of Olympic sports and mega-events within the context of digital transformation using bibliometric analysis. Olympic mega-events are not only sporting events but also complex structures intertwined with economic, environmental, and socio-political dimensions. Based on 81 publications from the Web of Science database, the analysis explored annual literature production, citation performance, country collaborations, key concepts, and thematic development. Findings show the first publication appeared in 1996, with significant growth after 2010 and an annual growth rate of 5.71%. The highest average citation occurred in 2014. Common word and abstract analyses highlighted concepts such as Olympic Games, technology, economic impact, and sustainable development. Thematic mapping indicated an interdisciplinary structure encompassing media, governance, urban planning, sports management, digital infrastructure, and politics. Eight main conceptual clusters were identified: operational processes, social dynamics, digitalization and health management, financial growth, media and social dimensions, international perspectives, and mega-event development. Host cities like Beijing and London hold particular significance, and the economic and social impacts of sports are expanding through digital transformation. Future studies should extend bibliometric analysis to databases like Scopus to deepen understanding of these evolving dynamics.

Keywords

Bibliometric analysis, sport, sustainable, technology

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Introduction

Since the mid-20th century, the world has undergone significant social, cultural, economic, and technological transformations. These changes have contributed to various developments, including increased per capita income and advancements in transportation and communication systems (Akyüz & Türkmen, 2016; Türkmen et al., 2013). Mega events play a critical role in enhancing the prestige of host cities and contribute to their competitiveness at both national and international levels by fostering investment and infrastructure development (Galván et al., 2008). In the digital age, these effects have become more pronounced, reshaping the relationship between sport, media, technology, and sustainable development. Hosting mega sporting events often accelerates infrastructure investment, expands employment opportunities, and diversifies economic activities, indicating the macroeconomic contributions of such events to host countries (Terekli & Çobanoğlu, 2018).

Olympic sports and mega events offer a valuable lens through which to understand the macroeconomic impacts of digital transformation. Digitalization has significantly reshaped the relationship between sport, media, and technology, fundamentally altering the fan experience through digital platforms. This transformation has not only changed how sports are consumed but has also redefined economic models, communication strategies, and cultural dynamics (Öktem et al., 2020). In particular, Olympic sports and mega events have become symbols not only of athletic achievement but also of the economic, technological, and environmental shifts driven by digitalization (Long et al., 2018). A noteworthy example is the study by Zhou et al. (2024), which treats mega sports events in China as quasi-natural experiments to examine their impact on green total factor productivity (GTFP). Their findings highlight how digital transformation contributes to green economic development in cities through mechanisms such as increased use of public transportation, investments in the digital economy, and industrial transformation. These factors suggest that digitalization functions not only as a technological shift but also as a driver of structural change at the macroeconomic level. Furthermore, debates over whether digitally rooted disciplines such as eSports should be included in the Olympic program illustrate how the boundaries of traditional sport are being redrawn. This evolving landscape calls for a multi-layered assessment of the macroeconomic

implications of digital transformation (Todt et al., 2020).

Digital transformation is reshaping not only data management, communication, and marketing, but also the organizational infrastructure of mega events. In this context, the study by Meyers (1996) stands out as an early and significant example. The research examines the evolution of smart card technology since the 1970s and its implementation during the 1996 Atlanta Olympics, highlighting how digital infrastructure enhances both economic and operational efficiency in mega events. The study also emphasizes that the speed at which technological innovations diffuse is directly related to user adaptation, which is a critical factor in understanding the broader macroeconomic implications of digital transformation. Moreover, digitalization plays a vital role not only in performance and audience engagement but also in ethical oversight. For instance, digital testing systems used to detect long-standing issues such as doping contribute to enhancing the integrity of sport. At the same time, these systems have broader implications, influencing the economic, political, and reputational dimensions of sport organizations.

In his study, Ningthoujam (2025) examined doping cases in the Olympic Games from 1968 to 2022 and highlighted the crucial role of digital test technologies, particularly in retrospective analyses, in detecting doping violations. These findings suggest that digital transformation is not merely a technological advancement, but also a process of economic and structural restructuring. In this context, the question of how the macroeconomic impacts of digital transformation in Olympic sports and mega events are addressed in the scientific literature is of great significance-both for academic researchers and policymakers. In addition to the search query shown in Figure 1. Advanced Search Screen, the keyword “bibliometrics” was added to the search. No prior bibliometric analysis focusing specifically on this topic was identified, underlining the novelty of the research area.

Fig 1. Advanced search screenshotused for the Web of Science database query

Therefore, a systematic evaluation of how the macroeconomic impacts of digital transformation in Olympic sports and mega events are discussed in the academic literature is warranted. This study aims to analyze these impacts using a bibliometric mapping approach. The analysis includes a wide range of bibliometric techniques, such as annual scientific production, keyword analysis, international collaboration networks, co-occurrence patterns, and thematic mapping. In doing so, the study presents concrete evidence of the field's development over time and its interdisciplinary interactions. Based on 81 academic publications retrieved from the Web of Science (WoS) database, this research seeks to offer a comprehensive framework for understanding the field's evolution, conceptual structure, and research trends. Accordingly, the following core research questions are addressed;

- What are the scientific production capacities and key bibliometric indicators of countries?
- How do the annual production values and average citation counts of academic publications on Olympic sports and mega events distribute over the years?
- What factorial structure exists in the abstracts of publications, and how has the network of co-occurring keywords developed?
- What distribution pattern emerges from the co-occurrence network analysis based on titles, abstracts, and keywords?
- What topics are most frequently focused on in the studies, and how does the word cloud distribution illustrate this?
- What distribution is displayed by the tree map of concepts found in titles and abstracts?
- What distribution pattern emerges from the frequency analysis of words in titles and abstracts over time?
- How are titles and keywords categorized into thematic clusters through thematic maps?

This study does not conduct a primary empirical analysis; rather, it provides a comprehensive mapping review of the existing literature examining the macroeconomic impacts of digital transformation in Olympic sports and mega events. This study is significant as it addresses the intersection of Olympic sports and mega events with digital transformation from a macroeconomic perspective, providing both theoretical and practical groundwork for future research.

Method

Research Model

This study employs a bibliometric analysis method based on quantitative research and scientific mapping techniques to map the macroeconomic impacts of digital transformation in Olympic sports and mega events. The study follows a literature based mapping review approach, focusing on identifying, classifying, and summarizing previous research rather than conducting new empirical measurements. Bibliometric studies provide an overview of past, present, and future research, identifying possible emerging research topics (Rojas-Lamorena et al., 2022). Bibliometric mapping has become one of the most effective methods for examining the dynamics of research areas across diverse fields such as finance, sports, accounting, information systems, technology, and bureaucracy. The bibliometric mapping method contributes to uncovering notable trends, popular studies, and potential research areas, helping to explore the trends in the literature (Aliusta, 2023; Alma, 2024; Castillo-Vergara et al., 2023; Chen et al., 2025; Ferreira et al., 2025; Filatova et al., 2023; Mudey et al., 2025; Rachmawati et al., 2023; Wang et al., 2023).

Data Collection

In this study, comprehensive searches were conducted in Clarivate's Web of Science (WoS) core collection, which is internationally regarded as the most recommended and reliable bibliometric database (Cai & Liao, 2025; Casado-Aranda et al., 2013; Hammerschmidt et al., 2024). A total of 81 publications, obtained on June 25, 2025, from the Web of Science (WoS) database, were retrieved using advanced search queries in the title, abstract, keywords plus,

and author keywords sections related to the macroeconomic impacts of digital transformation in Olympic sports and mega events.

The search query was carefully designed to encompass three dimensions relevant to this study: Olympic sports and mega-events, macroeconomic impacts, and digital transformation/technological advancements. The first set of keywords represents the scope of Olympic and mega-events (e.g., "Olympic*," "mega-event*") and ensures that the study targets the correct domain. The second set reflects macroeconomic variables encompassing various measures of economic performance (e.g., GDP, employment*, fiscal policy). The third set represents digital and technological trends (e.g., "digital*," artificial intelligence, internet of things, virtual reality, augmented reality, blockchain) to capture the literature addressing technological transformation. The combination of these three keyword sets ensures a comprehensive retrieval of relevant literature from the WoS Core Collection.

Data Analysis Tools

The obtained data were analyzed using the Bibliometrix R package, VOSviewer, and Sankey Diagrams. In this study, the Bibliometrix R package (Biblioshiny) was primarily used for performance analysis, including simultaneous analysis of titles, abstracts, and country-level contributions and assessment of thematic development. VOSviewer was primarily used to map common keyword networks, while Sankey Diagrams were used to visualize the flow of thematic and conceptual relationships (Conception, 2022; Dertli & Erden Dertli, 2025; Okine et al., 2025; Van Eck & Waltman, 2007; Van Eck & Waltman, 2010; Yao et al., 2025). This combination of tools allowed for both quantitative and visual bibliometric analyses, providing a comprehensive assessment of temporal trends, keyword co-occurrences, thematic clusters, and research contributions in the field of macroeconomic impacts of digital transformation in Olympic sports and mega-events.

By examining the 81 publications retrieved from the advanced search query in the Web of Science (WoS) database, both quantitative and visual analysis techniques were employed to evaluate various parameters. The keyword sets were designed to ensure that the retrieved publications accurately represent research on the macroeconomic impacts of digital transformation in Olympic sports and mega events. This approach provides a representative overview of the field and ensures that the bibliometric study is methodologically robust.

The study analyzed the following parameters: "main information," "annual scientific production," "annual average citation count," "scientific production by country," "co-occurrence network map of keywords," "factorial analysis of abstracts," "co-occurrence network of titles, keywords plus, and abstracts," "word cloud of keywords plus and author keywords," "tree map of titles and abstracts," "word frequency analysis of titles and abstracts over time," and "thematic map of keywords plus and titles." These parameters helped uncover the temporal trends and thematic clusters of the field, contributing to a comprehensive evaluation of the visibility of Olympic sports and mega events in the literature. These analyses allowed for mapping temporal trends, keyword co-occurrences, thematic clusters, and country-level contributions, ensuring methodological clarity and reproducibility.

Findings

This section presents the bibliometric analysis data obtained regarding the macroeconomic impacts of digital transformation in Olympic sports and mega events.

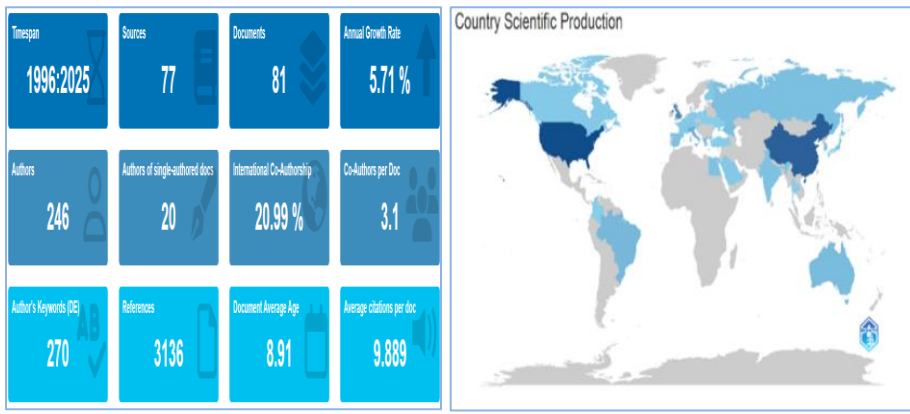

Fig 2. Main information and scientific production by country

In Figure 2, the bibliometric analysis of the macroeconomic impacts of digital transformation in Olympic sports and mega events reveals that the first publication occurred in 1996, with a total of 81 documents produced by 2025. The annual publication growth rate is 5.71% indicating a gradual but steady increase in research activity over the years. The documents have an average of 9,889 citations, and the average number of collaborations among authors is 3.1. Additionally, the international co-authorship rate is 20.99%.

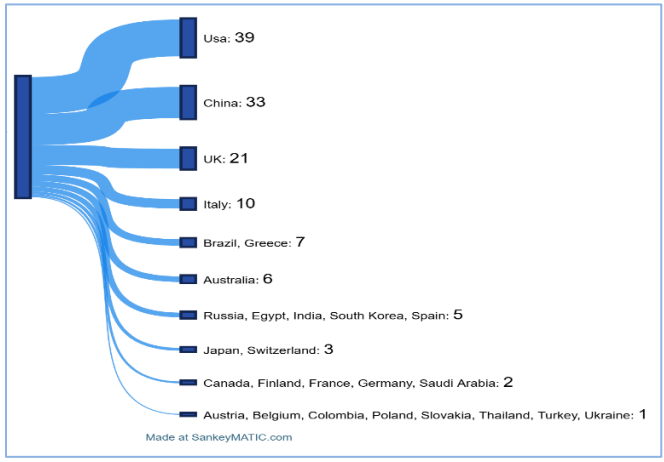

Fig 3. Countries scientific production

In Figure 3, the distribution of scientific production by country shows that the United States has the highest output with 39 publications, followed by China with 33, and the United Kingdom with 21.

Italy contributed 10 publications, while Brazil and Greece each contributed 7, and Australia contributed 6. Other countries, including Russia, Egypt, India, South Korea, and Spain, each had 4 publications; Japan and Switzerland had 3; and Canada, Finland, France, Germany, and Saudi Arabia each had 2. Austria, Belgium, Colombia, Poland, Slovakia, Thailand, Turkey, and Ukraine contributed 1 publication each.

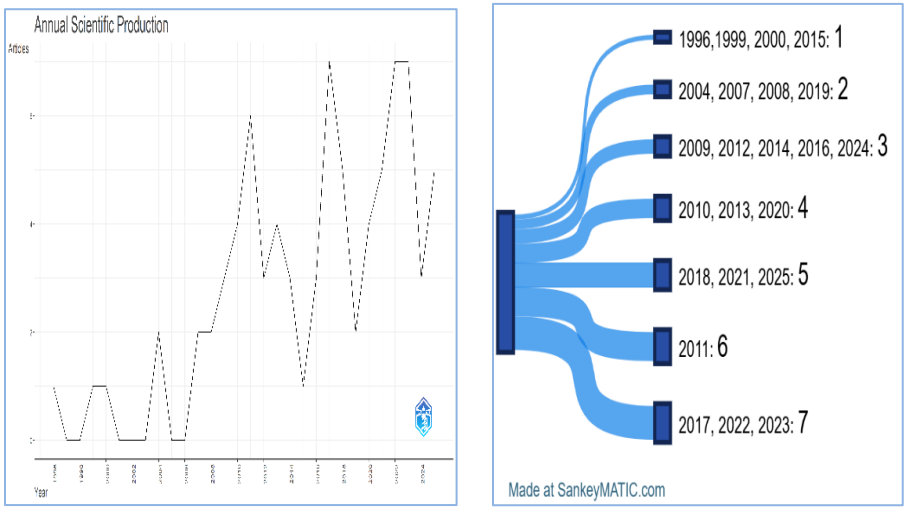

Fig 4. Annual scientific production

In Figure 4, the scientific production related to digital transformation in Olympic sports and mega events from a macroeconomic perspective is examined. The first publication was in 1996, and the production accelerated notably after 2010, with the highest production levels in 2017, 2022, and 2023, each with 7 publications. As of June 25, 2025, 5 articles have been published in the current year, indicating that production is ongoing. Since this data covers only the first half of the year, the number of publications is expected to increase with new releases by the end of 2025. This suggests that the topic remains current, and there is continued academic interest.

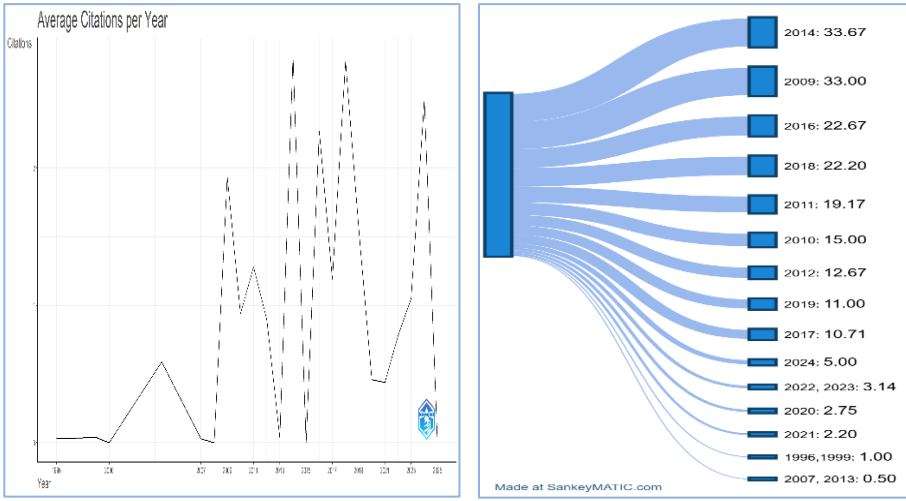

Fig 5. Annual average citations

In Figure 5, when examining the annual average citation values, it was found that the highest average citation occurred in 2014 with 33.67, followed by 2009, 2016, and 2018 with average citations of 33.00, 22.67, and 22.20, respectively. The year 2018 was also one of the periods with the highest academic impact on an annual basis. Data for 2025, as of June 25, has not yet received citations, showing a value of zero, but it is expected that this number will rise by the end of the year.

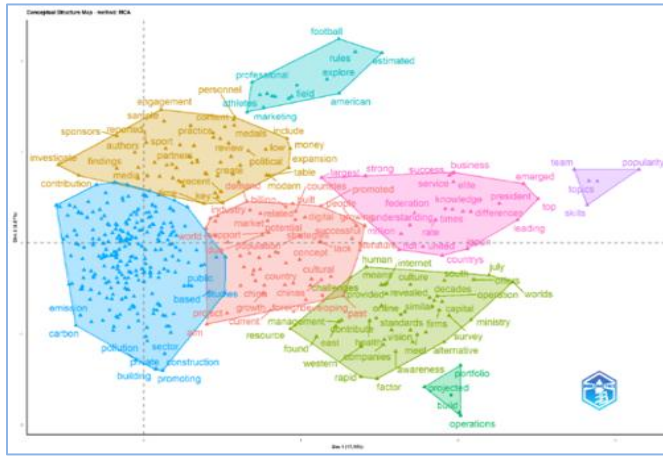

Fig 6. Factorial analysis

In Figure 6, the factorial analysis of the abstracts reveals eight conceptual clusters, providing a comprehensive overview of the thematic structure and research trends in the field. The first cluster focuses on operational processes, structuring, and planning themes, while the second and third clusters cover the social dynamics of sport, individual skills, and professional sports management.

The growing importance of digitalization, health management, and internet technologies is represented in the fourth cluster, while the fifth cluster emphasizes financial growth, business strategies, and success criteria. The media and social dimensions of sport are concentrated in the sixth cluster, while the seventh cluster highlights international perspectives, globalization, and cultural interactions. Finally, the eighth cluster includes theoretical and empirical studies on the development processes of the Olympics and mega sporting events.

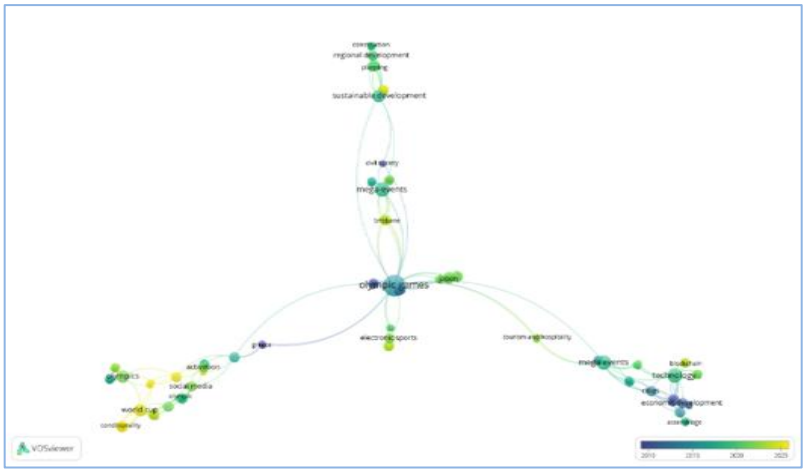

Fig 7. Co-occurrence network map of keywords

In Figure 7, the co-occurrence network analysis of keywords related to the macroeconomic impacts of digital transformation in Olympic sports and mega events revealed a network consisting of 134 nodes, 16 clusters, 395 links, and a total of 398 connection strengths. In terms of total connection strength, the most connected keyword is Olympic Games, with a connection strength of 34. Other prominent keywords include technology (total connection strength of 20), mega events (17 total connection strength), World Cup (16 total connection strength), sustainable development (15 total connection strength), cities (13 total connection strength), and Olympics/big data (12 total connection strength). Additionally, keywords such as COVID-19 pandemic, Japan, London, cycling, Giro d'Italia, mega events, performance management, performance measurement, sports event, sustainable tourism, Tour de France, tourism destination, tourism development and tourism innovation (11 total connection strength each), as well as economic impact, regional development, and social media (10 total connection strength each), were also identified as significant.

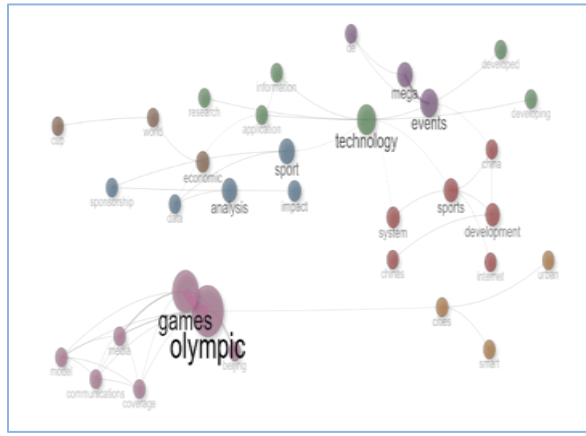

Fig 8. In the co-occurrence network analysis of titles

In the co-occurrence network analysis of titles presented in Figure 8, it was found that prominent keywords such as Olympics, games, mega, world, economic, technology, and media play a central role in the bibliometric structure of Olympic sports and mega events from a macroeconomic perspective.

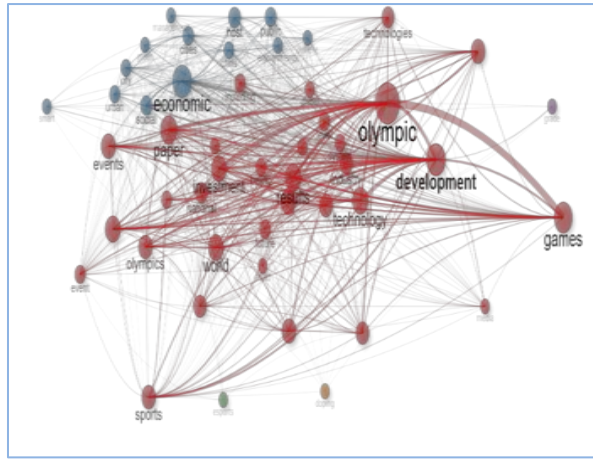

Fig 9. In the co-occurrence network analysis of abstract

Figure 9 in the co-occurrence network analysis of abstracts, keywords like Olympic sponsorship, games, economic, internet, technology, media, urban, smart development, and developing were highlighted, indicating their central role in the bibliometric structure of Olympic sports and mega events from a macroeconomic perspective.

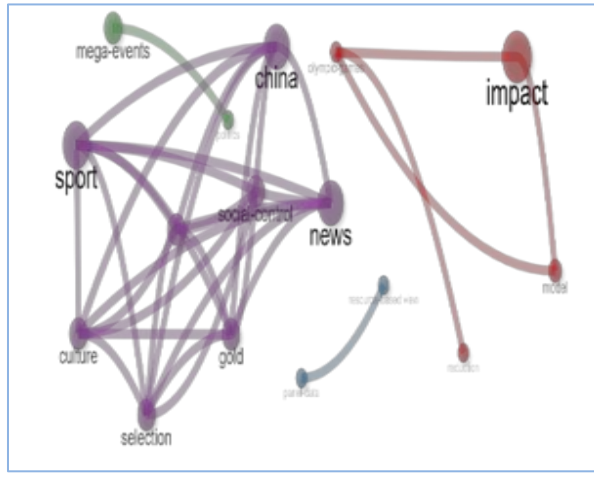

Fig 10. In the co-occurrence network analysis of keywords

Figure 10, the co-occurrence network analysis of keywords plus revealed that terms such as Olympic games, culture, resource-based view, mega events, and policy are central concepts in the bibliometric structure of Olympic sports and mega events from a macroeconomic perspective.

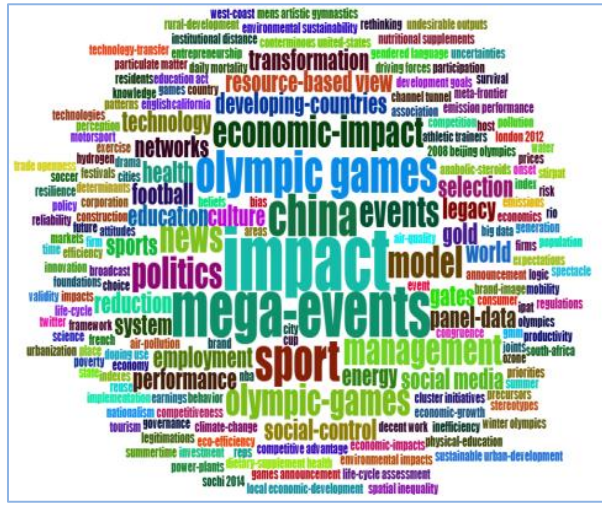

Fig 11. Keywords plus word cloud distribution

In the word cloud analysis of keywords plus presented in Figure 11, the most frequent keywords include impact (appearing 6 times), mega events (5 times), China (4 times), and Olympic Games and sport (4 times each). Additionally, keywords such as events, manage, model, news, politics,

technology, and economic impact appear 3 times each. Concepts like culture, developing countries, education, employment, energy, football, gates, gold, health, heritage, networks, panel data, performance, cuts, resource-based view, elections, sport, social control, social media, system, transformation, and world appear twice. These findings highlight the fundamental concepts and priorities in research on Olympic sports and mega events from a macroeconomic perspective in the context of digital transformation.

Fig 12. Author keywords word cloud distribution

Figure 12, in the word cloud analysis of author keywords, the most frequent terms include Olympic Games (appearing 9 times), mega events (4 times), technology (4 times), and Olympics, sustainable development, and World Cup (3 times each). Other frequently used keywords include activation, big data, cities, COVID-19 pandemic, economic development, eSports, information technology, Japan, London, regional development, science and technology, social media, sponsorship, economic privilege, economic impact, economic leverage, economic policy, economics and development studies, regional economy, and regional policy. These data reveal the key themes and focal points of research in the field of Olympic sports and mega events.

Fig 13. Tree map titles

In the tree map analysis of the titles presented in Figure 13, the most frequently occurring terms include Olympics (18 times), Games (13 times), sport and technology (9 times each), system (8 times), and development (7 times). Additionally, terms such as China, cities, analysis, economic, impact, media, and mega appear six times each. Words such as Beijing, application, data, and model occur five times, while information, internet, research, sustainability, urban, and world are each mentioned four times. These data indicate that themes such as Olympic sports, mega-events, urban contexts, digitalization, sustainability, and economic impacts are prominent in the literature.

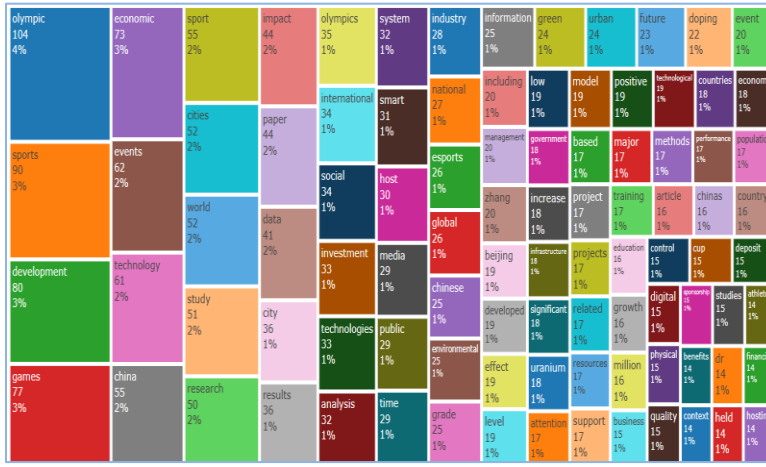

Fig 14. Tree map abstracts

Figure 14, in the tree map analysis of the abstracts, the most frequently occurring words include Olympics (104 times), sport (90 times), development (80 times), Games (77 times), economic (73 times), events (62 times), and technology (61 times). These are followed by China (55 times), cities and world (52 times each), study (51 times), and research (50 times). Additionally, the terms impact and paper appear 44 times each, data 41 times, cities and results 36 times each, Olympic Games 35 times, international and social 34 times each, and investment and technologies 33 times each. These findings suggest that in the abstracts, Olympic sports, economic impacts, technological developments, urbanization, research trends, and international dimensions are strongly associated with a macroeconomic perspective.

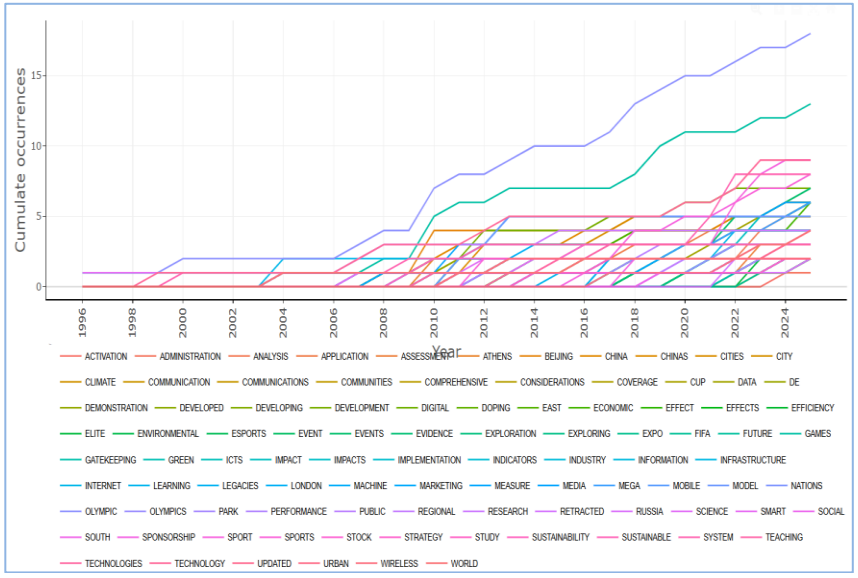

Fig 15. Word frequency over time titles

According to Figure 15, the frequency of words appearing in titles over the years has been tracked starting from 1996. Notably, terms such as Olympics, Games, sport, and technology have shown an upward trend over time. While the word Olympics consistently appears from 1996 onward, terms like technology, system, and development have been used more frequently since the early 2000s. In the period following 2010, there has been a noticeable increase in the usage of terms such as internet, data, model, sustainability, and urban, indicating a diversification of topics and a growing emphasis on contemporary technological and environmental concepts in titles.

Additionally, words such as China, Beijing, and megabecame prominent during the period surrounding the 2008 Beijing Olympics, while modern terms like digital, smart, and e-sports have gained attention in the post-2010 period. These findings clearly demonstrate an increasing diversity in the vocabulary of titles over time and a rising trend in the use of technology-related terms.

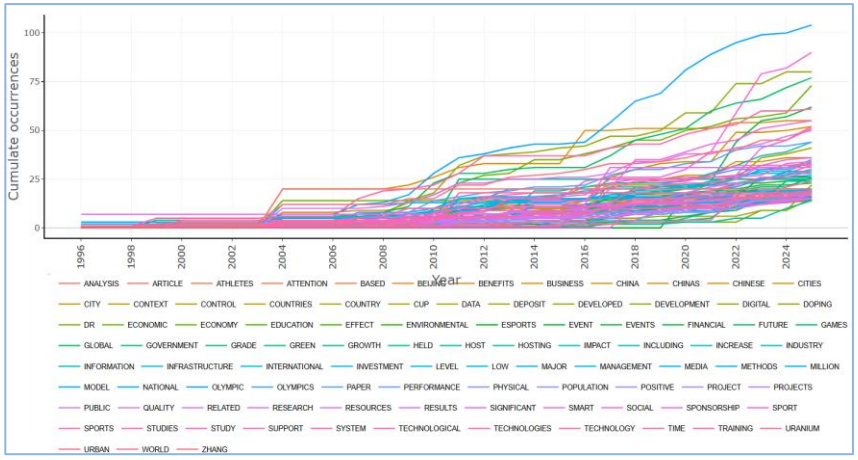

Fig 16. Word frequency over time abstracts

Figure 16 similar pattern is observed in the frequency of words in abstracts, where a marked increase has occurred over the years. In particular, terms such as Olympics, sport, development, economic, technology, and China have become increasingly prevalent, reflecting the substantial macroeconomic impact of the Olympics from both economic and technological perspectives. Starting in 2004, with China's preparations for hosting the Beijing Olympics, the frequency of terms like China, Beijing, and global rose sharply. Moreover, the presence of words such as investment, infrastructure, media, and social suggests that the Olympics are analyzed not only within the realm of sports but also in the context of economic growth, urban development, and social policy. In the post-2010 era, the increased use of terms like digital, smart host, technological, and global highlights the Olympics' close ties with contemporary technological and globalization processes. Altogether, these findings reveal that the Olympics are addressed from broad economic, technological, and social dimensions, and are increasingly viewed as strategic investments for host countries.

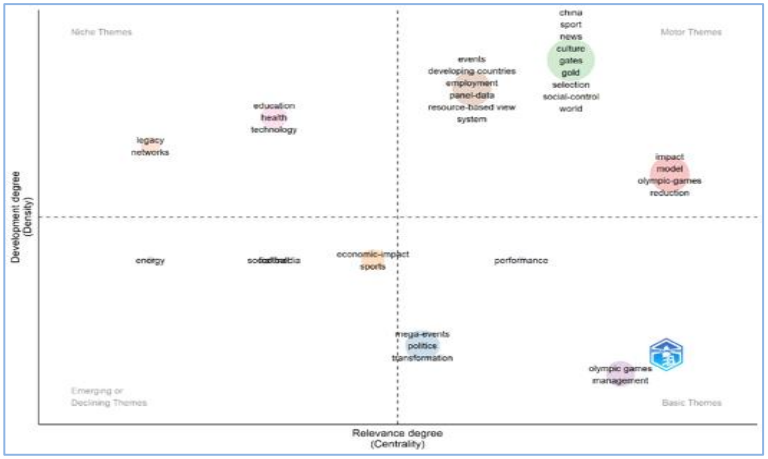

Fig 17. Thematic map keywords network

The thematic map of the keyword network presented in Figure 17 reveals significant findings related to the bibliometric analysis of Olympic sports and mega-events from a macroeconomic perspective. The analysis shows that terms such as impact, mega-events, China, and Olympic Games stand out with high relevance scores. In particular, the impact cluster is positioned at the center of the thematic structure, indicating its critical role within the field and highlighting its prominence in scholarly research. Similarly, the mega-events cluster plays a key role in the thematic organization. Keywords associated with China-including China, sport, and news-form essential components of this thematic structure and hold a significant place in the literature, especially when considered alongside subthemes such as cultural and social control. The Olympic Games emerge as a comprehensive theme that is examined in the contexts of both mega-events and economic impact. The term technology also constitutes a crucial conceptual area, particularly in connection with clusters related to education and health, offering insights into the macroeconomic effects of mega-events and Olympic sports. In this regard, technology plays a vital role in the management of sports organizations, the digitalization of events, and processes of economic transformation. In addition, clusters such as economic impact, events, education, energy, and football have also gained a certain level of importance in the literature.

This thematic map visualizes the overall structure of the field and its conceptual focal points, illustrating the multidimensional and interconnected nature of the macroeconomic impacts of Olympic sports and mega-events.

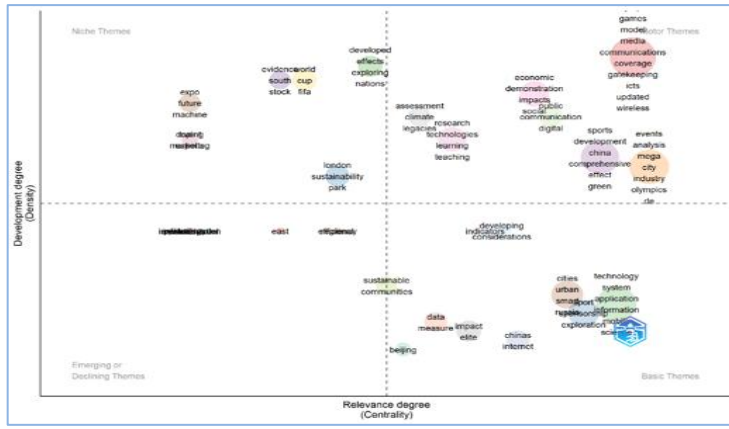

Fig 18. Thematic map titles

Figure 18 the thematic map of titles presents a significant finding in illustrating the thematic concentration within the literature on Olympic sports and mega-events. Upon examining the map, key concepts such as Olympics, sport, technology, economics, systems, cities, data, research, and sustainability emerge as dominant themes. The most prominent cluster is centered around the Olympics, encompassing concepts such as Games, media, models, and communications, indicating that the Olympics are explored within the frameworks of media coverage, information dissemination, and governance models. In the second cluster, the keyword sport is associated with political and social concepts such as impact and elites, highlighting that sport is not merely a physical activity but also embedded within a socio-political structure. The third cluster, technology, is analyzed in the context of developing and developed countries; terms such as effects, nations, and performance emphasize the role of technology in sports performance and national development. In the fourth cluster, the concept of sport reappears, this time linked with terms such as development, China, inclusivity, and green, reflecting the connection between mega sporting events and themes of sustainable development and environmental impact. The economic-themed eighth cluster features terms like impacts, social, and spectacle, indicating that the Olympics and mega-events are studied not only in financial terms but also as social and cultural phenomena.

Furthermore, the map reveals independent clusters built around themes such as data, systems, cities, research, sustainability, world, evaluation, Beijing, and London.

These clusters offer a comprehensive framework for understanding how Olympic mega-events intersect with topics such as urban planning, smart cities, environmental sustainability, digital transformation, legacy management, and global competition. The map also includes more specific topics such as exposition, doping, sponsorship, event, science, strategy, and implementation, supporting the notion of a multidimensional approach within the literature. Therefore, this thematic distribution clearly demonstrates that the Olympics and mega-events are not merely sporting organizations but complex political, economic, technological, environmental, and social structures. This finding underscores that the multi-thematic and interdisciplinary approach revealed through the bibliometric analysis significantly reinforces the position of the macroeconomic perspective within the field of sport.

Discussion and Conclusion

The bibliometric analysis conducted in this study examined the macroeconomic impacts of Olympic sports and mega-events in the era of digital transformation from an interdisciplinary perspective, systematically revealing the main themes in the literature. Based on the analysis of 81 publications, the study explored the development of the scientific structure across a wide spectrum from annual publication trends to thematic clusters. By integrating these findings, it highlights how the bibliometric results obtained within the scope of the study reflect the evolving conceptual framework of digital transformation in Olympic contexts, combining theoretical patterns with empirical evidence.

This bibliometric research offers a comprehensive and systematic overview of the current state and developmental trends in the field, addressing the macroeconomic effects of the digital transformation of Olympic sports and mega-events through a multidimensional lens. The findings indicate that academic production in this area, which began in 1996, gained momentum after 2010 and peaked between 2017 and 2023. This upward trend aligns with the co-occurrence results identifying technology, economic development, and sustainability as central research clusters, demonstrating that scholarly attention parallels the acceleration of digital innovation within mega events.

This trend demonstrates that Olympic events have increasingly become a focal point of academic interest in parallel with the rise of digital transformation. The highest average number of citations occurred in 2014, suggesting that the studies from that period made strong contributions both theoretically and practically.

This finding aligns with Reiche (2016) argument that traditional indicators such as medal counts or GDP based assessments fail to capture the complexity and economic impact of Olympic success. Therefore, the researcher emphasizes a more holistic approach that includes technological and institutional factors. This result corresponds directly to the thematic clusters identified in this study, confirming that the literature increasingly values integrative macroeconomic frameworks.

Keyword co-occurrence and thematic map analyses highlighted the prominence of concepts such as Olympic Games, technology, economic impact, sustainable development, urban planning, data, and globalization in the literature. These clusters reveal a dual thematic orientation: one focusing on economic sustainability and another on digital transformation, both of which underpin the evolving discourse on the macroeconomic dimensions of mega events. Factorial analysis and co-word networks revealed that subthemes such as digitalization, media management, cultural intraction, political structure and international strategies are strongly connected to the field.

The integration of these subthemes demonstrates that macroeconomic impacts cannot be fully understood without acknowledging the mediating roles of digital infrastructure and global communication systems. These findings echo the frameworks proposed by the World Ranking of Elite Sports Countries (WRCES) and Millet et al. (2023), which argue for scientifically based indices to measure global competitiveness and representativeness in sport. Similarly, the digital transformation process described in this study offers a new dimension for assessing macroeconomic performance through technological capacity, sustainability, and data-based innovation, rather than traditional performance outcomes.

Among the authors' keywords, the most frequently emphasized concepts were Olympic Games, technology, sustainability, and economic development, indicating a concentration of research trends around specific thematic foci. This alignment underscores that digital transformation has become both a

driver and a metric of macroeconomic development in the context of Olympic sports. However, no direct inference regarding the economic impact or sustainability of mega sport events can be drawn solely from bibliometric data. Sardi et al. (2025) discuss the economic dimensions of mega-sport events, which is related contextually, but our analysis only reports on thematic trends and keyword co-occurrences.

Hayduk (2020) examined the role of mega-sport events in high-tech exports and found that such events increased high-technology exports in host developed countries, whereas the same effect was not observed in developing countries. This finding reveals that the economic contributions of mega-events vary depending on a country's level of development, emphasizing the critical role of factors such as technology and infrastructure in their integration into local economies. Therefore, in assessing the macroeconomic impacts of mega-sport events, it is essential to consider not only digital transformation but also country-specific conditions and technological capacity.

A retrospective study by Ningthoujam (2025) on the digital detection of doping cases highlights the importance of digital technologies in preserving the ethical and economic integrity of Olympic sports. The implementation of retrospective testing has enhanced the effectiveness of doping detection, and these technological advancements also contribute indirectly to the economic sustainability of mega-events. By reducing doping scandals and protecting the reputation of sport, digital transformation directly influences the macroeconomic interests of host countries and sponsors. However, the high costs of digital technologies and variations in their implementation may hinder the full realization of the potential benefits of digitalization. This suggests that the macroeconomic impacts of digital transformation should be evaluated not only from a technological perspective but also from a political and ethical perspective. Similarly, Han (2025) has shown that psychological and motivational factors often exert their influence through indirect rather than direct means.

From this perspective, the indirect mechanisms through which digital transformation shapes macroeconomic and ethical outcomes, such as social motivation, institutional participation, and collective commitment, should also be considered when assessing its broader economic impacts.

The limited number of studies on the macroeconomic impacts of digital transformation suggests a need for further in-depth investigations into how

media representation intersects with economic development and societal transformation in the context of mega-events.

In their 2017 study, İmamoğlu et al. emphasize that this transformation has contributed to Turkey's global sporting achievements and has enhanced the efficiency of Olympic preparation processes. However, the study also notes that digitalization has not been implemented uniformly across all training centers, with some centers adapting to the transformation more rapidly than others. Accelerating the pace of digitalization in Turkey's athlete training centers could broaden the scope of success. Additionally, the study highlights that digital transformation has strengthened Turkey's sports brand, contributing to its competitiveness on the international stage. This transformation is also expected to facilitate the more efficient management of major events and increase sponsorship revenues. In conclusion, digitalization makes a significant contribution to the growth of Turkey's sports economy.

When all the data obtained are evaluated, one of the main contributions of this study is its demonstration of thematic diversity and interdisciplinary collaboration within the field. The findings reveal significant gaps in the existing literature and highlight areas that require further development. Although the study yields several important insights, there remain certain topics in the literature that are either underexplored or require deeper investigation. Primarily, the impact of Olympic mega-events on the political systems of host countries-particularly within authoritarian regimes-has not been sufficiently analyzed, presenting a critical gap for future research. The lack of comprehensive political impact analyses, especially regarding the social and economic implications of mega-events in authoritarian contexts, constitutes a notable deficiency. Future studies should therefore adopt a comparative approach to political transformations in both democratic and authoritarian systems.

Furthermore, issues such as social justice and access-framed under the theme of sustainability-require more detailed examination, particularly regarding their effects on low-income groups and broader dimensions of social exclusion.

These findings align with those of Cardoso et al. (2023) and Gretzel et al. (2018), who emphasize that, in the context of digital transformation, it becomes essential to explore the role of innovation in promoting sustainable tourism management practices that can ensure the long-term economic

viability of destinations hosting major sporting events.

Meyers (1996) demonstrates the potential economic benefits that the early implementation of smart card technology in mega-events can offer, depending on the adoption processes of the technology. His study highlights that the speed of adaptation to digital technologies is more dependent on user habits than on the rate of technological change itself. This perspective reveals that, when assessing contemporary digital transformation processes, both the technological infrastructure and user behaviors play a critical role in determining macroeconomic impacts. Therefore, when evaluating the effects of digitalization in sports and mega-events, it is essential to closely examine the speed of adoption and diffusion processes of technological innovations.

The micro level effects of technological innovations, particularly in areas such as artificial intelligence, blockchain, and augmented reality, require further empirical studies. It is important to investigate not only the macroeconomic but also the organizational and managerial transformative impacts of digital technologies. The micro level effects of digital technologies have not yet been fully explored, and more empirical research is needed on the concrete impacts of innovations such as artificial intelligence, blockchain, and augmented reality on event management. In line with this, Agbozo and Hayawi (2024) emphasizes that blockchain technologyalthough often debated as either a marketing trend or a temporary fashionholds a promising future for sports and related industries. His bibliometric study highlights that blockchain has achieved notable success in areas such as supply chain management, finance, and data governance, and that similar applications are beginning to emerge in the sports ecosystem. This suggests that the integration of blockchain into mega sport events could enhance transparency, financial traceability, and stakeholder trust, reinforcing the broader economic and managerial impacts of digital transformation.

In line with these findings, Azhagumurugan et al. (2025) emphasizes that the integration of the Internet of Things (IoT) and sports has created new opportunities within the sports industry, particularly through the use of wearable sensors and devices for real-time data collection and analysis. The author also highlights that the implementation of lightweight algorithms and edge computing with artificial intelligence capabilities remains an underexplored but promising field. As these technologies evolve, they are expected to enhance athlete performance, healthcare systems, and the overall

sports economy, thereby reinforcing the transformative potential of digitalization in Olympic sports and mega events.

Additionally, while countries like China, Japan, and the United Kingdom are prominent in the literature, there has been a lack of comparative analyses of digital transformation and macroeconomic effects in developing countries. Finally, limiting research to the Web of Science database may exclude certain regional and interdisciplinary studies; thus, integrating sources such as Scopus, Google Scholar, and local data repositories is believed to enhance the inclusiveness of the literature. However, Yuan et al. (2019) affirm the importance of the Web of Science database for bibliometric research. Furthermore, a bibliometric systematic review on sports sponsorship was conducted for the first time by Varea-Calero et al. (2025), with researchers suggesting that sports sponsorship studies should be explored within an interdisciplinary framework.

In conclusion, Olympic sports and mega-events are strategically significant for countries in the digitally transforming world, particularly in terms of economic growth, urbanization, and technological transformation. This study, by mapping the bibliometric landscape of the field, clearly outlines the trends, gaps, and priorities in the literature. The synthesis of findings highlights that technological innovation, sustainability, and macroeconomic resilience form the core conceptual triad shaping future research directions. It emphasizes the need for future research to further enrich the literature, particularly focusing on social impact, political transformation, micro level effects of technological innovations, and ethical dimensions.

In line with Liu et al. (2025), future research should broaden the scope beyond macroeconomic and technological aspects. Key directions include professionalization and promotion strategies for emerging sports, digital education and youth engagement, and the use of data-driven management systems. Studies should also examine innovative training technologies, wearable analytics, and AI-based platforms to enhance athlete development, while fostering interdisciplinary collaboration to support the long term sustainability of the Olympic ecosystem.

Policy Implications

The findings of this study suggest that international sports organizations and urban planners should integrate digital transformation strategies into the macroeconomic planning of mega-events. Establishing international standards to assess technological capacity and sustainability performance, and strengthening digital inclusion are critical to global equity. Furthermore, multi level collaboration among local governments, the private sector, and international federations should support the alignment of digital transformation goals with long term economic sustainability.

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Author contributions

The aspects of the study handled by each author are given below: Ş.D: conception, design, data collection and processing, fundings, meterials and process, writing, critical review; Y.S.B.: conception, design, supervision, materials, data collection, literature review, analysis and critical review; V.A: data collection and writing.

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This article does not contain any studies with human participants performed by any of the authors

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Research Article

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Psychosocial and Economic Research Trends in Sport Sciences: A Bibliometric Analysis

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Abstract

The main purpose of this study is to examine the field of sports economics and psychosocial relations through bibliometric analysis and to reveal the thematic structure, keyword trends, and interdisciplinary connections within the field. A comprehensive bibliometric analysis was conducted using the Bibliometrix-R package and VOSviewer software to provide an integrated overview of research developments between 1990 and 2025. The results show that the number of publications increased steadily after 2010 and peaked in 2020, indicating growing academic interest in the holistic interaction between economic and psychosocial dimensions. Thematic and keyword analyses revealed that sports are not only associated with physical activity but also connected to economic impact, mental health, social cohesion, behavioral change, and sustainable development. Recently, emerging topics such as the metaverse, artificial intelligence, digital health, social media, and post-pandemic mental health have gained prominence, demonstrating how technological and societal transformations shape research directions. Consequently, further exploration of long-term mental health effects, the socio-economic sustainability of mega sporting events, the psychosocial contributions of digital platforms, and the role of artificial intelligence and the metaverse in the sports economy is recommended. This study offers a multidimensional and original contribution to understanding the evolving structure of the field.

Keywords

Economy, psychosocial, sports psychology, sports economy

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Introduction

Sport has evolved from mere competition to a multidimensional domain shaping quality of life, social structures, and sizeable economic value. (Keane et al., 2019; Huang et al., 2022). Sports not only generate billions of dollars globally but also affect psychosocial processes such as mental health, social belonging, and societal integration (Zhou et al., 2022). Therefore, the economic and psychosocial dimensions of sports can no longer be considered independently, and interdisciplinary studies at their intersection have gained increasing importance. Accordingly, economic and psychosocial dimensions should be studied jointly to capture their intertwined mechanisms and outcomes.

Sport economics examines the financial structure, resource distribution, and economic impacts of sports activities, while psychosocial research focuses on the effects of sports on individuals' mental health, social relationships, and social cohesion. Despite a rise in academic publications aimed at understanding the multifaceted effects of sports on individuals and society in recent years (Eckermann et al., 2021; Gaskin et al., 2010; Huang et al., 2022; Yimer, 2025), there remains a noticeable gap in addressing these two dimensions through bibliometric analysis.

This study aims to fill this gap by simultaneously examining the fields of sport economics and psychosocial relationships, utilizing bibliometric analysis to contribute to the understanding of the complex nature of sports, revealing the thematic development, publication trends, and future research directions within the field. In doing so, this research seeks to provide a comprehensive and up-to-date perspective to both the academic community and stakeholders shaping sports policies.

In line with the research questions and the scope of the analysis, this study has sought to answer the following key questions:

- Uncovering long-term publication and citation dynamics in sport economics and psychosocial research (1990–2025);
- Delineating evolving thematic structures and emerging topics through advanced keyword and conceptual analyses;
- Elucidating the interconnections among abstracts, author keywords, and keyword-plus terms to reveal underlying conceptual frameworks;

- Mapping global collaboration patterns and co-authorship networks to demonstrate the international landscape of the field;
- Establishing a transparent, reproducible bibliometric framework supported by robust validation techniques, including age-normalized citations and threshold sensitivity analysis.

Method

This study is based on the bibliometric analysis method. Bibliometric analysis is a quantitative method that involves measuring literature and time to comprehensively evaluate mathematics, statistics, and philology (Perianes-Rodriguez et al., 2016). It is a more reliable method than subjective or intuitive evaluation techniques. Nowadays, bibliometric methods are commonly combined with quantitative and statistical approaches to examine publication patterns, scientific progress, academic contributions, international collaboration, and citations within a specific research area (Thompson et al., 2015). This approach provides an overview of the global dynamics of science over the years (Al Jarroudi et al., 2025). In this context, the study aims to analyze the content frequency, distribution over the years, and conceptual density of publications covering sports, health, economics, and psychosocial themes between 1990 and 2025. In this study, bibliographic coupling and co-citation analyses were performed to identify structural relationships among publications, using appropriate threshold values to ensure the reliability of the results.

Research Design

This study is based on a quantitative approach aimed at revealing the spread and conceptual relationships of selected key concepts in the literature. Through bibliometric analysis, data have been evaluated based on publication counts and term frequencies. This has contributed to presenting an overall view of the sports economics and psychosocial fields in the relevant literature and their changes over time.

Data Collection Process and Analysis

In the data collection process, reliable and internationally recognized academic databases, such as the Web of Science (WoS) Core Collection, were used (Dertli

& Erden Dertli, 2025). Bibliometric analysis is a systematic and reliable quantitative method that reveals publication trends, conceptual relationships, and thematic developments in the literature. This method has been widely applied in sport research to examine various interdisciplinary domains, including business, environment, and sustainability (Alma, 2024).

The data were retrieved from the WoS Core Collection using the following search strategy: *TS = (sport AND (econom* OR "sport economics") AND (psychosocial OR "mental health" OR "social cohesion"))**. The search was limited to English-language journal articles indexed in SSCI, SCI-Expanded, ESCI, and A&HCI, and conducted in July 2025. The subject categories were restricted to *Sport Sciences, Economics, Psychology,* and *Social Sciences (Interdisciplinary)*. This structured filtering ensured that only relevant, high-quality, and interdisciplinary publications were included in the analysis.

The collected bibliometric data were analyzed using the VOSviewer program to perform the analysis of the co-author country network. Additionally, for the analysis of fundamental data such as annual scientific production values, average citation counts per year, three-field analysis, world map of country collaborations, thematic map, thematic evolution, word cloud, frequency of words over time, trending topics, conceptual structure map, and reference spectroscopy, the bibliometrix R software was used. Figure 1 presents the search strategies for sport, economics, and psychosocial relationships.

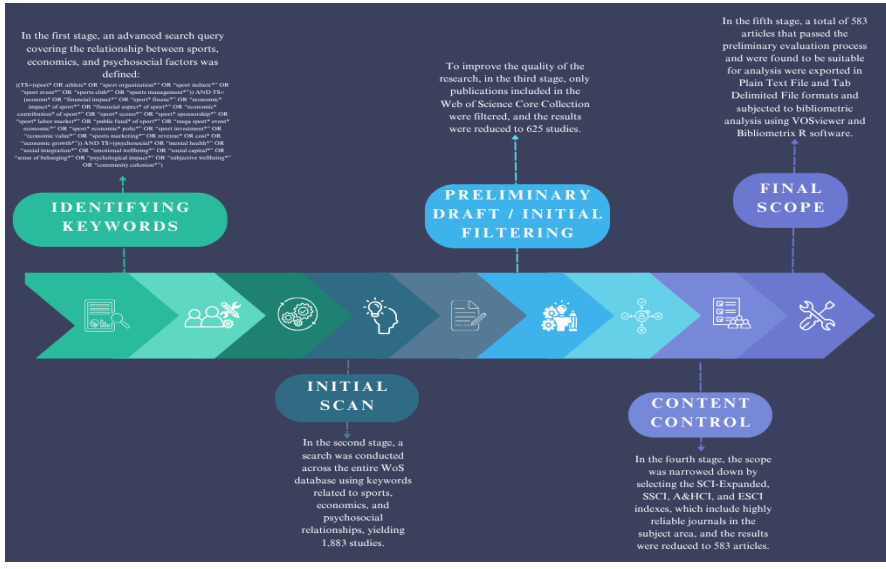

Fig 1. Search strategies

Limitations of the Study

This study was conducted within certain historical, conceptual, and methodological limitations. First, the data obtained for the study was collected in July 2025. Therefore, studies published after this date or those that have not yet been fully indexed were not included in the analysis. Second, the bibliometric data were limited to publications indexed in the Web of Science (WoS) database, specifically those included in the SSCI (Social Sciences Citation Index), SCI-EXPANDED (Science Citation Index Expanded), ESCI (Emerging Sources Citation Index), and A&HCI (Arts & Humanities Citation Index). Thus, studies from databases outside WoS were not considered. This limitation means that the entire literature could not be accessed, restricting the generalizability of the findings. Third, the analysis was conducted based on selected keywords. While the keywords used included key concepts related to sports, economics, and psychosocial fields, they may not cover all the terms used in these fields. This could result in some studies in the literature being overlooked. Considering all these limitations, the findings of the study should be evaluated within the framework of a specific time frame, database, and analysis criteria.

Ethics Committee Approval

This research was conducted solely on the basis of secondary data (Web of Science database) and does not involve any experimental procedures or direct data collection from human or animal participants. Therefore, ethics committee approval is not required for this study. According to the Ethical Principles published by ULAKBİM TR Index in 2020, ethics committee approval is mandatory for studies that collect data from participants through methods such as surveys, interviews, focus groups, observations, experiments, and similar approaches, or for studies conducted on human or animal subjects. However, since this study is limited to the evaluation of secondary data within the scope of bibliometric analysis, it falls outside the scope of research requiring ethics committee approval.

Findings

This section presents the findings obtained in the study. At this point, the findings related to the key information of the relationship between sports, economics, and psychosocial aspects are presented **in** Figure 2**.**

The dataset covering the years 1990–2025 comprises 583 documents published across 388 different sources. The average age of the documents is 6.2 years, with an annual growth rate of 12.25%. Each document has received an average of 28.89 citations, and a total of 2,449 authors have contributed to these publications. On average, there are 4.58 co-authors per document, with an international co-authorship rate of 24.7%. In addition, the analysis identified 1,482 Keyword Plus (ID) terms and 1,816 author keywords (DE), with the earliest publication dating back to 1990.

The findings related to the annual scientific production values of the relationship between sports, economics, and psychosocial aspects are presented in Figure 2**.**

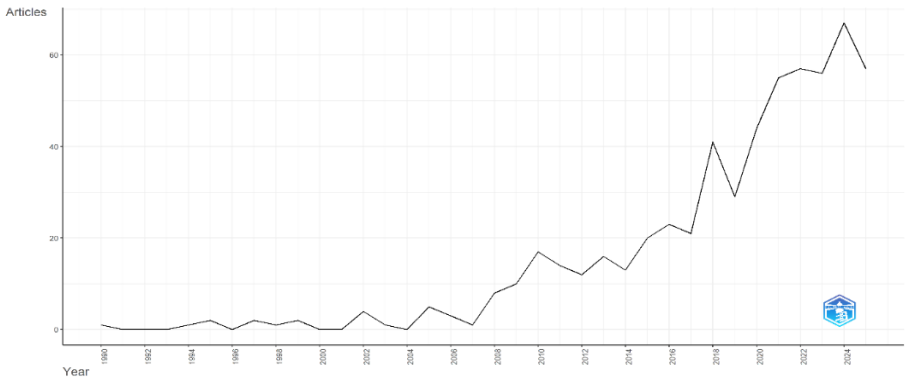

Fig 2. Annual scientific production

As seen in Figure 2, the relationship between sports, economics, and psychosocial aspects has been examined from 1990 to 2025. In 1990, only one article was published, and in subsequent years, the production fluctuated, with some periods showing a decline or remaining at very low levels. However, from 2010 onwards, a clear upward trend emerged, with a particularly rapid increase in the number of articles after 2018. Between 2020 and 2025, the annual publication count ranged from 44 to 67, reaching its highest levels. These findings indicate a significant increase in academic interest and production in the field of sports economics and psychosocial relationships in recent years.

The findings related to the annual average citation counts for the relationship between sports, economics, and psychosocial aspects are presented in Figure 3.

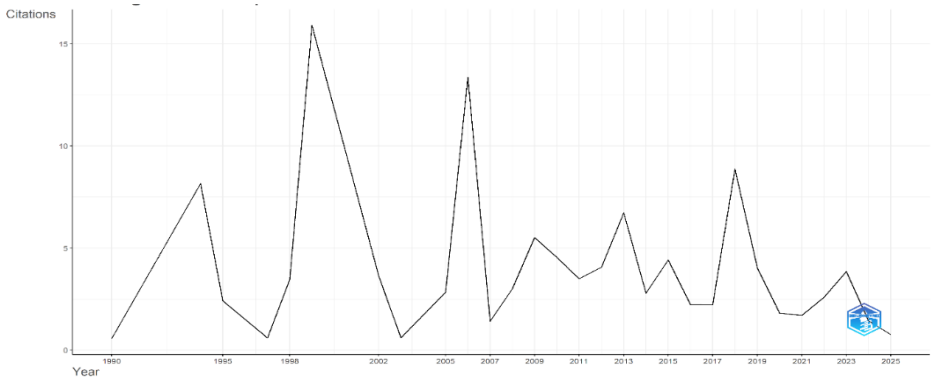

Fig 3. Annual average citation counts

In Figure 3, although the number of publications addressing the relationship between sports, economics, and psychosocial aspects was low in the 1990s, some years saw high average citation counts. Notably, the years 1994, 1995, 1998, 1999, and 2006 recorded significant average citation values. The year 1999 stands out as the year with the highest average citation count, at 429.50. Despite the increase in publication numbers after 2010, the average citation counts generally remained at lower levels. The year 2018 partially reversed this trend, recording one of the highest averages in recent years with a citation count of 71.07. In the period after 2020, citation counts began to decline again, with especially limited average citations in 2024 and 2025. These findings suggest that earlier studies received higher citations due to their longer presence in the literature, while newer publications have not yet had sufficient time to accumulate citations.

The findings related to the three-field analysis of the relationship between sports, economics, and psychosocial aspects are presented in Figure 4.

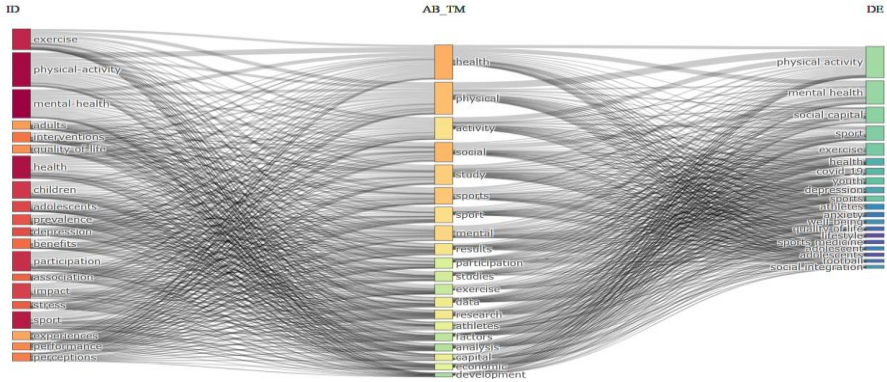

Fig 4. Three-Field analysis

In Figure 4, it has been found that the terms social capital, depression, youth, anxiety, well-being, social integration, physical activity, mental health, exercise, health, economic, development, and sport are interrelated.

The findings related to the countries of co-authors addressing the relationship between sports, economics, and psychosocial aspects are presented in Figure 5.

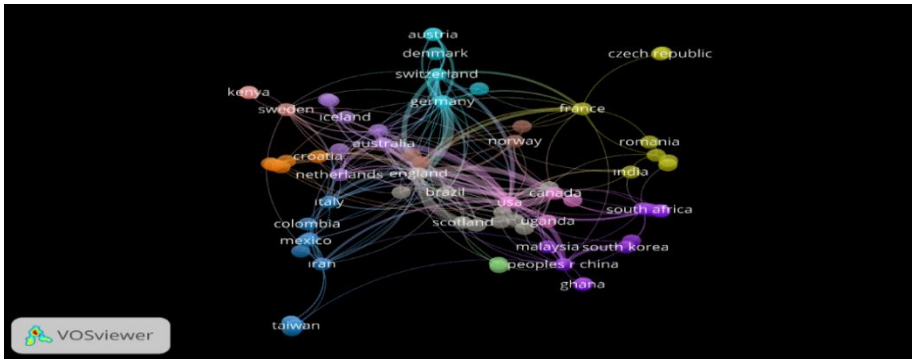

Fig 5. Co-Author country network

In Figure 5, it has been found that the co-author country network graph consists of 70 nodes, 11 clusters, 266 links, and a total link strength of 440. The country with the most publications is the United States, with 113 articles, followed by the United Kingdom with 96 articles and Australia with 71 articles. However, when examining citation counts, the United Kingdom leads with 6,029 citations, highlighting its significant contributions to the field. Despite China contributing 54 articles, it has only received 232 citations, indicating a relatively lower impact. Germany stands out with 46 articles and 1,607 citations.

The world map of country collaborations in the relationship between sports, economics, and psychosocial aspects is presented in Figure 6.

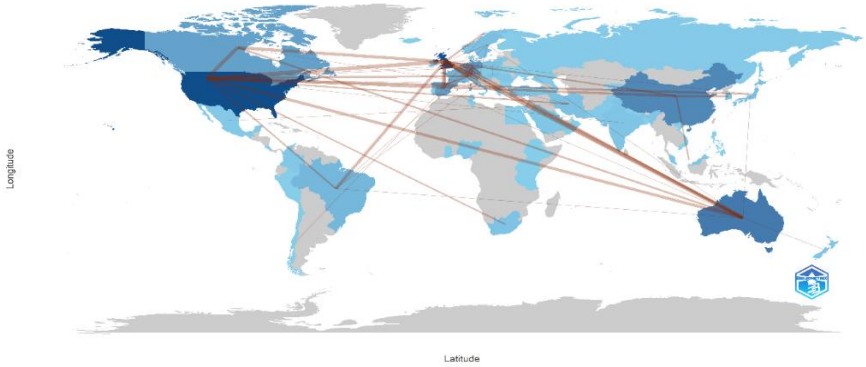

Fig 6. World map of country collaborations

As shown in Figure 6, the strongest international collaborations in sport economics and psychosocial research are observed between the United Kingdom and Australia (13 joint publications), followed by Germany–Switzerland (11), United Kingdom–Germany (10), and United States–United Kingdom (10). Additional active partnerships include the United States–Canada and United Kingdom–Spain collaborations (9 each). Overall, the network demonstrates a strong concentration of research collaboration among European and Anglo-Saxon countries, highlighting their central role in shaping international scholarly connections within the field.

The thematic map of keyword plus terms in articles discussing the relationship between sports, economics, and psychosocial aspects is presented in Figure 7.

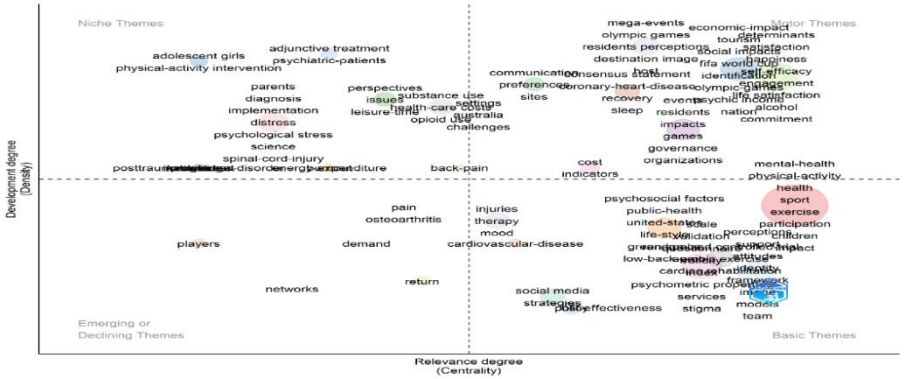

Fig 7. Thematic map of keyword plus

Thematic mapping (Figure 7) highlights mental health, physical activity, and exercise as high-centrality themes within sport-related research. A robust economic-impact cluster-including *tourism*, *FIFA World Cup*, and *Olympic Games*-appears adjacent to the core, while psychosocial and public-health terms (e.g., *lifestyle*, *psychosocial support*) indicate societal-level mechanisms through which sport contributes to community well-being.

The thematic evolution of Keyword Plus terms in articles discussing the relationship between sports, economics, and psychosocial aspects is presented in Figure 8.

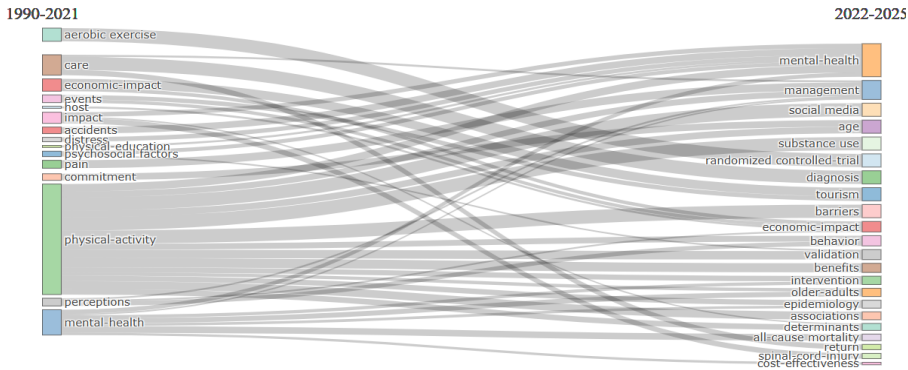

Fig 8. Thematic evolution of keyword plus

The thematic evolution map between 1990-2021 and 2022-2025 in Figure 8 reveals a significant transformation in the fields of sport economics and psychosocial relationships. Research in sports and health has deepened from the theme of physical activity to more specific psychosocial subtopics such as mental health, behavior, interventions, older adults, and substance use during the 2022-2025 period. This development indicates that physical activity is not only related to physical health but is also closely linked to individuals' psychosocial well-being and behavioral health dimensions.

In terms of sport economics, the theme of economic impact has maintained its significance in both the 1990-2021 and 2022-2025 periods. Topics like tourism, sports management, and access barriers have gained prominence. The economic dimension of sports is viewed not only in terms of sectoral growth and investment but also as a strategic area contributing to sustainability and the overall welfare of society. The economic impact of events like the FIFA World Cup and mega sports events highlights the scale of sports economics and its broad-reaching effects on society.

From a psychosocial perspective, the mental health theme has expanded from the 1990-2021 period into new research areas in 2022-2025, such as the effects of social media, psychosocial interventions for different age groups, and substance use. The positive impacts of sports on psychosocial factors like motivation, self-efficacy, resilience, and rehabilitation are increasingly emphasized. Therefore, the strong relationship between the economic and psychosocial dimensions of sports underscores its critical role in the healthy development of individuals and societies. The thematic evolution clearly illustrates the interaction between sport economics and psychosocial factors and how these two areas are playing an increasingly central role in sport health research.

The word cloud of articles discussing the relationship between sports, economics, and psychosocial aspects is presented in Figure 9.

Fig 9. Word cloud

As seen in Figure 10, the frequent use of key concepts such as health, social, physical, and sports highlights the multidimensional impact of sports. At the same time, terms like economic, psychosocial, participation, interventions, and behavior emphasize the significant role of sports in both the economy and individuals' psychosocial health. In the field of sport economics, terms such as tourism, financial, and socio-economic concepts emphasize the contributions of sports' economic impact on sectoral development and societal welfare.

Similarly, within psychosocial factors, concepts such as mental health, psychological state, depression, resilience, and rehabilitation emerge, demonstrating that sports support individuals' mental health and strengthen

social bonds. Research often focuses on psychosocial dynamics like participation and motivation to explain sports' effects on quality of life and social integration. These data reveal the dynamic and reciprocal relationship between the economic sustainability of sports and individuals' psychosocial well-being, highlighting sports as a critical tool for both public health and economic development.

Sport economics and psychosocial factors emerge as two complementary critical dimensions in the fields of sport and health. The economic effects of sports are not limited to sectoral growth and tourism revenues but are directly related to societal welfare and sustainable development. This economic infrastructure increases individuals' participation in sports while also supporting psychosocial gains such as social attachment, self-sufficiency, and psychological resilience. From a psychosocial perspective, the positive impacts of sports on mental health manifest in various aspects such as stress reduction, prevention of depression, and strengthening social integration. Directing economic resources towards the accessibility and quality of sports allows individuals to improve both their physical and psychosocial health through sports. Thus, there exists a mutually reinforcing relationship between sport economics and psychosocial factors, which further enhances the importance of sports for public health and economic sustainability.

The frequencies of articles addressing the relationship between sports, economics, and psychosocial aspects over time are presented in Figure 10.

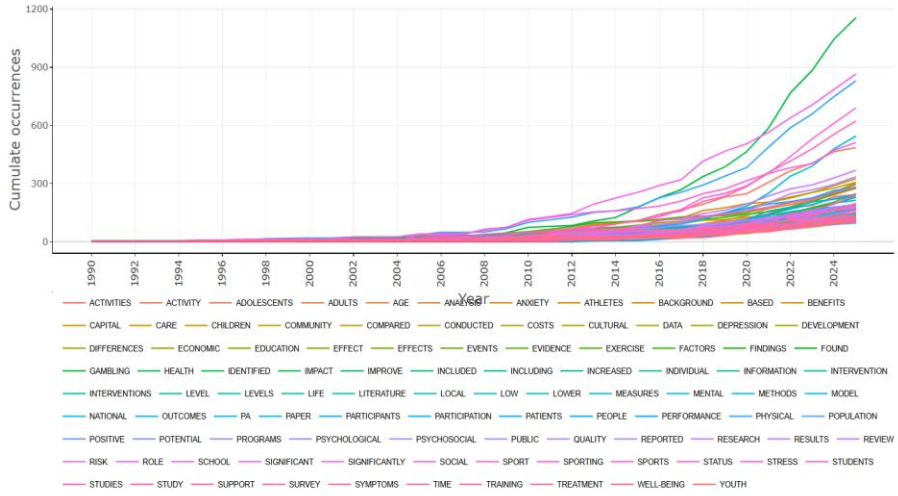

Fig 10. Frequency of words over time

According to Figure 10, between 1990 and 2025, a significant increase is observed in the use of key terms in academic studies related to sports and health. Words such as health, sport, social, physical, psychological, economic, and psychosocial have been used more frequently over the years. Notably, after 2010, there was a rapid acceleration in the use of these terms, with the increase becoming even more pronounced in the 2020s. This period, where sports are considered not only for their physical aspects but also for their psychosocial and economic dimensions, indicates a shift in research trends towards a multidimensional approach.

The rise in the frequency of terms like economic, psychosocial, participation, intervention, and behavior demonstrates that sports are viewed as an important tool not only for individual health but also for economic development and societal welfare. In the field of sports economics, terms like tourism, financial, and socio-economic concepts highlight how sports' economic impacts contribute to sectoral development and societal well-being. Psychosocially, terms such as mental health, depression, resilience, and rehabilitation emphasize how sports support mental health and strengthen social bonds. Furthermore, studies often explain the effects of sports on quality of life, social integration, and individuals' psychosocial well-being through terms like motivation and participation. These data suggest that there is a reciprocal and mutually reinforcing interaction between sport economics and psychosocial factors, underscoring the critical importance of sports for both individual health and the economic sustainability of society.

The trending topics in articles discussing the relationship between sports, economics, and psychosocial aspects are presented in Figure 11.

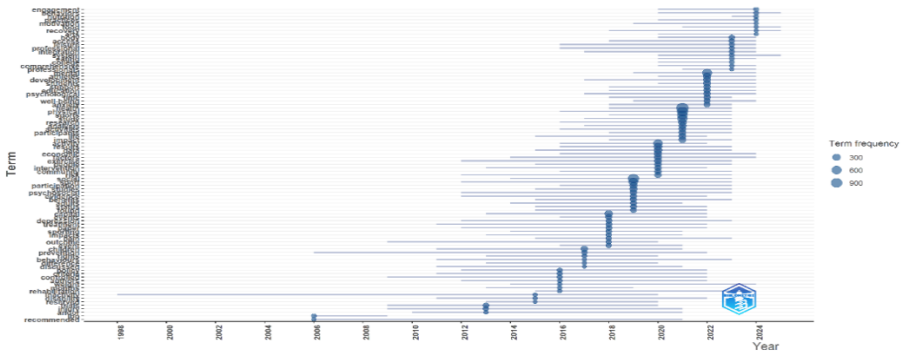

Fig 11. Trending topics

According to Figure 11, from the 2010s onwards, key concepts in the field of sports and health have shown a significant increase over the years, with this trend gaining momentum after 2020. This increase reveals that sports have evolved into a multidimensional structure, not just as a physical activity but also closely related to economic development and psychosocial well-being. Notably, terms such as economic, psychosocial, motivation, participation, intervention, well-being, resilience, and rehabilitation have become central trending topics in recent years.

This trend indicates that sports economics has become an important area not only in terms of sector growth but also in relation to individuals' access to sports, the expansion of activities, and investments in public health. Additionally, psychosocial factors such as depression, mental health, psychological support, social participation, motivation, and social integration highlight the effects of sports on individual well-being. The increased interest in these concepts, particularly after the pandemic, signals the rising demand for sports' role in enhancing mental resilience.

Thus, the trending topics presented in Figure 11 illustrate that there is a bidirectional, mutually reinforcing relationship between sport economics and psychosocial factors, positioning sports as a strategic tool that strengthens both societal economic sustainability and individuals' psychosocial well-being.

The conceptual structure map of articles discussing the relationship between sports, economics, and psychosocial aspects is presented in Figure 12.

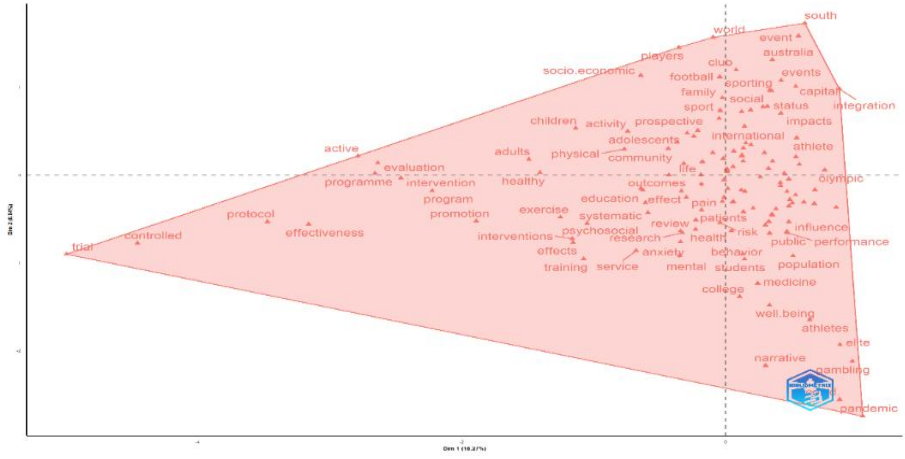

Fig 12. Conceptual structure map

As seen in Figure 12, the conceptual structure map obtained through factorial analysis illustrates the clustering of conceptual structures in studies published in the field of sport economics and psychosocial relationships. The map includes terms related to experimental research such as intervention, program, effectiveness, and protocol, as well as terms associated with mental health and contemporary psychosocial issues, such as well-being, anxiety, pandemic, mental health, and athletes. Additionally, terms like football, society, education, health, and exercise appear, indicating a focus on interdisciplinary convergence.

The reference spectroscopy of articles discussing the relationship between sports, economics, and psychosocial aspects is presented in Figure 13.

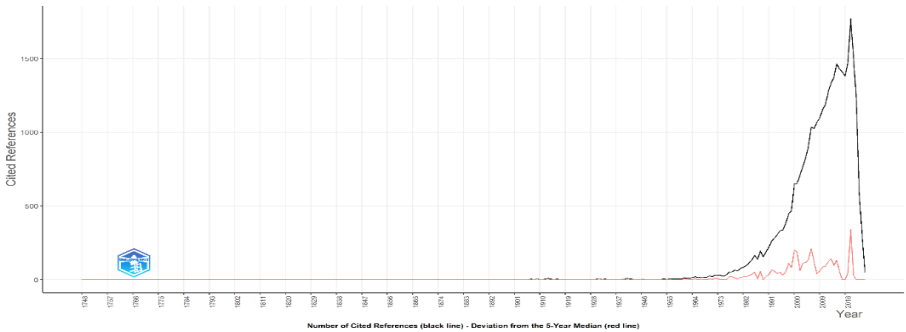

Fig 13. Reference spectroscopy

According to the Reference Spectroscopy data in Figure 13, there has been a noticeable upward trend in citation counts for academic studies in the field of sports and health since 1990. The number of citations, which was 189 in 1990, steadily increased in the following years, with the growth rate accelerating particularly in the 2000s. From 2000 to 2010, there was a gradual increase, while the rise became sharper after 2010. In 2015, the citation count reached 1,465, and by 2020, it had further increased to 1,770, indicating a period of intense scientific interest in the field. This period shows that sports were being considered multidimensionally in the academic community, not just for their physical effects, but also for their psychosocial, economic, and societal impacts.

However, this upward trend reversed after 2021, with a rapid decline observed in the following years. The number of citations fell to 1,504 in 2021, then dropped to 1,217 in 2022, 592 in 2023, and 294 in 2024, reaching significantly low levels. The year 2025 stands out as the lowest in the analysis

period, with just 48 citations. This decline could be due to the fact that the year is not yet complete, delayed citation processes, transformations in digital publishing, saturation within the field, or external factors such as shifts in research priorities following the COVID-19 pandemic. The pandemic significantly affected the physical and mental health of athletes, as highlighted in related literature (Bhatia et al., 2020; Hu et al., 2020), which emphasized the role of regular exercise in preventing psychosocial issues such as anxiety and depression. However, the restrictions during the pandemic led to a decrease in sports activities, negatively affecting athletes' psychosocial well-being (Pálvölgyi et al., 2020). This situation demonstrates that the supportive role of sports in mental health, especially during crisis periods, faces serious sustainability threats.

Discussion and Conclusions

The bibliometric analysis conducted in this study demonstrates a substantial rise in academic interest in the interdisciplinary field of sport economics and psychosocial relationships. The number of publications, which began to gain momentum after 2010, has shown a sharp increase since 2020, underscoring the growing scientific and societal relevance of this domain. Furthermore, the results of the three-field analysis reveal strong thematic linkages between author-selected keywords and the journals of publication. The frequent occurrence of terms such as *sport*, *economics*, *psychosocial*, *health*, and *physical activity* clearly reflects the conceptual core and evolving focus areas of the field.

The thematic map analysis indicates that sport and physical activity occupy a central position, closely linked to themes of economic impact and psychosocial factors. Terms such as *mental health*, *social integration*, and *economic sustainability* suggest that sport plays a pivotal role not only in enhancing individual well-being but also in promoting societal development and resilience. Over time, the thematic evolution reveals a clear transition from *physical activity*-focused studies toward more nuanced psychosocial topics, including *mental health*, *behavioral interventions*, *social media influences*, and *substance use*. At the same time, research on economic aspects-such as *sports tourism*, *management*, and *mega-events*-continues to maintain a prominent place in the literature.

Emerging and contemporary themes such as the metaverse, artificial intelligence, digital health applications, and post-pandemic psychosocial support illustrate how the field has evolved in parallel with technological innovation. However, the COVID-19 pandemic challenged sport's supportive role in mental health due to restrictions on physical activity and the psychosocial consequences of social isolation, while simultaneously disrupting the global sports economy. This period revealed the close interdependence between the economic sustainability of sport and its psychosocial benefits, emphasizing the need for interdisciplinary and integrated approaches to sustain both dimensions under crisis conditions (Di Cagno et al., 2020; Kelly et al., 2022; Sayyd et al., 2021).

Thus, sport economics and psychosocial factors, with their complementary and integrative structures, are increasingly gaining ground in the sports science literature. This study clearly demonstrates that sports are not only a physical activity but also a strategic tool for individual well-being, social integration, economic development, and sustainable societal progress.

The integration of the economic and psychosocial dimensions of sport-particularly regarding its effects on mental health, social inclusion, and community interaction-remains an area in need of further exploration. The *Ahead of the Game (AOTG)* study by Eckermann et al. (2021) partially addresses this gap by comprehensively evaluating both the psychosocial outcomes and the implementation costs of mental health promotion strategies. This interdisciplinary approach provides a valuable framework for assessing the multidimensional benefits of sport and for reinforcing the conceptual and empirical links between sport economics and psychosocial research. Future studies should further examine this relationship across diverse demographic and socio-economic contexts, as such efforts will be essential for designing sports policies that optimize both economic efficiency and social well-being.

In recent years, sport has evolved from being merely a physical activity into a multifaceted social and economic phenomenon that shapes individual lives through its psychological, social, and financial dimensions. With the rapid advancement of digitalization, sport has also become intertwined with emerging economic trends such as online gambling, bringing new psychosocial risks alongside financial opportunities. In this context, Yimer (2025) demonstrates how sport, through its association with online betting, has shifted from a recreational pursuit to a determinant of young people's social and economic

behaviors. Using multiple regression analysis, the study identifies significant relationships between gambling behavior and variables such as psychological well-being and financial distress. The risky behaviors and intervention strategies emphasized by Yimer align closely with the thematic domains identified in this study-namely mental health, social integration, and economic sustainability-further supporting the interconnected nature of sport's economic and psychosocial dimensions.

Furthermore, the recommendation to move beyond purely quantitative designs and adopt holistic approaches supported by qualitative methods-such as focus group discussions and in-depth interviews-represents a valuable contribution to deepening the understanding of sport's psychosocial effects. In line with this perspective, future research should explore how technological advancements and socio-economic conditions shape the experiences and behaviors of young individuals, employing larger samples and interdisciplinary frameworks to capture the complex, multidimensional nature of these relationships.

In parallel with the findings of this study, the bibliometric analysis conducted by Yılmaz (2024) underscores the growing influence of metaverse and artificial intelligence (AI) technologies within the fields of sport and recreation. Future research should undertake a more detailed examination of how metaverse technologies affect sport economics, particularly through the emergence of virtual reality environments that host sports events and digital fan experiences. These innovations have the potential to generate new revenue models and transform consumer engagement in the sports industry. Accordingly, it is crucial to explore both the economic implications of the metaverse on consumer behavior and its psychosocial effects on users. Similarly, Dertli and Erden Dertli (2025) emphasize that the integration of sport sciences and technology has become an increasingly significant research focus in recent years, reflecting the interdisciplinary expansion of the field.

In this context, the analysis of sport economics and psychosocial relationships, as presented in this study, should be expanded to include an in-depth exploration of how metaverse and artificial intelligence technologies will shape the future of sport economics. The transformative potential of these technologies-affecting both the economic structures and psychosocial dimensions of sport-should be examined more comprehensively through interdisciplinary research, integrating insights from economics, psychology,

and technology studies.

Suggestions / Recommendations

Based on the findings of this study, it is recommended that future research in the fields of sports economics and psychosocial studies adopt interdisciplinary approaches. In particular, the impacts of technological developments such as artificial intelligence, the metaverse, and digital health applications on sports should be examined in greater depth. In the post-pandemic period, the relationship between the role of sports in enhancing psychological resilience and economic sustainability should be explored in more detail, with a focus on youth, disadvantaged groups, and different socio-economic segments. Greater emphasis should be placed on qualitative research methods to evaluate the multidimensional effects of sports on individuals' mental health and social integration. Furthermore, the long-term socio-economic impacts of mega sporting events should be addressed within the framework of sustainability, and international collaborations should be encouraged.

Limitations

This study is limited to data obtained from the Web of Science database as of July 2025. Only publications indexed in SSCI, SCI-Expanded, ESCI, and A&HCI were included, excluding studies outside the WoS database. Although the selected keywords cover specific thematic areas, they may not fully represent the entire literature. Additionally, as bibliometric analysis focuses on structural patterns, it may carry certain limitations in terms of content depth. The findings should be interpreted within this framework.

Conclusion

This study examined the intersection of sports economics and psychosocial domains through bibliometric methods, revealing academic trends, key concepts, and thematic developments in the field. The findings indicate that sports have significant impacts not only physically but also economically and psychosocially on both individual and societal well-being. Increasing digitalization and global crises have further emphasized the importance of addressing these areas together. In the future, interdisciplinary studies that holistically examine the effects of technological advancements and socio-economic changes will be essential.

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Author contributions

The author contributed to the manuscript's conceptualization, analyzed, editing, and finalization.

Declaration of Conflicting Interests

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Ethnical statement

This article does not contain any studies with human participants performed by any of the authors.

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Sport Economics Research
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Research Article

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A Bibliometric Evaluation of the Relationship Between Sports, Psychology, and Economics

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Abstract
This study aimed to examine the interdisciplinary relationship between sports, psychology, and economics through a comprehensive bibliometric analysis. A total of 335 publications indexed in the Web of Science (WoS) database were identified in the second quarter of 2025 using an advanced search within the abstract field. The data were analyzed using Bibliometrix R and VOSviewer software. The analysis included annual publication trends, citation averages, international author collaborations, keyword co-occurrences, and conceptual network structures. Additionally, thematic evolution and the temporal development of research topics were visualized through trending topic maps and co-occurrence networks. The results indicate a notable increase in scientific production at the intersection of these fields, particularly after the mid-2000s, accompanied by a growing conceptual integration. Findings suggest that sports should be approached not only as a physical performance domain, but also as a multifaceted structure shaped by psychological and economic factors. Overall, this study maps the existing literature landscape and provides a conceptual framework that may guide future interdisciplinary research in sports economics and sports psychology.

Keywords
Bibliometric analysis, interdisciplinary research, mental well-being, socio-economic factors, sport science,

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Introduction

In today's world, the interaction between the disciplines of sports, psychology, and economics is becoming increasingly prominent. The connection that young individuals form with sports is not only a result of personal interest and abilities but is also shaped by family economic status, societal structures, and available opportunities. Particularly, structural barriers faced by individuals from low socioeconomic backgrounds not only limit sports participation but also negatively affect fundamental psychological factors such as self-perception, motivation levels, and social adaptation skills (Sanderson & Brown, 2020). This situation demonstrates that sports are not only significant for individuals' physical development but also for their psychological and social growth. Therefore, without addressing both the economic aspects of sports and their psychological impacts together, the full societal benefits of youth sports cannot be adequately evaluated. For this reason, it is crucial to approach the fields of sports, economics, and psychology in an interdisciplinary manner, as this allows for a more effective understanding of the psychological and economic challenges faced by young people and the design of appropriate interventions (Lii, 2023).

Yılmaz and Dertli (2025) emphasize that sports are not just an element of entertainment but are also a field intertwined with economic, psychological, and political contexts that affect social structures. Indeed, the rise of sub-disciplines such as sports psychology and sports economics in recent years has made the necessity of evaluating these three areas in an integrated manner more visible. In this regard, addressing the interaction between sports, psychology, and economics is of great importance. Lu (2024) explores the effects of physical exercise on the consumption psychology and behaviors of different economic sport audiences through cross-theoretical models, revealing the role of sports consumption in economic growth and sustainable development. The interaction between psychological processes at different stages of exercise behavior and economic dimensions is crucial for understanding the multidimensional nature of sports. Therefore, this study aims to explore the integration of the disciplines of sports, psychology, and economics using bibliometric analysis. In line with this goal, the study seeks to answer the following questions:

- Publication Patterns: How has scientific production evolved over time at the intersection of sports, psychology, and economics?

- Collaboration Networks: Which countries, institutions, and authors form the core collaboration structures?
- Conceptual Trends: Which thematic clusters and conceptual linkages define the intellectual structure of this interdisciplinary field?

Sports, psychology, and economics intersect because sport functions simultaneously as a behavioral, social, and financial institution. From a psychological standpoint, sport contributes to the development of motivation, emotional regulation, identity formation, and resilience. Economically, sports systems create labor markets, consumer behaviors, capital flows, and policy-driven resource allocation. Socially, sports generate community belonging, participation networks, and symbolic cultural value. Therefore, examining these three disciplines together allows researchers to understand how individual psychological processes and broader economic structures interact within sport environments, forming a unified interdisciplinary research space.

The interdisciplinary convergence of sports, psychology, and economics can be theoretically explained through Human Capital Theory and Social Capital Theory. Human Capital Theory (Becker, 1964) posits that individuals' physical and psychological development enhances their productivity and long-term socio-economic value. Within this perspective, participation in sport contributes not only to physical performance but also to psychological resilience, motivation, self-regulation, and transferable skills. Meanwhile, Social Capital Theory (Putnam, 2000) highlights how sports form networks of trust, cooperation, and shared identity, which in turn shape both community well-being and societal economic outcomes. These theoretical frameworks provide a conceptual basis for understanding why research across these fields has become increasingly integrated: sports function simultaneously as a site of psychological development and as a socio-economic institution with individual and collective benefits.

Method

In this study, a bibliometric analysis method was employed to reveal the interdisciplinary integration of the fields of sports, psychology, and economics. Scholars use bibliometric analysis for various reasons, such as identifying emerging trends in article and journal performance, exploring collaboration models, uncovering research components, and examining the intellectual

structure of a specific field within the existing literature (Donthu et al., 2020; Donthu et al., 2021a; Donthu et al., 2021b; Verma & Gustafsson, 2020). The primary data for this study were collected from the Web of Science (WoS) platform, one of the most comprehensive academic literature databases worldwide (Millet et al., 2021). This database stores and categorizes high-quality bibliographic and citation information that can be examined through bibliometric software tools (Tsilika, 2023; Dertli & Erden Dertli, 2025). At the data collection stage, an advanced search was conducted in the abstract (AB) field in the second quarter of 2025 using the expression *AB = (sport AND psycholog* AND economic), which allowed the retrieval of publications explicitly addressing the intersection of sports, psychology, and economics.

A total of 335 publications related to the intersection of sports, psychology, and economics were identified through an advanced search in the abstract (AB) field of the Web of Science Core Collection database, based on the expression *AB = (sport AND psycholog* AND economic), which ensured the selection of studies explicitly addressing the interdisciplinary relationship between these fields.

The use of bibliometric analysis typically extends from graphical user interface-based software, such as VOSviewer (Van Eck & Waltman, 2010), to command-based software like the Bibliometrix package in R (Aria & Cuccurullo, 2017), which are used alongside network visualization tools (Donthu et al., 2021a). In the data analysis process, bibliometric packages such as the Bibliometrix library in R Studio, as used by Büyüksıdık (2022) and Türkoğlu & Semiz (2025), were employed. Furthermore, visualization of the bibliometric data was conducted using VOSviewer, a commonly preferred tool for mapping and network analysis. This allowed for a detailed visualization and interpretation of the interdisciplinary publication structure, collaboration networks, and the locations of key concepts. During the analysis process, trends in annual scientific production was examined to track the development of the research field over time. Additionally, inter-country collaboration relationships and networks were visualized and analyzed based on the number of joint publications between countries. In this context, the intensities of scientific collaboration between different countries and the dynamics of these collaborations were revealed. For keyword and topic analysis, the change in frequently occurring terms over time was monitored. This enabled the analysis of keyword frequencies, co-occurrence word density maps, and trending topic

analyses. Additionally, to better understand the relationships between topics, a topic dendrogram analysis was conducted, visually revealing the proximity of interdisciplinary concepts.

Findings

A total of 335 documents published between 1980 and 2025 in the fields of sports, psychology, and economics were identified in the dataset. These documents were sourced from 260 different sources, with an annual average growth rate of 6.63%. This indicates a steady increase in scientific interest in these fields over time. The average age of the documents was calculated to be 7.74 years, and the average citation per document was 19.88, highlighting strong academic interest in the studies. In terms of content, 784 "Keyword Plus" (ID) terms and 1,172 author-defined keywords (DE) were identified. Looking at the author profile, a total of 1,179 different authors contributed to the publications. Among these authors, only 57 participated in single-author documents, while the average number of co-authors per document was 3.6, indicating a high trend of collaboration in the field. Additionally, it was found that the international co-authorship rate was 19.4%. All these findings suggest that scientific production at the intersection of sports, psychology, and economics has increased over time. The findings related to annual scientific production values are presented in Figure 1.

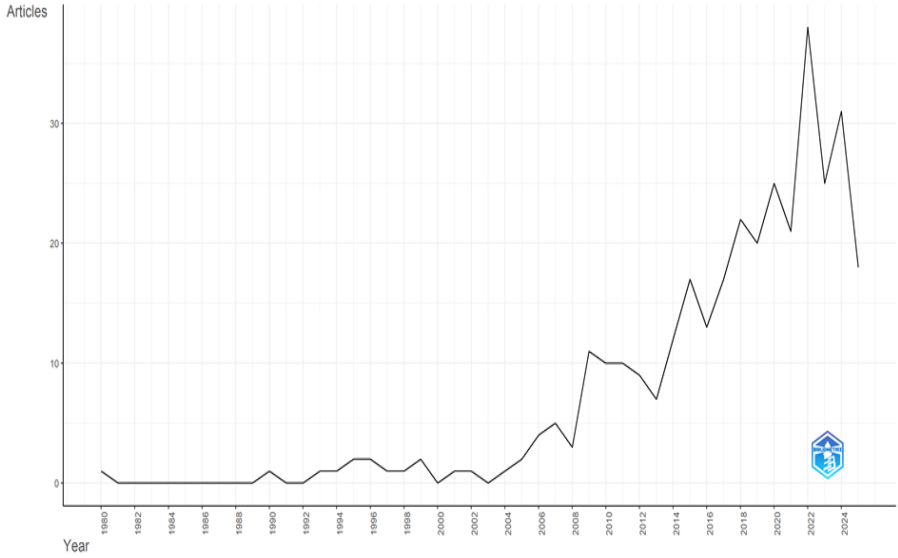

Fig 1. Annual scientific production

Figure 1 reveals that academic publication production in the fields of sports, psychology, and economics has shown a significant increase over the years between 1980 and 2025. In the 1980s and 1990s, the number of publications remained at very low levels, with no publications in many years. This suggests that interdisciplinary studies were limited during this period. However, from the mid-2000s, there has been a noticeable increase in the number of publications.

The upward trend, which started with 11 publications in 2009, continued with 12 publications in 2014, 17 publications each in 2015 and 2017, 22 publications in 2018, and 25 publications in 2020. The highest number of publications was reached in 2022, with 38 publications. These findings indicate that the topic has gained increasing attention in the scientific literature and that academic production in this area has grown. In this context, it is found that scientific production in sports, psychology, and economics has shown a steady increase since the mid-2000s, and the interdisciplinary approach at the intersection of these three fields accelerated after 2020. Findings related to the annual average citation counts are presented in Figure 2.

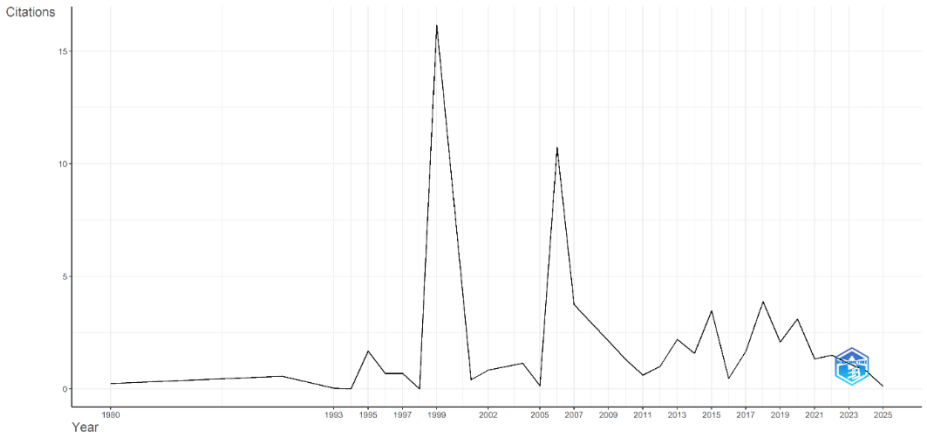

Fig 2. Average citations per year

As seen in Figure 2, the year 1999 stands out with an average of 436.5 total citations for 2 publications and a remarkable annual average of 16.17 citations. Similarly, in 2006, 4 publications received an average of 214.5 citations, with an annual average of 10.72, a high value. The period between 2005 and 2015 shows relatively high citation averages. Particularly in 2015, 17 publications received an average of 38.12 citations, with each publication being cited an average of 3.47 times per year. The year 2018 also stands out, with 22

publications receiving an average of 31.05 citations per document and an annual citation rate of 3.88. Despite the increase in the number of publications after 2020, it is noteworthy that the citation averages have decreased. Specifically, the low average citation numbers in 2023, 2024, and 2025 indicate that these publications have not yet fully reflected their academic impact. Findings related to the countries of the corresponding authors are presented in Figure 3.

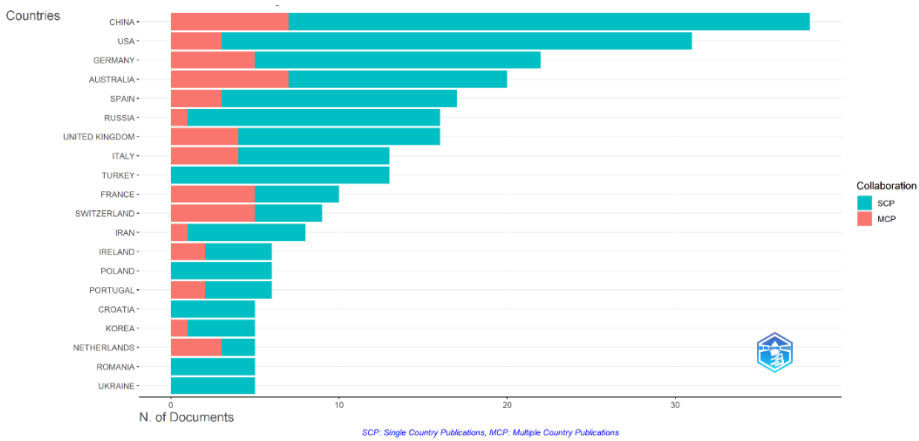

Fig 3. Corresponding author's countries

As seen in Figure 3, China ranks first in terms of corresponding author production with 38 publications, and 18.4% of these publications are based on multinational collaborations. The United States ranks second with 31 publications, while the collaboration rate is 9.7%. Germany (22 publications) and Australia (20 publications) stand out with higher multinational collaboration rates; in particular, Australia's 35% MCP rate indicates that the country is open to international research collaborations. Turkey, on the other hand, produced all 13 publications within a single country, and its MCP rate remained at 0%. This suggests that research in Turkey is largely conducted at the national level. Similarly, countries like Poland, Romania, Ukraine, Brazil, and South Africa also conducted all their publications independently. In contrast, countries such as Switzerland (55.6%), the Netherlands (60.0%), France (50.0%), Hungary (50.0%), and Austria (100%) stand out with high MCP rates, meaning that corresponding authors in these countries are more involved in international partnerships. Findings related to the country citation network are presented in Figure 4.

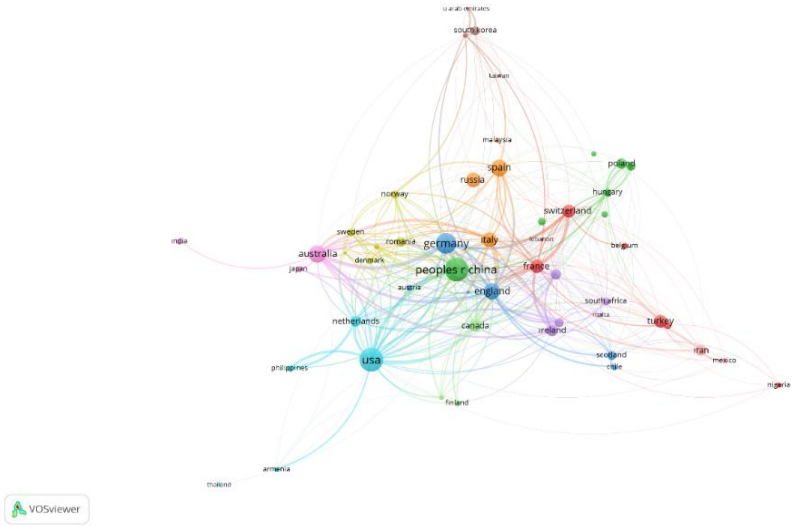

Fig 4. Country citation network

Figure 4 reveals that the country citation network map consists of 55 nodes, 11 clusters, 404 connections, and a total connection strength of 11,823. When citation counts are examined, the countries with the most citations are the United States with 1,927 citations, the United Kingdom with 1,669 citations, Australia with 703 citations, Italy with 533 citations, and Scotland with 484 citations. These countries are followed by Turkey with 346 citations, Spain with 308 citations, the Netherlands with 295 citations, and Canada and Sweden, each with 291 citations. Findings related to country collaboration are presented in Figure 5.

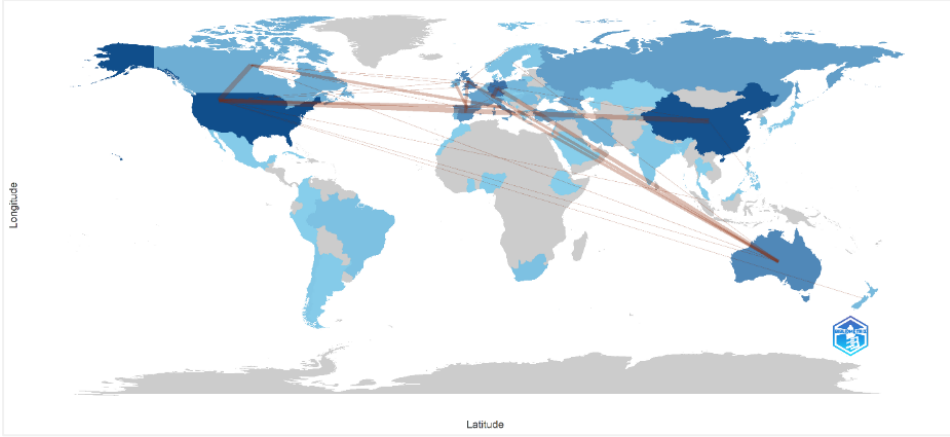

Fig 5. Countries' collaboration world map

Figure 5 shows that 93 different bilateral country collaborations related to the relationship between sports, psychology, and economics have been identified. Among these collaborations, the United States was found to have the highest frequency. Specifically, the United States-Canada and United States-China pairs, with 5 publications each, emerged as the most frequent collaborators. These are followed by Germany-Australia and Germany-Switzerland collaborations, with 4 publications each. The United Kingdom, one of the countries with the largest network of connections, has collaborated with 9 different countries, totaling 19 collaborations. In this regard, it can be said that European-centered research networks are at the core of this collaboration. Australia has also been involved in over 20 collaborations with 11 countries, particularly standing out with its connections to Italy, Canada, Sweden, and New Zealand. Among the rising collaborations, China has collaborated with a total of 12 countries, including both Asian countries like South Korea and the Philippines, as well as European countries such as Italy, the Netherlands, and Norway. This highlights China's growing contribution to the international literature in the fields of sports psychology and economics. Findings related to the countries' production values over time are presented in Figure 6.

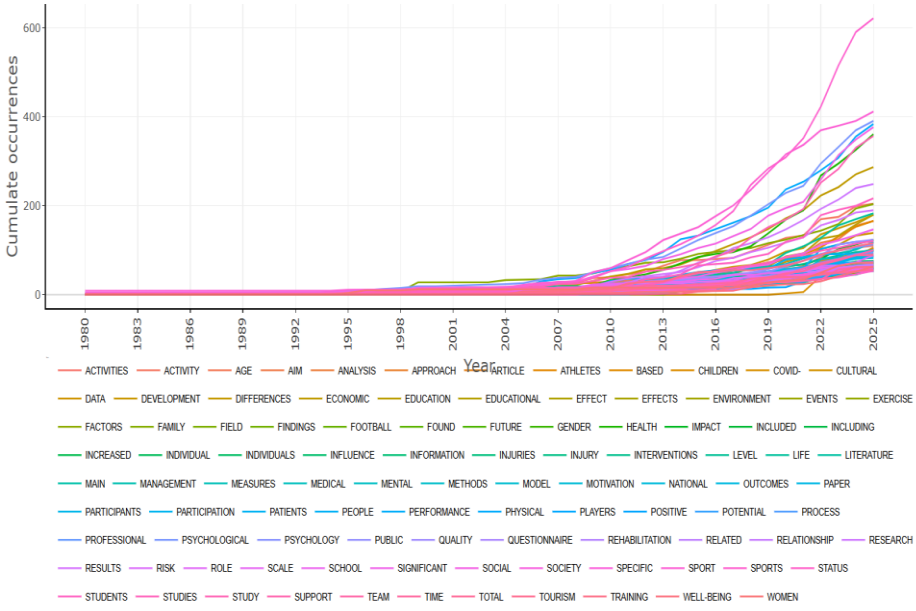

Fig 6. Words' frequency over time

According to the word frequency analysis in Figure 6, significant changes and interdisciplinary integration are observed in the fields of sports, economics, and psychology from the 1980s to 2025. In the 1980s, the use of words related to sports remained relatively low and stable, while from the early 1990s onwards, concepts such as rehabilitation, social issues, and gender began to appear more frequently in the context of sports. In the 2000s, with the increase in studies on the psychological and social impacts of sports, the use of sports-related terms significantly increased. In the field of economics, from the mid-1990s, an increase in terms related to words such as national, differences, and growth indicated that the economic dimensions of sports began to receive more attention in research. Under the psychology theme, from the 2000s onwards, the increasing frequency of terms such as rehabilitation, gender, and social concepts indicated that the psychological dimensions of sports and economics were being addressed together. Overall, these data show that, after the 1990s, the word frequency increases in sports, economics, and psychology fields strengthened the interdisciplinary integration, and academic production in these areas became increasingly diverse. These findings support the rise of subfields such as sports economics and sports psychology and emphasize the importance of interdisciplinary approaches. Findings related to trending topics are presented in Figure 7.

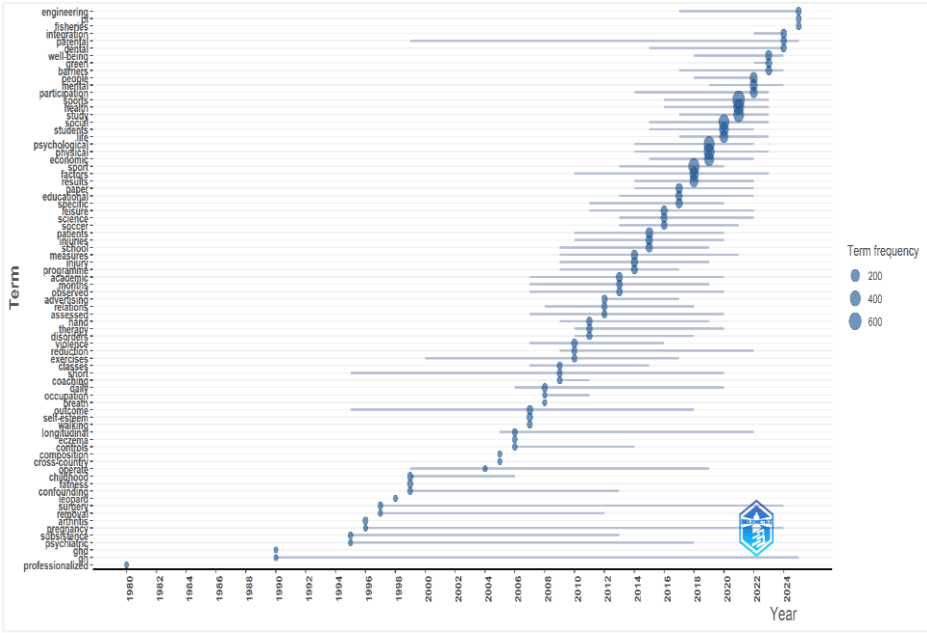

Fig 7. Trend topics

In Figure 9, when examining the trend words emerging in the fields of sports, economics, and psychology, the changes in word frequencies and the rise of new concepts are noteworthy. Trends that began in the 1980s with words like "professionalized" diversified in the 1990s with terms related to health and psychology, such as "psychiatric," "arthritis," and "childhood." In the 2000s, psychological and social concepts like "self-esteem," "violence," and "therapy" gained importance, while terms related to sports and health, such as "exercise," "injury," and "patients," became more frequent. Particularly from the 2010s onward, keywords such as "sport," "psychological," "economic," "social," and "health" came to the forefront, indicating that the economic, psychological, and social dimensions of sports are being addressed interdisciplinarily. By the 2020s, words like "integration," "well-being," and "participation" have emerged as trends, signaling that the fields are becoming more interconnected. These data show that sports, psychology, and economics are increasingly integrating with one another. Findings related to the co-occurrence word density map are presented in Figure 8.

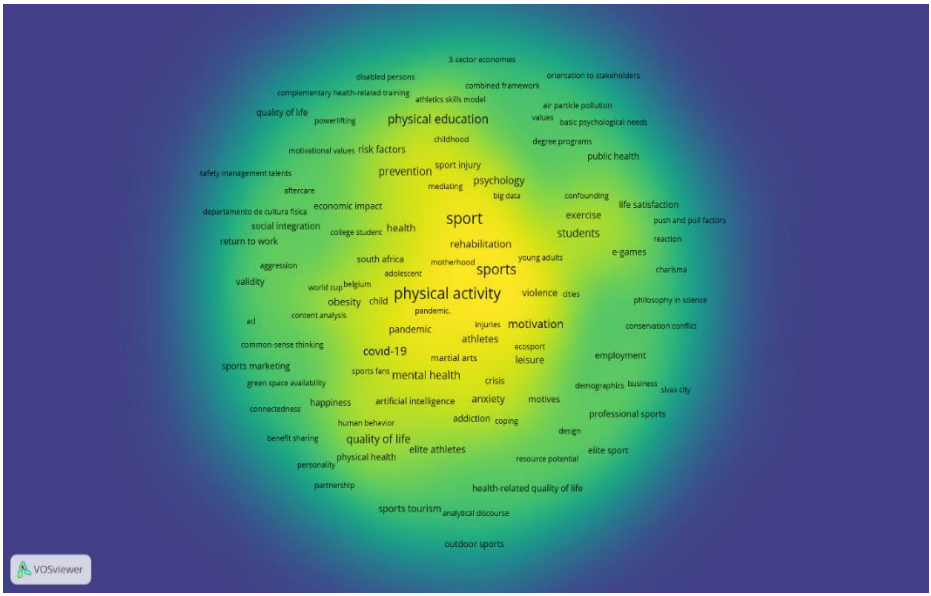

Fig 8. Co-occurrence word density map

The co-occurrence word density map in Figure 10 shows that the fields of sports, psychology, and economics are in strong and interdisciplinary relationships with each other. Terms such as "economic impact," "employment," and "social integration" highlight that sports are not just an

economic activity; they are intertwined with social and psychological dimensions. Keywords from the field of psychology, such as "mental health," "motivation," "well-being," "self-efficacy," and "rehabilitation," indicate that the economic impacts of sports also play a significant role in individuals' psychological state and quality of social life. In particular, the increased frequency of words like "well-being" and "rehabilitation" alongside economic factors suggests that the economic investments in sports have value not only financially but also in terms of psychological recovery and improving life quality. According to Turaç (2024), the economic dimension of sports contributes to increased individual and societal well-being by affecting individuals' motivation, psychological resilience, and social integration. In this context, economic investments in sports, through the provision of job opportunities and social participation, can positively influence people's psychological health. This demonstrates that the interaction between sports economics and psychology is a multidimensional and mutually beneficial relationship. The co-occurrence word density map points to interdisciplinary studies investigating the effects of economic factors on psychological health and social integration at the intersection of sports economics and psychology. Findings related to the co-occurrence network are presented in Figure 9.

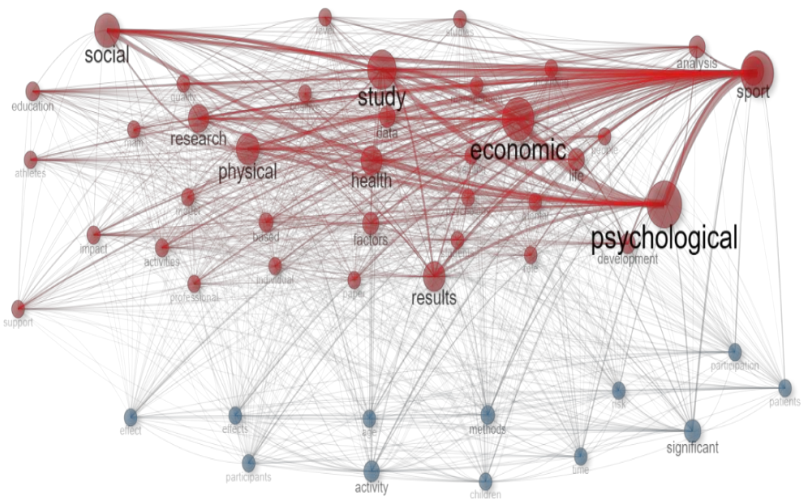

Fig 9. Co-occurrence network

In Figure 9, the words in central positions, such as "sport," "economic," "psychological," "study," and "health," attract attention due to their high number of connections. This indicates that these concepts play complementary

roles in research. The frequent connections between the terms "sport" and "economics" highlight that topics such as the economic impacts of sports, professionalization processes, and financial management are increasingly being addressed. Moreover, the frequent use of words related to psychology, such as "mental," "motivation," "support," "stress," and "individual," alongside sports, reveals that the field of sports psychology is on the rise. At the intersection of sports economics and psychology, factors like performance, motivation, and mental resilience stand out, showing that athletes' psychological states are being linked to economics. All these findings suggest that, beyond its physical aspects, sports have become an interdisciplinary research field that also encompasses economic and psychological dimensions. Findings related to the topic dendrogram are presented in Figure 10.

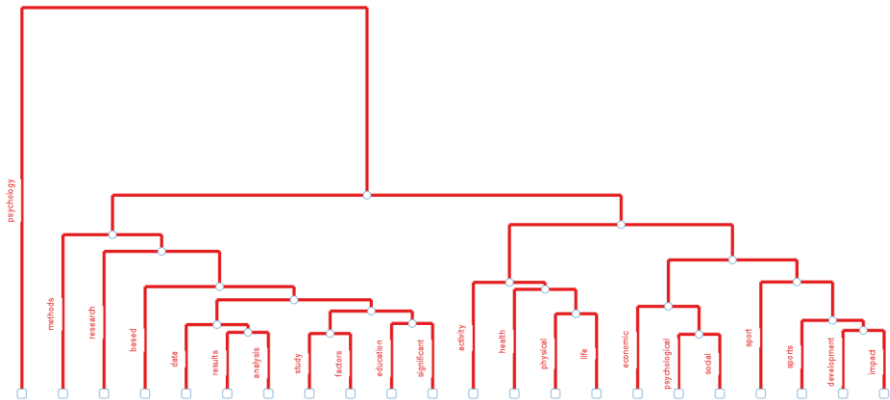

Fig 10. Topic dendrogram

In Figure 10, the topic dendrogram shows that scientific production-related terms such as "methods," "research," "data," "results," and "analysis" cluster together, indicating that sports psychology and sports economics are grounded in methodological foundations. This cluster reveals how research-based approaches are intertwined with psychology. Additionally, the inclusion of terms like "activity," "health," "physical," "life," "economic," "psychological," "social," and "sport" in a single cluster highlights that individual physical activities are directly related not only to health but also to psychological well-being and economic conditions. This finding supports the idea that the multidimensional nature of sports and its impact on an individual's quality of life are evaluated from an interdisciplinary perspective. Furthermore, the close positioning of words like "development" and "impact" with "sport"

and"economic" indicates that research focuses not only on the contribution of sports to economic development but also on its effect on individual development. All these findings demonstrate that the intersection of sports, psychology, and economics is being studied in an integrated manner.

Discussion and Conclusions

This study comprehensively examines the scientific literature at the intersection of sports, psychology, and economics through bibliometric analyses, revealing how these three fields have integrated and have been increasingly addressed together over time. The 335 publications obtained from the Web of Science database were evaluated using bibliometric analysis, demonstrating that an interdisciplinary approach has been gaining momentum. Notably, since the mid-2000s, scientific production in this field has significantly increased, peaking in 2022. Word frequencies and trending topics have shown that this increase is not limited to numerical intensity but also represents a significant development in terms of content diversity. The prominence of terms such as "well-being," "integration," "rehabilitation," and "participation" indicates that the economic and psychological aspects of sports are being more frequently associated with societal contexts. The co-occurrence word density map shows that concepts like "economic impact," "employment," "social integration," "mental health," "motivation," and "self-efficacy" are increasingly used together, highlighting that the multidimensional nature of sports is being addressed with an interdisciplinary approach.

The conceptual network map reveals that terms with high connection strength, such as "sport," "economic," "psychological," "study," and "health," indicate that these fields are being evaluated in a complementary manner. The topic dendrogram, by clustering terms like "methods," "data," "results," and "analysis" with terms such as "activity," "health," "economic," "psychological," and "social," shows that sports economics and sports psychology are built on research-based methodological foundations. All these findings provide strong indicators that sports are not just a physical activity, but are also directly connected to individual psychological well-being, societal welfare, and economic sustainability.

As emphasized by Sanderson and Brown (2020), sports are not only a physical activity but also strongly connected to individual psychological well-being, societal welfare, and economic sustainability. Economic inequalities in

youth sports affect access to sports and psychological development; therefore, addressing the economic and psychological dimensions of sports together is likely to make a significant contribution to the literature. In this context, future research should focus on examining the impact of sports on psychological health alongside economic variables, comparing macro and micro-level sports policies, increasing studies focused on the role of sports in developing countries, and deeply investigating economic and psychological opportunity inequalities in the context of gender. Additionally, concepts such as self-efficacy, resilience, and burnout should be further explored within the framework of sports economics and psychology, which is expected to deepen the theoretical foundation of the field. As a result, this study demonstrates that considering sports as a multidimensional tool in both psychological and economic development processes within an interdisciplinary framework can contribute to the literature.

As mentioned in Yimer (2025), future research should address several key issues to better understand the dynamics at the intersection of sports, psychology, and economics. In particular, longitudinal studies should examine the interactions between economic, social, and psychological factors over time and the long-term effects of various interventions. Comparative research between different regions and countries will highlight regional differences in the economic and psychological impacts of sports, contributing to the generalization of findings. Furthermore, evaluating the effectiveness of intervention strategies designed to increase youth participation in sports and support psychological well-being will provide important guidance for policymakers and practitioners. Considering cultural and demographic variables will allow for a more comprehensive understanding of the complex interactions in this interdisciplinary field.

The findings of this study have important implications for policymakers and practitioners. Increasing access to community sports programs may contribute to psychological well-being and reduce inequalities caused by socioeconomic disparities. Governments and institutions can support interdisciplinary sports policies by integrating economic investment strategies with psychological development programs. Additionally, coaches, educators, and sports managers can design interventions that simultaneously strengthen mental resilience, promote social participation, and ensure sustainable resource use in sports environments.

According to Alwan et al. (2023), in the field of sports, perfectionism, performance pressure, and competitive conditions can increase stress levels, while economic conditions can play a determining role in either alleviating or exacerbating this psychological burden. The strategies used to cope with perfectionism play a decisive role in the psychological health of individuals. However, research on the relationship between these psychological processes and young individuals in the fields of sports and economics is still limited. Coping strategies such as seeking social support, problem-solving, and cognitive restructuring has been found to be effective in reducing the negative effects of perfectionism and enhancing individuals' psychological resilience. Therefore, the psychological challenges faced by young people in the fields of sports, economics, and engineering should be addressed through interdisciplinary approaches and personalized interventions. Future studies are expected to contribute to the development of sustainable support systems by further exploring the relationship between perfectionism and psychology across different disciplines.

Recommendations

In light of the findings of this study, future research should adopt multidisciplinary approaches to further explore the interactions between the fields of sports, psychology, and economics. In particular, quantitative and qualitative studies investigating the psychosocial and economic impacts of digitalization on sports participation will significantly contribute to filling current gaps in the literature. Evaluating the effects of sports on psychological resilience, motivation, and social integration in the context of economic inequalities and socio-demographic variables will help to uncover disparities in opportunities among different population groups. Moreover, comparative studies on the micro and macro-level impacts of sports policies in developing countries are needed. The effects of emerging technologies such as artificial intelligence, augmented reality, and the metaverse on psychological well-being and sports engagement should also be addressed as promising areas of future inquiry.

Limitations

This study is limited to data obtained solely from the Web of Science (WoS) database, covering publications indexed in SSCI, SCI-Expanded, ESCI, and A&HCI. As a result, research found in other academic databases was excluded,

which may narrow the scope of the analyzed literature. Additionally, the search was conducted based only on the "abstract" field, and thus the full-text content of the publications was not considered. As a method, bibliometric analysis focuses primarily on the structural and quantitative characteristics of academic production, which may lead to limitations in terms of in-depth content interpretation. Therefore, the findings should be interpreted within the boundaries of this methodological framework.

Conclusion

This study examined the interdisciplinary intersection of sports, psychology, and economics through bibliometric methods and revealed a growing conceptual integration among these fields. The sharp increase in publications after the mid-2000s appears to be associated with global socio-economic developments, rising public health concerns, and a greater recognition of sports as a vehicle for psychological well-being and social participation. As societies increasingly face issues such as sedentary lifestyles, mental health challenges, and widening economic disparities, the role of sport has been reconceptualized from a purely performance-oriented practice to a multidimensional social resource. This shift explains the clustering of keywords such as “well-being,” “participation,” and “rehabilitation,” and the emergence of research themes linking sports to mental health support and economic sustainability.

The co-occurrence and conceptual network analyses show that the terms “sport,” “economic,” “psychological,” and “health” form a coherent interdisciplinary research structure. In other words, contemporary research now tends to evaluate sports not only in terms of individual physical performance but also in relation to social welfare, personal development, and public policy outcomes. Future research should further investigate how technological innovations, professionalization trends, and global economic transitions reshape the psychological and financial dimensions of sport. By emphasizing the interconnected and layered nature of these domains, this study highlights the importance of adopting a comprehensive interdisciplinary approach to better address complex social, psychological, and economic challenges within sport contexts.

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Author contributions

The author contributed to the manuscript's conceptualization, analyzed, editing, and finalization.

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Ethnical statement

This article does not contain any studies with human participants performed by any of the authors.

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Research Article

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Loyal to the Crest, Not Limited by the Wallet: The Effect of Emotional Commitment to the Sports Team on the Intention to Purchase Counterfeit Club Products

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Abstract
This study investigated the effect of emotional commitment to the sports team on the intention to purchase counterfeit club products and examined the role of perceived income level in this relationship. A quantitative research design based on the relational survey model was employed. The sample consisted of 467 football fans residing in Erzurum, selected through the snowball sampling method. Data were collected via face-to-face questionnaires, and reliability analyses confirmed high internal consistency. After testing normality assumptions, correlation and moderation analyses were conducted using Hayes' PROCESS Macro (Model 1) with 5000 bootstrap samples. The results showed a significant negative relationship between emotional commitment and counterfeit product purchase intention, indicating that stronger attachment to the team reduces the tendency to buy counterfeit products. However, perceived income level did not significantly moderate this relationship. These findings suggest that emotional commitment is associated with lower counterfeit purchase intention, independent of income differences. The study contributes to understanding sport-related consumer behavior and provides practical insights for sports clubs to enhance fan loyalty, promote licensed merchandise, and develop more effective anti-counterfeiting strategies.

Keywords
Counterfeit product purchase intention, fanaticism, perceived income level

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Introduction

Emotional commitment to the sports team refers to the affective bond that fans develop with their team, reflecting the extent to which the team becomes an integral part of their self-concept and emotional life. In the context of football, emotional commitment to the sports team is manifested through fans' strong emotional attachment to their teams, the frequency with which they follow matches, and their consumption-related behaviors (Aydın & Kurudirek, 2025; Dwyer et al., 2018). Fans who experience a high level of emotional commitment to the sports team tend to internalize team-related values and norms, which plays a significant role in shaping their consumer identities and guiding identity-consistent consumption choices (Chung et al., 2018; Smith et al., 2007). The strength of the emotional bond between fans and their teams substantially influences purchasing behavior, particularly in relation to team-related products (Byon et al., 2010; Kwon et al., 2022). Similar to other forms of relational consumption, the relationship between fans and their teams is largely governed by emotion-driven processes (Aggarwal, 2004). Consequently, emotional fluctuations can be observed within the fan-team relationship, making consumption decisions open to both positive and negative responses (Romani et al., 2009). Fans with strong emotional commitment to the sports team are generally inclined to purchase team-related products; however, the realization of this inclination may be constrained by economic conditions, which can lead some fans to consider counterfeit alternatives.

Counterfeit products are defined as imitations that are deliberately reproduced with detailed precision to resemble original items (Zahari et al., 2016). In the process of constructing a consumer identity, individuals' behaviors do not always follow a consistent or linear pattern. Fans who experience internal conflicts between their emotional attachment to the team and economic limitations may display ambivalent purchasing tendencies, resulting in variations in consumption behavior (Antonetti et al., 2025; Arnould & Thompson, 2005). From a consumer culture perspective, individuals seeking prestige and social status may attempt to reinforce their social identity through the consumption of elite brands; however, when confronted with financial constraints, counterfeit products may be perceived as accessible alternatives (Amaral & Loken, 2016; Perez et al., 2010). Technological advancements have intensified counterfeiting practices, transforming them into a major global industry (Chiu et al., 2014). As the sports industry continues to expand, licensed

sports products have become increasingly important for football clubs seeking to strengthen fan loyalty and financial sustainability. Nevertheless, while some fans consistently purchase licensed merchandise, others-despite their emotional commitment to the sports team-may occasionally prefer counterfeit products due to situational or economic considerations (Avcı, 2024).

Drawing on Social Identity Theory, emotional commitment to a sports team reflects the extent to which individuals define themselves through their affiliation with the team and internalize team-related values and norms (Tajfel et al., 2001; Tajfel & Turner, 2004). Prior research in sport consumer behavior demonstrates that emotionally committed fans perceive their team as an integral component of their social identity, which, in turn, shapes their consumption-related decisions and loyalty behaviors (Mahony et al., 2000; Yoshida et al., 2014). From this perspective, purchasing counterfeit club products may be perceived as inconsistent with the symbolic meaning of authentic team support, as counterfeit consumption violates shared group norms and undermines the perceived authenticity of fandom. Consistent with identity-signaling and norm-based perspectives, consumers tend to avoid behaviors that conflict with valued group identities and moral expectations (Amaral & Loken, 2016; Kononova et al., 2024). Accordingly, emotionally committed fans are more likely to refrain from purchasing counterfeit products in order to maintain identity consistency and signal genuine loyalty to their team.

Previous studies further suggest that consumers with lower income levels may be more inclined to purchase counterfeit products due to financial constraints and affordability considerations (Wu & Zhao, 2021; Elsantil & Bedair, 2022). Research on counterfeit consumption indicates that economic motivations, such as price sensitivity and perceived value, play a significant role in shaping purchase intentions (Quoquab et al., 2017). However, from an identity-based perspective, emotional commitment represents a relatively stable psychological bond grounded in social identity and group membership, which may guide consumer behavior independently of economic conditions (Tajfel & Turner, 2004;). As a result, while income level may influence counterfeit purchasing behavior in general, its role in conditioning the relationship between emotional commitment to the sports team and counterfeit purchase intention remains theoretically ambiguous.

Despite the extensive literature on emotional commitment and team identification in sport consumption, prior studies have mainly examined

outcomes such as loyalty, satisfaction, and intentions to purchase licensed merchandise (Biscaia et al., 2013; Kunkel et al., 2016). In contrast, research on counterfeit consumption has largely focused on general consumer-level determinants, including attitudes, perceived risk, moral judgment, and price sensitivity, without adequately accounting for fan-team emotional attachment (Eisend, 2019; Riquelme et al., 2012). Consequently, empirical evidence on how emotional commitment to a sports team shapes fans' intentions to purchase counterfeit club merchandise remains limited. Moreover, although income level is widely recognized as a key driver of counterfeit consumption, recent studies suggest that economic factors may interact with psychological and identity-based motives rather than operate solely as direct predictors (Jiang & Shan, 2016; Samaddar & Menon, 2025). Thus, the moderating role of perceived income status in emotionally grounded and identity-driven sport consumption contexts remains theoretically unclear. Addressing this gap contributes to the literature by integrating emotional, identity-based, and economic perspectives within a single analytical framework.

Accordingly, the present study aims to examine the effect of emotional commitment to the sports team on the intention to purchase counterfeit club merchandise and to explore whether perceived income status influences this relationship. Based on this framework, the following hypotheses are proposed:

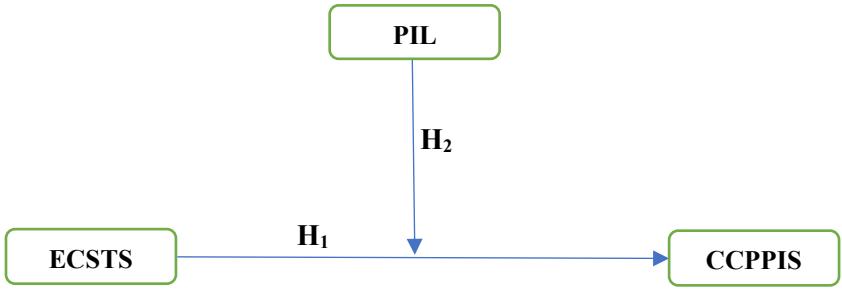
H_1: Emotional commitment to the sports team negatively affects the intention to purchase counterfeit club products.
H_2: Perceived income status may influence the relationship between emotional commitment to the sports team and the intention to purchase counterfeit club products.

Method

Research Design

This study was designed within the framework of a relational survey model. The research examines the relationship between fan fanaticism and the intention to purchase counterfeit club merchandise, and also evaluates the moderating role of perceived income status in this relationship. Since the relational survey model aims to identify the direction and degree of relationships between existing variables, it was considered an appropriate design for the purpose of this study. Accordingly, the proposed research model illustrating the

hypothesized relationships among the variables is presented below (Figure 1).



Note: CCPPIS: Counterfeit Club Product Purchase Intention Scale, ECSTS: Emotional Commitment to the Sports Team Scale, PIL: Perceived Income Level

Fig 1. Proposed research model

Research Group

The population of the study consists of football team supporters residing in Erzurum. The sample group was composed of 467 football fans, determined through the snowball sampling method. The snowball sampling method is based on expanding the sample through the recommendation of new participants by the initially selected individuals who meet the research criteria (Yıldırım & Şimşek, 2021).

Accordingly, data were collected through students attending the researcher's courses at the faculty, who assisted in reaching their friends and family members within their close social circles. The questionnaire was administered face-to-face and collected using the same procedure. Questionnaires that were incomplete or filled out incorrectly were excluded from the analysis.

A total of 467 football fans participated in the study, of whom 237 were female (50.7%) and 230 were male (49.3%). This distribution indicates that the sample has a balanced gender composition.

Table 1. Demographic characteristics of participants

Variable	Group	n	%
Gender	Female	237	50.7
	Male	230	49.3
Age	18-20 years	175	37.4
	21-24 years	138	29.6
	25 years or older	154	33.0
Education Level	Primary/Secondary/High School Graduate	98	21.0
	Associate/Bachelor's Student	221	47.3
	Associate/Bachelor's Graduate	118	25.3
	Master's Student	17	3.6
	Master's Graduate	13	2.8
Occupation	Student	260	55.7
	Public Sector Employee	58	12.4
	Private Sector Employee	61	13.1
	Other	88	18.8
Perceived Income Level	Low	285	61.0
	High	182	39.0
Supported Team	Beşiktaş	79	16.9
	Fenerbahçe	147	31.5
	Galatasaray	185	39.6
	Other Teams	56	12.0
	TOTAL	**467**	**100.0**

Table 1 shows that the highest proportion of participants falls within the 18-20 age range (37.4%; n=175). This finding indicates that the majority of the sample consists of young individuals. In terms of educational level, the largest group of participants were associate/bachelor's students (47.3%; n=221). Regarding occupation, a significant portion of the participants were students (55.7%; n=260). Examination of the perceived income level variable revealed that most participants perceived their income level as low (61.0%; n=285). In terms of the supported team variable, the largest group of participants were Galatasaray supporters (39.6%; n=185). Overall, these results indicate that the sample predominantly consists of young, student, low-income individuals who support Galatasaray.

Data Collection Instruments

1. Personal information form

This form was designed by the researchers to determine the demographic characteristics of the study group, including gender, age, educational level, occupation, perceived personal income level, and the supported football team.

2. Emotional commitment to the sports team scale

The Emotional Commitment to the Sports Team Scale (ECSTS), developed by Dwyer et al. (2015) and adapted into Turkish by Erdoğan and Şirin (2021), consists of 7 items and 2 subdimensions: Cognitive Investment and Emotional Investment. The scale is a 7-point Likert-type, ranging from "1: Strongly Disagree" to "7: Strongly Agree."

During the adaptation process conducted by Erdoğan and Şirin (2021), the Cronbach's Alpha (α) reliability coefficient was calculated as 0.94 for the Cognitive Investment subdimension, 0.95 for the Emotional Investment subdimension, and 0.97 for the overall scale.

In the reliability analysis conducted within the scope of the present study, the Cronbach's Alpha (α) values were found to be 0.910 for the Cognitive Investment subdimension, 0.973 for the Emotional Investment subdimension, and 0.966 for the total scale.

3. Counterfeit club product purchase intention scale

In this study, the Counterfeit Club Product Purchase Intention Scale (CCPPIS), adapted into Turkish by Avcı (2024) based on the studies of Liu and Shi (2019) and Khan et al. (2023), was used. The scale consists of 3 items and a single dimension. The Cronbach's Alpha (α) reliability coefficient for the original adaptation was 0.836.

Based on the data obtained in this study, the Cronbach's Alpha (α) reliability coefficient was calculated as 0.947, indicating a high level of internal consistency.

Data Collection Process

The study was conducted in accordance with the approval granted by the "Atatürk University Faculty of Sports Sciences Ethics Committee" (Approval No: E-70400699-050.02.04-2500272761, Decision No: 172, Date: August 21, 2025). The data collection process was carried out between September 29 and October 3, 2025. During this process, participants were reached through the snowball sampling method employed in the sampling stage.

In the first phase, questionnaire forms were administered to students in the classroom environment, and participants were informed that the collected data would be used anonymously and solely for scientific purposes. Students were

then asked to share the questionnaire with their friends and family members who met the research criteria, thereby allowing the sample to expand progressively.

Prior to participation, all respondents were clearly informed about the purpose, scope, and confidentiality principles of the study. They were assured that no personal information would be recorded, that their responses would be analyzed only for scientific purposes, and that they could withdraw from the study at any time. Participants who read and approved the information statement completed the data collection tools on a voluntary basis.

During data collection, sufficient time was provided for participants to complete the questionnaires. The researcher did not intervene in the process to avoid influencing responses and only provided technical assistance when necessary. To minimize common method bias, anonymity and confidentiality were emphasized, the order of scale items was randomized, and the application environment was arranged to avoid distractions.

Moreover, to reduce the potential impact of common method variance, several procedural remedies were implemented during the data collection process. Participants were assured that there were no right or wrong answers, and the predictor and outcome variables were presented in separate sections of the questionnaire to reduce respondents' ability to infer hypothesized relationships. These procedural steps were intended to mitigate bias associated with self-reported, single-source data.

In addition, Harman's single-factor test was conducted during the analysis phase. The results showed that the variance explained by a single factor was 34.2%, which is below the 50% threshold, indicating that common method bias was not a significant issue in this study.

Statistical Analysis

Before proceeding with the analyses, the data set was examined to determine whether it met the assumptions of parametric tests. Accordingly, to evaluate the assumption of normality, skewness and kurtosis values, as well as Q-Q (Quantile–Quantile) plots, were utilized.

For the Emotional Commitment to the Sports Team (Fanaticism) Scale, the skewness value was -0.459 and the kurtosis value was -1.050; for the Counterfeit Club Product Purchase Intention Scale, the skewness value was

0.138 and the kurtosis value was -1.251. Since these values fall within the acceptable range of ±1.5, and the Q–Q plots indicated that the data were distributed close to the theoretical diagonal line (George & Mallery, 2010; Tabachnick & Fidell, 2013), it was concluded that the data exhibited an approximately normal distribution. Therefore, it was deemed appropriate to use parametric statistical methods in the analysis process.

In the study, fanaticism was treated as the independent variable, counterfeit club product purchase intention as the dependent variable, and perceived income level as the moderating variable. In this context, perceived income level was categorized into two groups: "low" and "high".

To test the moderating effect among the variables, PROCESS Macro (Model 1) developed by Hayes (2018) was employed. Within this model, it was examined whether the effect of fanaticism on counterfeit club product purchase intention differed according to individuals' perceived income levels. The model simultaneously assessed both the direct effect of fanaticism on the dependent variable and the moderating effect of perceived income level on this relationship.

In the moderation analysis conducted using Hayes' PROCESS Macro (Model 1), predictor and moderator variables were automatically mean-centered by the macro prior to computing the interaction term. Analyses were conducted using the bootstrap method with 5000 resamples, and results were interpreted based on a 95% confidence interval (CI = 0.95).

Findings

Table 2. Descriptive statistics and correlation coefficient between ECSTS and CCPPIS

Variables	M	SD	1	2
1. ECSTS	4.65	1.98	-	
2. CCPPIS	2.64	1.26	-0.371***	-

Note: ***p< 0.001, ECSTS: Emotional Commitment to the Sports Team Scale, CCPPIS: Counterfeit Club Product Purchase Intention Scale

Table 2 presents the descriptive statistics and correlation coefficient between Emotional Commitment to the Sports Team (ECSTS) and Counterfeit Club Product Purchase Intention (CCPPIS). As shown in the table, there is a significant negative correlation between ECSTS and CCPPIS ($r = –.371$, $p < .001$). According to Cohen's (1988) conventional benchmarks for effect size

(small ≈ .10, medium ≈ .30, large ≈ .50), this correlation represents a moderate effect size, indicating a meaningful association between the two variables. This finding indicates that as individuals' emotional commitment to their sports team increases, their intention to purchase counterfeit club products decreases. In other words, stronger fan attachment is associated with a lower tendency toward counterfeit consumption behavior.

Table 3. Moderation analysis results for the effect of emotional commitment to the sports team on counterfeit club product purchase intention by perceived income level

Independent Variables	***b***	**SE**	**t**	**p**	**LLCI**	**ULCI**
Constant	2.636	0.045	57.731	**0.000*** **	2.546	2.726
ECSTS	-0.178	0.023	-7.750	**0.000*** **	-0.224	-0.133
PIL	-1.365	0.093	-14.542	**0.000*** **	-1.550	-1.181
Interaction (ECSTS × PIL)	0.028	0.047	.606	0.544	-0.064	0.121
Model Summary	**R**	**R^2**	**F**	**df1**	**df2**	**p**
	0.639	0.408	106.583	3	463	**0.000*** **
	ECSTS × PIL	**ΔR^2**	**F**	**df1**	**df2**	**p**
		0.0005	.367	1	463	0.544

Dependent Variable: CCPPIS

Note: ***p< 0.001, ECSTS: Emotional Commitment to the Sports Team Scale, CCPPIS: Counterfeit Club Product Purchase Intention Scale, PIL: Perceived Income Level

Table 3 presents the results of the moderation analysis conducted to examine the effect of Emotional Commitment to the Sports Team (ECSTS) on Counterfeit Club Product Purchase Intention (CCPPIS), with Perceived Income Level (PIL) as a moderating variable.

As shown in the Table 3, the overall model was found to be statistically significant ($F(3, 463) = 106.583$, $p < 0.001$), explaining approximately 40.8% ($R^2 = 0.408$) of the variance in counterfeit club product purchase intention. Emotional commitment to the sports team ($b = –0.178$, $p < 0.001$) and perceived income level ($b = –1.365$, $p < 0.001$) had significant negative effects on purchase intention. However, the interaction term between emotional commitment and perceived income level ($b = 0.028$, $p = 0.544$) was not statistically significant. This indicates that perceived income level did not moderate the relationship between emotional commitment to the sports team and counterfeit club product purchase intention.

In summary, Table 3 demonstrates that emotional commitment to the sports team and perceived income level are significant predictors of counterfeit club product purchase intention; however, the moderating role of perceived income level was not supported.

Table 4. Predicted values of CCPPIS by ECSTS levels at low PIL

ECSTS Level	PIL	Predicted CCPPIS
Low ECSTS (-2.5050)	Low Income (-0.3897)	3.6443
Moderate ECSTS (0.3521)	Low Income (-0.3897)	3.1016
High ECSTS (2.3521)	Low Income (-0.3897)	2.7218

Note: ECSTS: Emotional Commitment to the Sports Team Scale, CCPPIS: Counterfeit Club Product Purchase Intention Scale, PIL: Perceived Income Level

Table 4 presents the predicted values of counterfeit club product purchase intention (CCPPIS) across different levels of emotional commitment to the sports team (ECSTS) for individuals with low perceived income levels. The values are provided to illustrate the pattern of the relationship between ECSTS and CCPPIS within this income group. Given that the interaction term between emotional commitment and perceived income level was not statistically significant, these predicted values are reported for descriptive purposes only and should not be interpreted as evidence of differential or conditional effects.

Table 5. Predicted values of CCPPIS by ECSTS levels at high PIL

ECSTS Level	Perceived Income Level	Predicted CCPPIS
Low ECSTS (-2.5050)	High Income (0.6103)	2.2066
Moderate ECSTS (0.3521)	High Income (0.6103)	1.7459
High ECSTS (2.3521)	High Income (0.6103)	1.4235

Note: ECSTS: Emotional Commitment to the Sports Team Scale, CCPPIS: Counterfeit Club Product Purchase Intention Scale

Table 5 presents the predicted values of Counterfeit Club Product Purchase Intention (CCPPIS) across different levels of Emotional Commitment to the Sports Team (ECSTS) for individuals with high perceived income levels. These values are reported to descriptively illustrate the pattern of predicted CCPPIS scores across ECSTS levels within the high-income group. Given that the interaction term between emotional commitment and perceived income level was not statistically significant, the predicted values in Table 5 are presented for exploratory and illustrative purposes only. Accordingly, they should not be interpreted as evidence of meaningful simple slopes or differential effects across income levels.

Following Tables 4 and 5, an interaction plot was generated solely to visually summarize the overall pattern observed in the data. Consistent with the non-significant interaction effect, the figure is not interpreted as indicating conditional relationships but is provided to aid descriptive understanding of the model results.

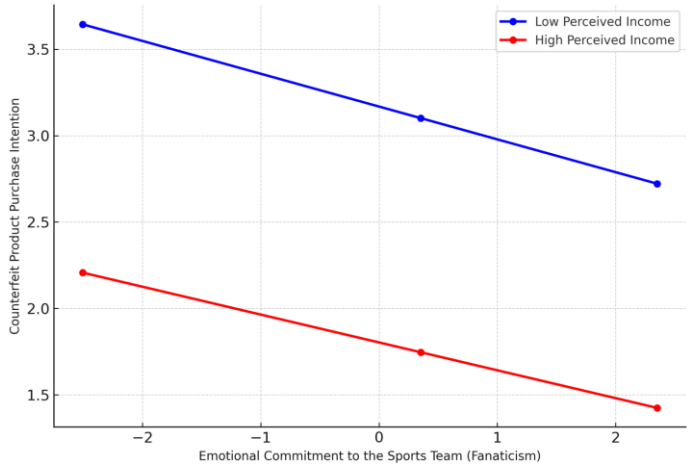


Fig 2. Interaction effect of emotional commitment to the sports team and perceived income level on counterfeit product purchase intention

Figure 2 illustrates the interaction between emotional commitment to the sports team and perceived income level on counterfeit product purchase intention. The figure shows that counterfeit purchase intention decreases as emotional commitment increases across both income groups. Consistent with the non-significant interaction term, the slopes appear largely parallel, indicating that perceived income level does not meaningfully condition the relationship between emotional commitment and counterfeit product purchase intention. Accordingly, the figure is presented for descriptive visualization of the model results only and should not be interpreted as evidence of differential or conditional effects across income levels.

Discussion

This study found that emotional commitment to the sports team (ECSTS) is negatively associated with counterfeit club product purchase intention (CCPPIS), whereas the interaction with perceived income level (PIL) was not significant. Accordingly, H1 was supported, indicating that higher levels of emotional commitment to the sports team are associated with lower intentions to purchase counterfeit club merchandise. Conversely, H2 was not supported, as perceived income level did not significantly moderate this relationship.

The negative main effect aligns with sport consumer behavior work showing that stronger fan attachment and identification tend to promote pro-team consumption and reduce behaviors incongruent with team norms, such as supporting illicit markets that harm the club's brand equity (Chiu et al., 2014). Previous research has consistently shown that fans with stronger team identification or emotional attachment are more inclined to purchase officially licensed merchandise, largely because such attachment enhances perceived value and other positive evaluations of authentic products (Kwon et al., 2007; Kwon & Kwak, 2014; Lee & Trail, 2011). Building on this evidence, recent meta-analytic findings further indicate that strong fan attachment not only promotes pro-team consumption but may also discourage counterfeit purchasing by evoking perceptions of moral or identity misalignment and reduced symbolic value (Kwon et al., 2022).

Specifically, Kwon et al. (2007) demonstrated that perceived value mediates the effect of team identification on licensed purchase intentions; later replications further emphasized that identification per se is not always sufficient unless translated into value perceptions and attitudes. In our context, higher ECSTS may reduce counterfeit purchase intention because counterfeits undermine perceived value-in-use and value-in-identity (e.g., signaling, authenticity, collective identity), consistent with broader sport and sponsorship literature on fan-based value creation (Shapiro et al., 2019). In parallel, recent research shows that sport-related identification improves downstream intentions in varied contexts (e.g., social media/influencer settings), reinforcing the general pathway from identification/attachment to favorable consumption intentions and away from behaviors at odds with team affiliation (Lee, 2021).

Regarding counterfeits, extensive consumer research indicates that purchase intentions are often driven by social-adjustive motives (fitting in, status signaling) and cost–value trade-offs, even when quality considerations are secondary (Singh et al., 2022; Wilcox et al., 2009). In TPB-based studies across markets, counterfeit purchase intention is shaped by attitudes, norms, and perceived control, frequently moderated by income or affordability perceptions (Ting et al., 2016). Evidence from emerging markets also reveals income-related patterns in counterfeit demand, with some studies showing that higher income reduces counterfeit propensity, while others suggest that this relationship varies depending on factors such as product category and the

salience of ethical considerations (Gani et al., 2019).

Against that backdrop, our non-significant moderation by PIL is informative. One plausible explanation is that ECSTS exerts a robust, value- and identity-laden constraint that operates across income strata, thereby attenuating the role of income as a boundary condition. When fan attachment is strong, brand-protective norms and moral/identity consistency may dominate affordability considerations-consistent with evidence that attachment/identification can outweigh purely economic drivers in sport consumption (Kwon et al., 2007). Methodologically, two additional factors could also dampen moderation detection: (a) dichotomization of perceived income, which reduces variance and power to detect interactions; and (b) a student-heavy, young sample, where between-group income dispersion is narrower and counterfeit attitudes may be more normatively bounded. These considerations mirror reports that moderation by income on counterfeit-related attitudes is sample- and context-sensitive (Gani et al., 2019; Harun et al., 2020).

In summary, the findings support H1 but not H2, reinforcing that emotional commitment to the sports team is associated with lower counterfeit purchase intention. Given the non-significant interaction effect, this relationship should be interpreted as a general main effect rather than as differing across income groups. The results align with prior research emphasizing that strong emotional bonds with a team heighten the perceived inconsistency between genuine team support and participation in counterfeit markets that undermine club revenues and shared fan identity. This heightened moral and identity-based incongruence likely diminishes counterfeit purchase intentions, consistent with identity-signaling perspectives on consumer behavior (Wang et al., 2019; Chen et al., 2018).

Conclusions

In sum, stronger emotional commitment to one's team is associated with lower intention to purchase counterfeit club products, and this association reflects a stable main effect rather than income-contingent differences in our sample. The results reinforce the centrality of fan attachment and value-based mechanisms in shaping pro-club purchase behavior and in deterring counterfeit demand, offering clear guidance for club merchandising and anti-counterfeit strategies.

Limitations and future research

This study used self-reported measures and a cross-sectional correlational research design, which limits the ability to draw causal inferences about the relationships among variables. Accordingly, the findings should be interpreted as associative rather than causal. In addition, the sample was obtained using snowball sampling and recruitment through students, which may introduce selection bias and limit the representativeness of the research group. As a result, the generalizability of the findings beyond the studied context should be interpreted with caution.

Furthermore, perceived income level was operationalized as a dichotomous variable, which may have reduced variance and statistical power to detect moderation effects; this methodological choice should therefore be considered when interpreting the non-significant interaction results.

Future research should employ longitudinal and experimental research designs to enable causal inference and to more rigorously test the underlying mechanisms, such as perceived value and moral norms, that may mediate the relationship between emotional commitment to the sports team (ECSTS) and counterfeit club product purchase intention (CCPPIS). Furthermore, future studies may enable causal inferences by employing longitudinal and experimental research designs, and through such approaches, cross-market replications can be conducted to examine category-specific effects (e.g., apparel versus accessories), as well as the roles of ethical salience and public versus private consumption contexts in shaping counterfeit purchase intentions.

Practical implications

For clubs and rightsholders, the findings point to three main priorities. First, programs that strengthen emotional attachment, such as membership systems, community events, and behind-the-scenes content that help fans feel closer to the team, should be developed. These initiatives help fans identify more strongly with their team and increase their willingness to purchase licensed products. Second, the identity cost of buying counterfeits, including reduced support for the team or a loss of symbolic value, should be clearly communicated. This can help shift purchase decisions from being purely price-based to being grounded in identity and value. Finally, since income level did not make a meaningful difference, anti-counterfeit messages should be

delivered similarly across all income groups, emphasizing belonging and authenticity rather than purely economic deterrents.

Author contributions

All authors contributed equally to the manuscript's conceptualization, editing, and finalization and are worthy of their inclusion as authors. The aspects of the study handled by each author are given below: G.A[1].: conceptualized the overall study scope, design; G.A[2].: prepared methodology and conducted the analyses and extracted the results. All authors participated in drafting the manuscript and endorsed the final version.

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Ethnical statement

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Sub-Ethics Committee of Atatürk University Faculty of Sports Sciences (Date: 21.08.2025/No. 172).

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