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Mapping Key Concepts and Thematic Development in Sport Management: A Scientometric Perspective

Mohammad Ali Sahebkaran*[1], Fatemeh Taherinasab[2], Mahmood Sangari[3]

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Abstract

Purpose: This study provides a scientometric overview of Sport Management research, with particular emphasis on the thematic structure and keyword dynamics of the field.

Methodology: A keyword-based strategy was employed for data collection using the terms "sport management" and "sports management" within the titles or keywords of publications. A total of 5,743 English-language articles were retrieved from the Scopus database. Following data cleaning and normalization, the dataset was analyzed using advanced scientometric tools. The study examines the overall scientometric profile of the field, including temporal trends, citation patterns, and domain distribution, as well as thematic development within sport management literature. VOSviewer and the Bibliometrix R package were used to perform keyword analysis, co-occurrence mapping, and thematic clustering.

Findings: The results identify eight major thematic domains within sport management research: Organizational Strategy and Technological Integration; Athlete Health and Injury Management; Athlete Performance and Sport Psychology; Governance, Safety, and Health Policy; Sustainable Sport Event Management; Social Equity and Inclusion in Sport; Sport Tourism and Environmental Sustainability; and Participant Motivation and Volunteerism. Several of these domains exhibit notable thematic overlap, reflecting the interdisciplinary nature of the field.

Conclusion: The findings indicate a gradual shift in sport management research from traditional foundational themes toward technology-oriented topics, including the use of big data and machine learning in sport management contexts.

Value: These findings provide insights for future research while expanding the understanding of sport management. By offering an evidence-based overview of thematic developments, the study provides academics, practitioners, and policymakers with a foundation to guide future developments and strategic decision-making.

Keywords: ***Sport Management, Sports Management, Scientometric Analysis, Thematic Evolution, Keyword Trends, Concept Mapping***

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Extended Abstract

Introduction: The field of sport management has experienced substantial disciplinary growth in recent years (Funk, 2019), evolving from a predominantly practice-oriented domain into a multifaceted academic discipline. This transformation is also reflected in ongoing theoretical discussions within the field, such as the distinction between *sport management* and the *management of sport* (Lachance et al., 2024). As a consequence of this rapid expansion, it has become increasingly difficult to clearly identify the current structure of this dynamic research area and the factors influencing its development (Hammerschmidt, 2024). Understanding the evolution of such disciplines requires systematic analytical approaches, including bibliometric and scientometric methods.

Scientometric methodologies provide a structured framework for mapping the intellectual landscape of evolving research fields. As defined by Weingart (2015), scientometrics refers to the quantitative analysis and study of patterns in scholarly activity. These analyses can be conducted at multiple levels—individual, institutional, or national—each offering insights into the dynamics of knowledge production and dissemination (Sooryamoorthy, 2020).

Scientometric investigations focusing on sport management literature have emerged relatively recently, with most comprehensive studies appearing within the past decade. Existing research in this area has often examined relatively narrow temporal windows or focused on patterns within specific journals (Ciomaga, 2013). Other studies have primarily emphasized bibliometric indicators such as publication productivity and citation impact (Elahi et al., 2019; Gholampour et al., 2019).

Purpose: The present study addresses existing limitations in the literature by examining the intellectual and thematic structure of sport management research through six interconnected research questions:

1. What are the most frequently occurring keywords within the field of sport management research?
2. What relationships exist among author-indexed keywords within the network of keyword co-occurrence?
3. How have thematic priorities within sport management research evolved over time, and what patterns of thematic emergence or decline can be identified?
4. Which thematic domains demonstrate the highest scholarly impact based on citation metrics, and how does this distribution of impact distinguish core from peripheral knowledge areas within the field?
5. What thematic domains emerge from the co-occurrence network of author-indexed keywords, and what core themes characterize each domain?
6. How are the most prominent themes distributed across the broader landscape of Sport Management research?

Methodology: This study adopts a keyword-based scientometric approach to analyze the knowledge structure and keyword relationships within sport management research. A longitudinal research design was employed, covering the period from 1948 to 2024. The Scopus database was selected as the primary data source due to its extensive coverage of scholarly publications in the field.

Data extraction was conducted on July 1, 2025, using a systematic keyword-based search strategy consistent with established scientometric procedures. The search was performed using the terms “sport management” and “sports management” within the titles or author-indexed keywords of documents. A temporal

filter was applied to include all publications up to the end of 2024. The search was further limited to English-language publications, scientific articles, and sources categorized as academic journals.

Following data extraction, a preprocessing protocol was implemented to enhance dataset validity and address potential inconsistencies. This process involved cross-referencing records, removing duplicate entries, correcting data inconsistencies, and standardizing keywords. Subsequently, VOSviewer and the Bibliometrix R package were employed as the primary scientometric software tools for data analysis and visualization.

Findings: The results reveal distinct temporal patterns in keyword development within sport management research. Earlier periods of the literature are characterized by keywords such as "recreation," "physical fitness and sport," "sport fishing," "human resource management," "fisheries management," and "policy," reflecting foundational areas of inquiry in the field.

Keywords associated with a moderately developed period include terms such as "sport," "risk management," "sport marketing," "concussion," and "management." In contrast, more recent and emerging research themes—represented by yellow clusters in the visualization—include keywords such as "sustainable development," "team sport," "pain management," "sustainability," "machine learning," "big data," and "COVID-19," indicating the increasing influence of technological innovation and sustainability-oriented perspectives in sport management research.

Additionally, several influential keywords—including "sport management," "sport marketing," "machine learning," "sustainable development," and "load management"—demonstrate strong network connections within the dataset. Keywords represented by light pink to orange hues correspond to themes with moderate citation impact, typically averaging between 20 and 30 citations. These include terms such as "education," "tourism," "physical activity," "health," and "policy." Finally, the most prominent themes—highlighted in bright yellow—include keywords such as "youth," "physical fitness and sport," and "scale development," which represent highly visible and influential areas within the dataset.

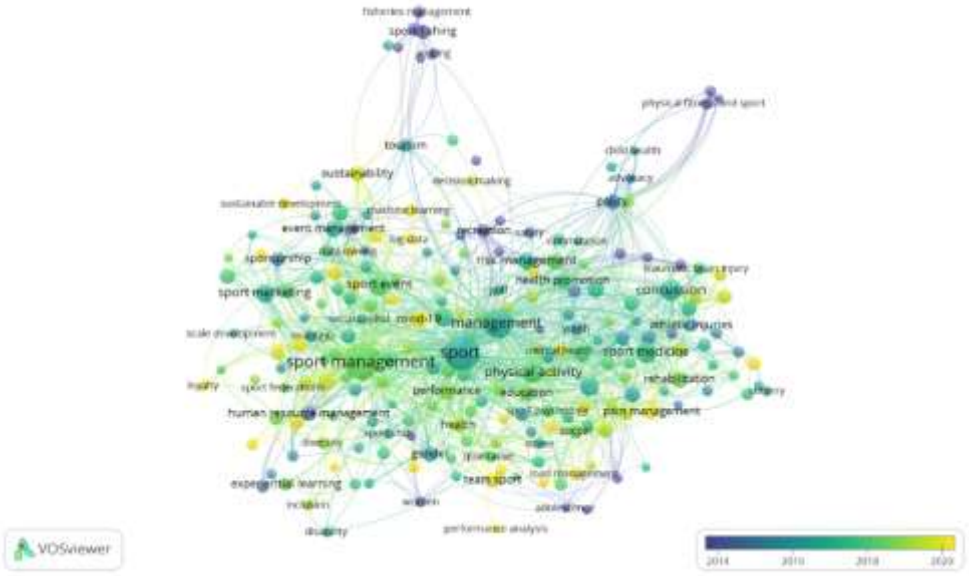

Figure 1. Average Publication per Year

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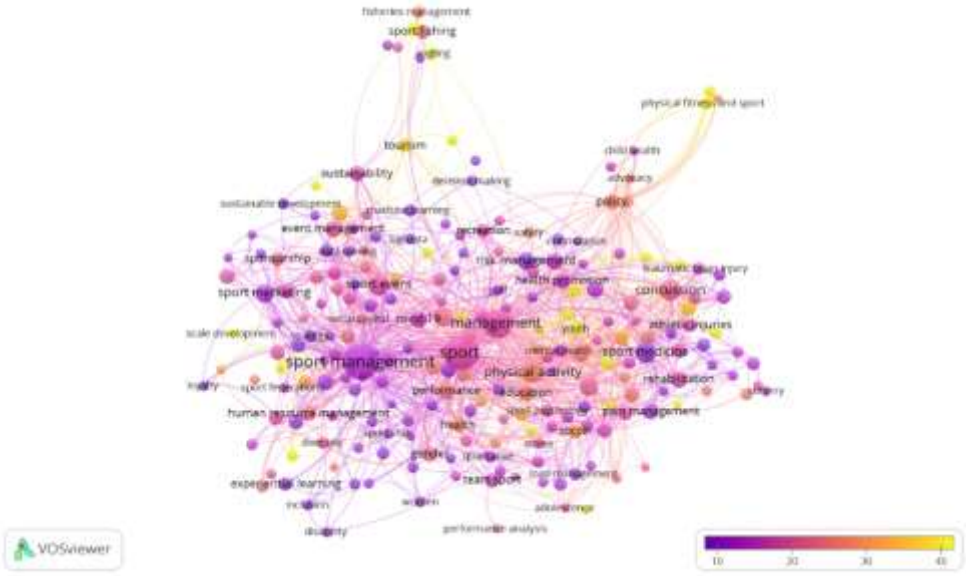

Figure 2. Average Citation of Keywords

Conclusion: The temporal analysis illustrates the chronological development of thematic trends within the sport management literature. A closer examination of the temporal map indicates a clear shift from foundational concepts toward technology-oriented and sustainability-focused themes. The transition from earlier emphases on topics such as "recreational fishing," "physical fitness and sport," "fisheries management," and "policy" to more recent themes including "sustainable development," "sustainability," and "machine learning" reflects broader sociocultural transformations and advances in technology that have reshaped the field.

Citation analysis further reveals notable variation across thematic domains. Medical- and health-oriented keywords demonstrate higher average citation counts compared to organizational and managerial terms. These differences likely stem from structural characteristics of publication and citation practices, as biomedical and physical science fields typically generate higher citation volumes than social science disciplines. Keywords with above-average citation impact—such as "physical fitness and sport," "tourism," and "policy"—appear to function as conceptual bridges, linking specialized research clusters to more foundational and widely recognized themes within the field. In contrast, emerging topics such as "big data" and "machine learning" have not yet accumulated high citation counts, largely due to citation time-lag effects. Nevertheless, given their growing prominence and centrality within the keyword network, these themes are likely to become highly cited and influential areas of inquiry in the near future.

Value: These findings provide valuable insights for future research while enhancing the overall understanding of the sport management field. By offering an evidence-based overview of thematic developments and research trends, the study equips academics, practitioners, and policymakers with a clearer foundation to inform future research directions, policy formulation, and strategic decision-making within the discipline.

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Abstract

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Methodology: A keyword-based approach was used for data collection, employing the terms "sport management" and "sports management" within the titles or author-indexed keywords of publications. A total of 5,743 English-language articles were retrieved from the Scopus database. Following data normalization and preprocessing, the dataset was analyzed using comprehensive scientometric tools. The study examines the overall scientometric profile of the field, including temporal trends, citation patterns, and domain distribution, as well as thematic developments within sport management literature. VOSviewer and the Bibliometrix R package were utilized to perform keyword analysis, co-occurrence mapping, and thematic clustering.

Findings: The results identify eight primary thematic domains within sport management research: Organizational Strategy and Technological Integration; Athlete Health and Injury Management; Athlete Performance and Sport Psychology; Governance, Safety, and Health Policy; Sustainable Sport Event Management; Social Equity and Inclusion in Sport; Sport Tourism and Environmental Sustainability; and Participant Motivation and Volunteerism. Several of these domains demonstrate thematic overlap, reflecting the interdisciplinary nature of the field.

Conclusion: The findings indicate a shift in sport management research from traditional and foundational themes toward technology-oriented topics, particularly those related to big data and machine learning.

Value: These findings provide insights for future research while expanding the understanding of sport management. By offering an evidence-based overview of thematic developments, the study provides academics, practitioners, and policymakers with a foundation to guide future developments and strategic decision-making.

Keywords: ***Sport Management, Sports Management, Scientometric Analysis, Thematic Evolution, Keyword Trends, Concept Mapping***

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1. Introduction

The field of sport management has experienced substantial disciplinary growth in recent years (Funk, 2019), evolving from a primarily practice-oriented domain into a multifaceted academic discipline. This transformation is also reflected in theoretical discussions surrounding the field, particularly the distinction between *sport management* and the *management of sport* (Lachance et al., 2024). As the discipline has expanded, it has become increasingly difficult to clearly determine the current status of this dynamic research field and the factors influencing its development (Hammerschmidt, 2024). Understanding the evolution of such disciplines requires systematic analytical approaches, including bibliometric and scientometric methods. The application of scientometric methodologies offers a structured approach for mapping the intellectual landscape of evolving academic fields. Scientometrics, as defined by Weingart (2015), refers to the analysis and study of patterns in scholarly activity. Such analyses can be conducted at multiple levels—individual, institutional, or national—each providing insights into the dynamics of knowledge production and dissemination (Sooryamoorthy, 2020).

Scientometric studies addressing sport management literature have emerged relatively recently, with most comprehensive investigations appearing within the past decade.

Overall, existing scientometric and bibliometric studies in sport management have predominantly examined limited temporal windows (Elahi et al., 2019; Gholampour et al., 2019; Miller et al., 2025), journal-specific datasets (Ciomaga, 2013; Elahi et al., 2019; Gholampour et al., 2019; Miller et al. 2025; Shilbury, 2011), productivity- and impact-focused indicators (Elahi et al., 2019; Gholampour et al., 2019; Shilbury, 2011), or a niche subdiscpline of sport management (Varea-Calero et al., 2025). Although these studies offer useful insights, they provide limited understanding of the comprehensive conceptual structure and thematic evolution that characterize the intellectual development of the field. Even the more extensive analysis by Lis and Tomanek (2020) was constrained by a relatively modest dataset (n = 1,979) and did not fully explore temporal dynamics or thematic clustering patterns. Similarly, the study by Varea-Calero et al. (2025), despite its longitudinal scope, analyzed a relatively small dataset (n = 851) and focused on a single thematic area within sport management. These methodological limitations highlight the need for a broader and more comprehensive scientometric investigation that incorporates multiple analytical dimensions across a substantially larger corpus of publications.

In light of the existing limitations within the literature of sport management scientometrics, the present study employs advanced scientometric techniques to analyze sport management publications spanning from the early development of the field through 2024. To achieve this objective, the study addresses the following six research questions:

1. What are the most frequently occurring keywords within the field of sport management research?
2. What relationships exist among author- indexed keywords within the network of keyword co- occurrence?
3. How have thematic priorities within sport management research evolved over time, and what patterns of thematic emergence or decline can be identified?

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4. Which thematic domains demonstrate the highest scholarly impact based on citation metrics, and how does this distribution distinguish core from peripheral knowledge areas within the field?
5. What thematic domains emerge from the co- occurrence network of author- indexed keywords, and what core themes characterize each domain?
6. How are the most prominent themes distributed across the broader landscape of sport management research?

By addressing these questions, the present study seeks to provide a comprehensive representation of the intellectual structure of sport management research. This mapping contributes to the field in three principal ways. First, it facilitates the identification of established research areas alongside emerging themes, thereby supporting future scholarly inquiry. Second, it highlights interdisciplinary connections between sport management and related academic domains. Third, it provides an empirical foundation for critical reflection on potential gaps, biases, and imbalances within the current research landscape, encouraging a more inclusive and comprehensive development of the discipline.

The findings of this analysis have important implications for researchers, academic program developers, and journal editors seeking to understand the historical development and contemporary configuration of sport management as a field of scholarly inquiry. Moreover, by systematically identifying thematic clusters and their interrelationships, the study offers practitioners and policymakers a structured understanding of the knowledge domains most relevant to evidence-based decision-making in sport organizations and governance frameworks.

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2. Literature Review

Scientometrics as a terminology and a discipline has evolved immensely during the past decades. The origin of this field comes from the term "bibliometrics" coined by Pritchard (1969), which refers to "statistical bibliography". Scientometrics was later coined by Nalimov and Mulchenko (1969) for "the study of all aspects of the literature of science and technology" (Hood & Wilson, 2001, p. 293). Although they are used interchangbly, these terms are different in nature as scientometrics focuses on the literature of science, while bibliometrics, is not necessarly about science itself (Hood & Wilson, 2001). According to Cobo et al. (2011b), such studies vary depending on the unit of analysis, database, unit of data collection, among others. The major ways of collecting data include reterival of data from one or more journals as well as a single or multiple keywords, each one serving a goal, both of which have been conducted within the field of sport management.

Early analyses by scholars such as Shilbury (2011) and Ciomaga (2013) employed bibliometric methods to examine citation patterns and institutional networks. Shilbury (2011), for instance, conducted a bibliometric study of sport management and sport marketing journals, focusing primarily on indicators such as author productivity and citation frequency. Similarly, Ciomaga (2013) analyzed articles from three sport management journals published between 1987 and 2010, employing co-citation analysis to identify intellectual clusters.

Subsequent studies expanded the use of bibliometric approaches but continued to focus on relatively narrow publication scopes. Gholampour et al. (2019), for example, conducted a comprehensive bibliometric analysis of the *Sport*

Management Review journal covering the period from 2011 to 2018. Their study examined various indicators, including prolific authors, contributing countries and institutions, publication trends, and keyword co-occurrence patterns. Similarly, Elahi et al. (2019) analyzed articles published in the *Journal of Applied Research in Sport Management* between 2012 and 2018 using Excel and NodeXL. Their study provided a detailed bibliometric assessment, including publication and citation trends, gender distribution among authors, subject area classification, co-authorship networks, and author productivity. However, the analysis was based on a relatively small dataset of 279 articles. Lis and Tomanek (2020) expanded the scope by examining 1,979 Scopus-indexed articles using VOSviewer to identify key research areas within sport management.

More recently, Miller et al. (2025) conducted a content analysis of the *Sport Management Education Journal* spanning the period from 2007 to 2023. The study analyzed 185 documents and found a higher representation of female authors, with women accounting for 54.1% of first authors and 48.8% of all authors. Another recent investigation by Varea-Calero et al. (2025) adopted a keyword-based bibliometric approach to examine the topic of sport sponsorship over a thirty-year period (1993–2024) using the Web of Science database. After applying inclusion and exclusion criteria, the dataset consisted of 851 documents. The findings revealed an annual growth rate of 12.69% in sport sponsorship research and highlighted key thematic areas such as governmental regulation, corporate social responsibility (CSR), and consumer behavior. The study also identified a notable increase in international collaboration, with 30.2% of publications involving authors from multiple countries.

Exploring the literature points to the need for an extensive scientometric analysis from two main prespectives. A study that covers the majority of the data published within sport management, using performance analysis in combination to science mapping, to provide a holistic view of the field and uncover the hidden evolutionary patterns of topics, ideas, and scholarly focus. The subsequent methodology is designed to achieve this goal.

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3. Methodology:

3.1. Research Design

This study employs a keyword-based scientometric approach to examine the knowledge structure and keyword relationships within sport management research. A keyword-based strategy was deliberately selected instead of a journal-based approach in order to capture the full thematic breadth of the field. Although journal-focused analyses provide valuable insights, they often limit the scope of investigation by restricting the dataset to a small number of outlets. For an evolving and interdisciplinary field such as sport management—one that frequently draws upon concepts and methods from adjacent disciplines—a keyword-based search within a comprehensive database such as Scopus provides a more inclusive and representative overview of the literature. This approach enables the identification of emerging themes and interdisciplinary topics that are increasingly integrated into sport management scholarship, which aligns with the central objectives of the present study.

The investigation adopts a longitudinal research design covering the period from 1948 to 2024. Scopus was selected as the primary data source due to its extensive coverage of peer-reviewed academic publications and its suitability for bibliometric and scientometric analyses. Data extraction was conducted on July 1,

2025, using a systematic keyword-based search procedure consistent with established scientometric practices.

The search strategy targeted the terms “sport management” and “sports management” within document titles (TITLE) and author-indexed keywords (KEY). A temporal filter (PUBYEAR) was applied to include all publications up to the end of 2024. To maintain semantic consistency in the keyword analysis, the dataset was limited to English-language publications (LANGUAGE = English). In addition, only peer-reviewed scientific articles were included, while conference proceedings, book chapters, and other document types were excluded to minimize methodological inconsistencies. The source type (SRCTYPE) was further restricted to scientific journals.

The following search query was used to retrieve the dataset from Scopus:

TITLE (Sport AND Management) OR KEY (Sport AND Management) OR TITLE (Sports AND Management) OR KEY (Sports AND Management) AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE,"ar")) AND (LIMIT-TO (LANGUAGE,"English")) AND (LIMIT-TO (SRCTYPE,"j"))

The search produced an initial corpus of 5,744 English-language articles published in peer-reviewed scientific journals. The retrieved records were exported in CSV format to ensure compatibility with scientometric analysis software.

3.2. Data Pre-processing and standardization

Following data extraction, a pre-processing protocol was implemented to enhance the validity of the dataset and eliminate potential inconsistencies. The dataset underwent three sequential standardization procedures.

First, publication information was cross-referenced with journal metadata to identify and correct potential discrepancies. During this stage, any inconsistencies or missing information related to authors, publication year, keywords, and other bibliographic elements were reviewed and corrected where possible.

Second, a two-stage verification procedure was conducted to identify and remove duplicate records within the dataset. The initial stage involved exact bibliographic matching based on identifiers such as links, Digital Object Identifiers (DOIs), and article titles. This was followed by a manual verification process to confirm and eliminate any remaining potential duplicates. This pre-processing stage resulted in a refined dataset consisting of 5,743 unique English-language articles. All pre-processing procedures were systematically documented to ensure methodological transparency and validity.

Third, due to variation in indexing practices across journals and databases, many author-indexed keywords appeared in multiple forms. To ensure the validity of the thematic and co-occurrence analyses, these keyword variants were standardized and consolidated into unified forms. This process began with the extraction of all keywords using the Bibliometrix R package, followed by a detailed review of the resulting list. In total, 11,675 author-indexed keywords were examined for inconsistencies. Standardization was conducted in three stages: (1) Harmonizing singular and plural forms of keywords; (2) Resolving hyphenation inconsistencies (e.g., hyphenated vs. non-hyphenated forms); (3) Aligning acronyms with their corresponding full forms to avoid duplicated conceptual representations. Examples of this process include standardizing “sports management” to “sport management” and replacing “sports” with “sport” where appropriate.

Finally, all scientometric analyses were performed on the fully standardized dataset, ensuring the creation of valid and reliable keyword co-occurrence networks

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and thematic maps that accurately reflect the knowledge structure of the sport management field.

3.3. Analytical Procedure

The investigation employed VOSviewer (version 1.6.18) as the primary software tool due to its robustness in co-occurrence network analysis, density visualization, and temporal mapping (van Eck & Waltman, 2010). In addition, the Bibliometrix R package (version 4.0) was used to conduct the general scientometric profiling, keyword analysis, and thematic mapping of the dataset (Aria & Cuccurullo, 2017).

In line with the objectives of the study, the results were organized into five analytical sections. First, general scientometric indicators of the dataset were examined to provide a comprehensive overview of the development of sport management research. Second, the frequency of author-indexed keywords was analyzed to identify the dominant knowledge areas and conceptual focuses within the literature. Third, a keyword co-occurrence network was constructed based on the simultaneous appearance of keyword pairs within individual documents. For the development of the network, the full counting method was applied to author-indexed keywords, with a minimum occurrence threshold set at 10. The association strength normalization method was used to generate the network, ensuring that the strength of relationships between keywords was appropriately standardized. These procedures enabled the identification of major thematic clusters and the structural relationships among key concepts within the sport management research landscape.

It is important to note that the minimum occurrence threshold of 10 was not selected arbitrarily. Rather, it was empirically determined through a sensitivity analysis designed to optimize network resolution while preserving sufficient keyword density for meaningful pattern detection (Perianes-Rodriguez et al., 2016). This approach ensured that the resulting networks were neither overly fragmented nor dominated by excessively generic terms. VOSviewer's overlay visualization function was also utilized to examine temporal and citation patterns within the co-occurrence network. This feature enables scholars to project the original keyword map onto two dimensions: (1) average publication year, which highlights the chronological evolution of concepts, and (2) average citation impact, which reveals influential or high-visibility research areas. Both temporal and citation overlays were generated using the same network construction parameters described above. Finally, Figure 1 was developed to provide a concise visual summary of the methodological workflow employed in this study, illustrating each step from data collection and preprocessing to network construction and advanced overlay analyses.

Finally, the strategic diagram (thematic map) of the field was generated using the Bibliometrix R package. This map illustrates the positioning of major research themes within the sport management literature and helps interpret the structural role of each theme in the field. The thematic map is based on two dimensions that form four quadrants, each representing a different level of development and relevance within the research landscape. The horizontal axis represents the degree of development (density), which measures a theme's internal coherence and conceptual maturity. The vertical axis represents the degree of relevance (centrality), indicating the importance of a theme and its level of interaction with other themes in the broader research network (Cobo et al., 2011a). The map was generated using the Louvain clustering algorithm, with the number of keywords set to 11,675 and a minimum cluster frequency threshold of

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10. These parameters were selected to allow the identification of the maximum number of meaningful themes distributed across the four quadrants while avoiding excessive proximity between clusters. Such proximity could lead to conceptual overlap and make the resulting themes difficult for readers to distinguish clearly.

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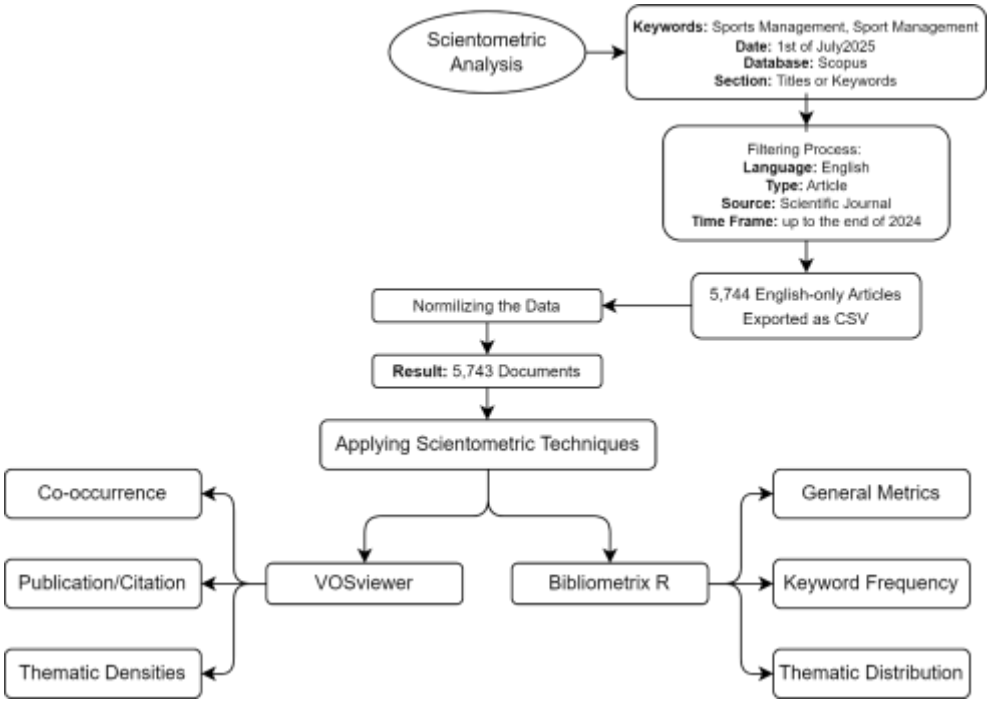

Figure 1. Methodology Process

4. Findings:

4.1. Keyword Analysis

As illustrated in Figure 2, the dataset comprises 11,675 author-indexed keywords generated by 16,709 authors over the period 1948–2024. In total, the study includes 1,920 distinct sources and 5,743 published documents, which collectively contain 199,999 cited references. Regarding authorship patterns, 975 documents were produced by single authors, whereas 4,768 publications involved at least one co-author. The average number of co-authors per document is 3.71, indicating that most publications are collaborative efforts involving approximately three to four contributors. This pattern reflects the increasingly collaborative nature of research in sport management. The average age of the articles is approximately 11 years, suggesting that a substantial proportion of the literature has been published since the early 2000s, consistent with the accelerated growth of the field during this period. International collaboration accounts for more than 17% of total publications, underscoring the progressive globalization of sport management research. Furthermore, the annual growth rate of the field is 8.58%, indicating a sustained and robust expansion of the sport management knowledge base and its scholarly output over time.

Figure 2. General Scientometric Metrics for the field of Sport Management

Table 1 presents the 20 most frequently occurring author-indexed keywords in the dataset. The results indicate that "sport management" is the most prevalent term, appearing 493 times. The second most frequent keyword is "sport," with 455 occurrences, followed by "management" with 262 mentions. "Concussion" and "physical activity" each appear 104 times. In sixth position is "sport medicine," recorded 96 times. Other high-frequency keywords in the upper half of the list include "sport event" (91), "football" (73), "athletes" (64), and "sport marketing" (63). The second half of the table contains terms such as "risk management" (61), "exercise" (60), "covid-19" (52), "education" (51), and "rehabilitation" (51). The remaining entries include "event management" (50), "sport tourism" (50), "public health" (45), "injury prevention" (44), and "performance" (44). Overall, the distribution of these high-frequency keywords suggests that the most prominent thematic areas in the sport management literature revolve around health-related topics, risk and event management, and various applied sport domains such as medical, tourism, and marketing subfields.

Table 1. Most Frequent Keywords

Keyword	Frequency	Keyword	Frequency
sport management	493	risk management	61
sport	455	exercise	60
management	262	covid-19	52
concussion	104	education	51
physical activity	104	rehabilitation	51
sport medicine	96	event management	50
sport event	91	sport tourism	50
football	73	Public health	45
athletes	64	injury prevention	44
sport marketing	63	performance	44

4.2. Co-occurrence Network

The keyword co-occurrence network for the dataset is presented in Figure 3, generated using the VOSviewer software package. This visualization serves as the foundational analytical model from which additional figures—such as temporal and citation overlays—are derived, enabling the identification of underlying patterns and conceptual structures within the sport management literature. Before interpreting the network, it is important to clarify several core concepts. Co-occurrence refers to the simultaneous appearance of two or more keywords within multiple documents. A co-occurrence network is composed of three main components:

• **Nodes** (depicted as circles), each representing a unique keyword.

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• **Links** (curved lines), which indicate the strength of co-occurrence between pairs of keywords.

• **Clusters** (groups of identically colored nodes), which represent thematic groupings formed based on keyword interconnections.

The network displayed in Figure 3 was generated using VOSviewer's default settings, with one modification: the minimum keyword occurrence threshold was set to 10 to ensure that only substantive and analytically meaningful terms were included. The size of each node corresponds to the frequency of the keyword—larger circles denote higher occurrence within the dataset. In total, the network consists of **220 keywords** distributed across **8 clusters**, each represented by a distinct color. This clustering approach effectively filters the dataset to emphasize central and thematically relevant keywords while excluding peripheral or rarely used terms. The color-coded clusters and their corresponding number of items are as follows: Red (51), Green (47), Dark blue (42), Yellow (23), Purple (23), Light blue (17), Orange (14), Brown (3). Together, these clusters provide an organized and interpretable representation of the thematic landscape of sport management research, highlighting the major conceptual domains present within the literature.

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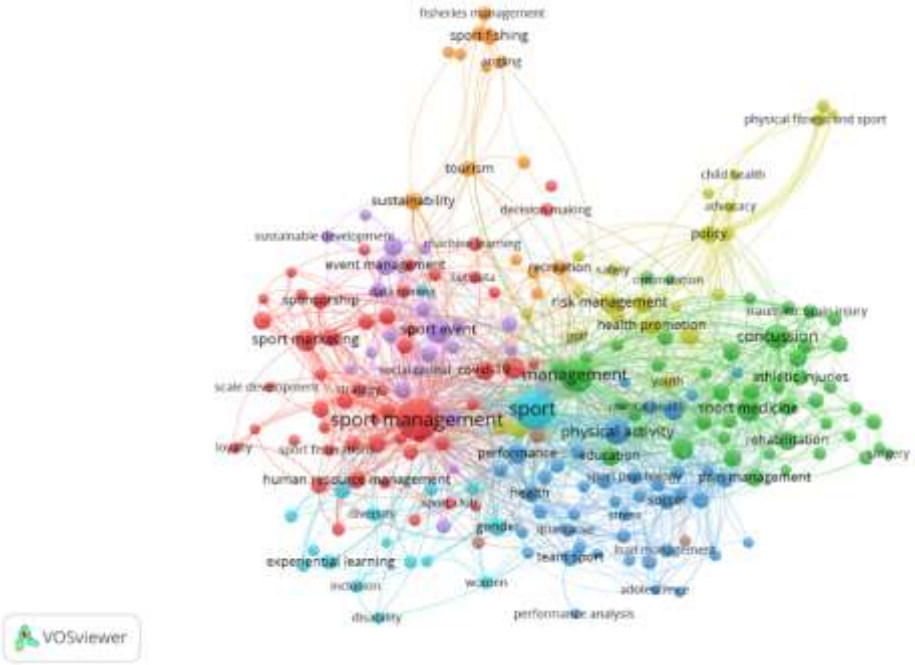

Figure 3. Co-occurrence Network

4.3. Temporal and Citation Analyses

Turning to the temporal distribution of author-indexed keywords, Figure 4 presents the average publication year of keywords within the co-occurrence network. This overlay visualization enables researchers to trace the intellectual evolution of sport management research from its early stages to 2024. The map is color-coded along a chronological spectrum: dark purple represents the oldest topics, dark to light green indicates moderately established themes, and yellow highlights the most recent and emerging areas.

The earlier phase of the field includes keywords such as "recreation," "physical fitness and sport," "sport fishing," "human resource management," "fisheries management," and "policy." These terms reflect foundational and administratively oriented research streams. Moderately established themes—shown

in green shades—include “sport,” “risk management,” “sport marketing,” “concussion,” and “management,” representing the consolidation and diversification of the field. In contrast, the yellow nodes denote contemporary and forward-looking topics. These include “sustainable development,” “team sport,” “pain management,” “sustainability,” “machine learning,” “big data,” and “covid-19.” The presence of these terms signals the increasing integration of technology, data analytics, global crises, and sustainability concerns into sport management scholarship.

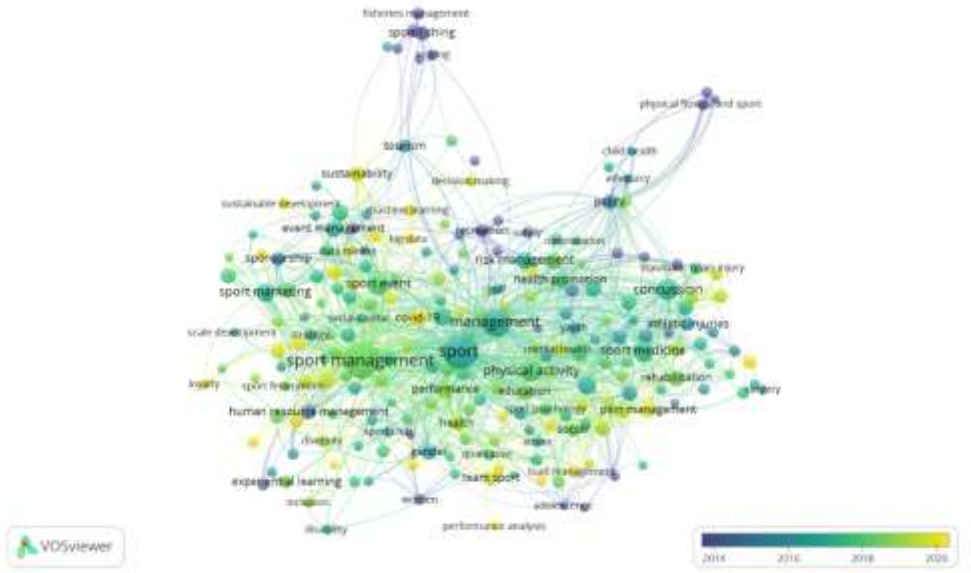

Figure 4. Average Publication per Year

Figure 5 illustrates the average citation impact of co-occurring keywords using a separate overlay spectrum ranging from purple to yellow. In this visualization, dark purple nodes represent relatively “cold” topics, with an average of ten or fewer citations across the dataset. Examples include “sport management,” “sport marketing,” “machine learning,” “sustainable development,” and “load management.” Keywords displayed in light purple, pink, and orange are classified as moderately cited themes, with an average of approximately 20 to 30 citations. These include terms such as “education,” “tourism,” “physical activity,” “health,” and “policy,” reflecting stable and consistently referenced research areas. Finally, the yellow nodes indicate the most highly cited and influential themes in the dataset. Notable examples include “youth,” “physical fitness and sport,” and “scale development.” These topics demonstrate comparatively stronger citation performance and occupy prominent positions within the intellectual structure of sport management research.

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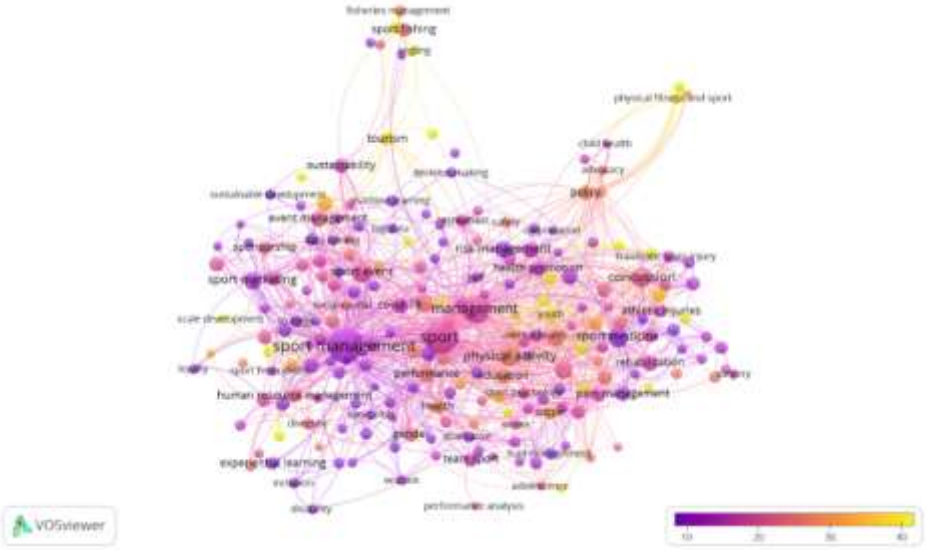

Figure 5. Average Citation of Keywords

4.4. Thematic Analysis

Figure 6, the final visualization in this study, presents the thematic clusters identified within the sport management literature. These clusters provide important insights into the principal thematic domains shaping the intellectual structure of the field. The **red cluster** centers on strategic and managerial dimensions of sport organizations. It includes keywords such as "sport management," "strategy," "sport federations," "sport marketing," "big data," "machine learning," "covid-19," and "loyalty." Together, these terms reflect research focused on strategic management, marketing practices, and the increasing role of data analytics and technological innovation in sport organizations. The **green cluster** represents the health and medical dimension of sport management research. It includes keywords such as "management," "concussion," "sport medicine," "athletic injuries," "rehabilitation," and "surgery," highlighting scholarship concerned with athlete health, injury management, and medical support systems within sport environments. The **dark blue cluster** focuses on sport performance and training-related topics. Keywords in this group include "physical activity," "team sport," "load management," "performance analysis," and "sport psychology," indicating a strong connection between sport management research and performance optimization, training management, and psychological factors affecting athletes.

The **yellow cluster** reflects themes related to governance, safety, and public health. It contains keywords such as "health promotion," "risk management," "safety," "policy," "child health," and "advocacy," emphasizing regulatory frameworks, risk mitigation strategies, and public health considerations within sport contexts. The **purple cluster** is primarily associated with sport events and sustainability. This domain includes keywords such as "sport event," "event management," and "sustainable development," reflecting research focused on the planning, management, and long-term impacts of sporting events. The **light blue cluster** highlights themes related to social inclusion and educational dimensions in sport. It includes keywords such as "experiential learning," "inclusion," "sport," "disability," "women," and "gender," representing scholarship addressing equity, diversity, and educational practices within sport settings. The **orange cluster**

relates largely to sport tourism and recreational activities. Keywords such as "fisheries management," "sport fishing," "angling," "tourism," and "sustainability" characterize this domain, reflecting research on recreational sport activities and their environmental and tourism-related implications. Finally, a **small brown cluster**, consisting of only three keywords—"motivation," "quality of life," and "volunteer management"—does not appear prominently in the network visualization due to its limited size. Compared with other clusters, this group represents a relatively fragmented and niche thematic area within the broader sport management literature.

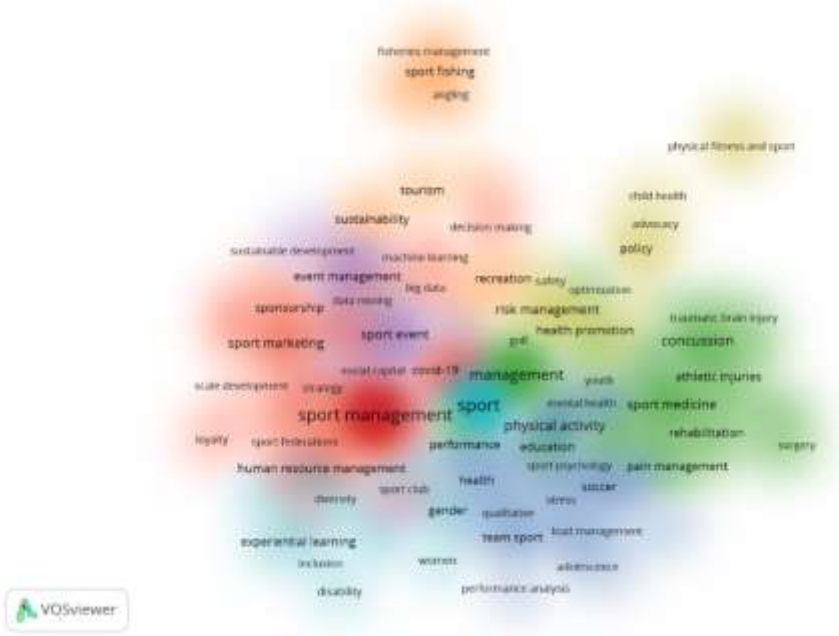

Figure 6. Thematic Domains

These thematic clusters can also be examined through a strategic, two-dimensional perspective. The Bibliometrix R package provides a thematic map that positions themes across four distinct quadrants, each representing a different role within the intellectual structure of a field. According to Cobo et al. (2011a), **Motor Themes** are highly developed and central topics that drive the field forward; **Basic Themes** serve as essential but less developed foundations of the discipline; **Niche Themes** are specialized and often fragmented areas of inquiry; and **Emerging/Declining Themes** represent topics that are either gaining traction or losing relevance over time. Figure 7 presents this thematic map for the sport management literature.

In the visualization, "management" and "concussion" appear within the Basic Themes quadrant, indicating that these concepts form important structural elements of the field but have not reached high levels of internal development. Terms such as "sport," "physical activity," "athletes," and "exercise" are positioned in the Motor Themes quadrant, reflecting both their conceptual importance and strong internal cohesion within the literature. "Sport medicine" and "risk management" occupy an intermediate space between Motor and Niche themes, suggesting that while they are conceptually significant, they exhibit a degree of specialization that distinguishes them from broader core topics. The upper-left quadrant, representing Niche Themes, displays notable fragmentation around the "football" research area, indicating that scholarship in this domain is specialized and somewhat isolated from the central knowledge structure. The term "sport event" lies between the Niche and

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Emerging/Declining quadrants, implying a shift toward increased specialization or a potential reduction in overall prominence within the literature. Finally, "sport management" and "sport marketing" appear in the Emerging/Declining quadrant. Their placement suggests that although historically prominent, these foundational terms may be decreasing in centrality or evolving into more specialized sub-topics as the field continues to diversify.

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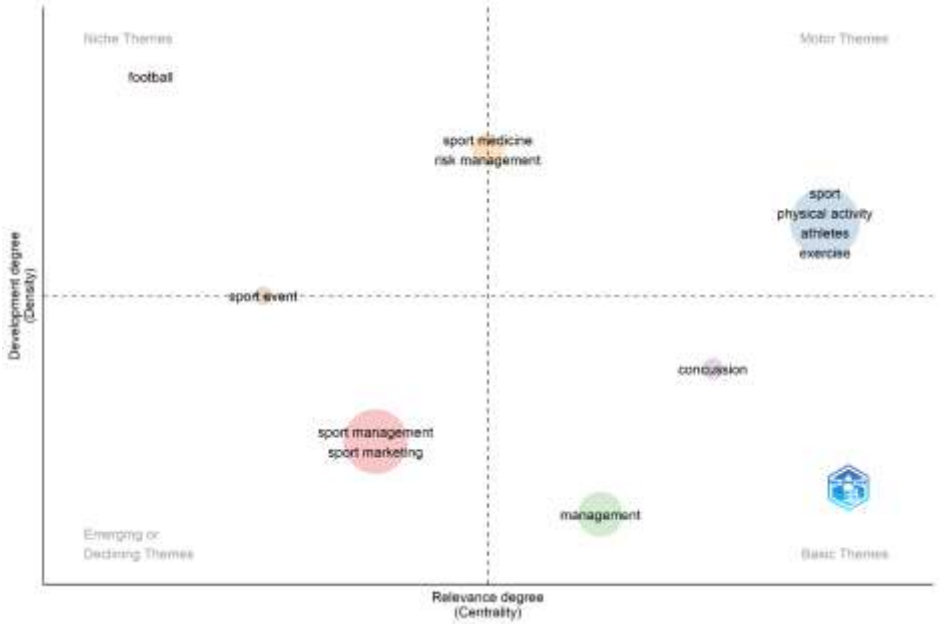

Figure 7. Thematic map of the literature (Louvain)

5. Discussion and Conclusion:

This scientometric analysis reveals a multifaceted architecture within sport management research, characterized by eight distinctive thematic domains with varying degrees of cohesion, connectivity, and temporal development. These primary domains—"Organizational Strategy and Technological Integration," "Athlete Health and Injury Management," "Athlete Performance and Sport Psychology," "Governance, Safety, and Health Policy," "Sustainable Sport Event Management," "Social Equity and Inclusion in Sport," "Sport Tourism and Environmental Sustainability," and "Participant Motivation and Volunteerism"—some of which exhibit overlapping features, confirm the heterogeneous epistemological foundations of sport management. This conceptual pluralism aligns with Doherty's (2013) view on the multidisciplinary and interdisciplinary nature of sport management research. Overall, this characterization positions the field as an applied domain that integrates multiple disciplinary perspectives rather than developing as a unified theoretical paradigm. The relative prominence of health-related domains (represented in three of the eight clusters) further suggests a stronger biomedical orientation within the field's publication landscape.

The temporal analysis illustrates the progression of published themes within the sport management literature. A closer look at the temporal map reveals a clear shift from foundational concepts toward technology-driven topics. Earlier emphases on terms such as "recreational fishing," "physical fitness and sport," "fisheries management," and "policy" have gradually transitioned to more contemporary subjects, including "sustainable development," "sustainability," and

"machine learning." This evolution reflects broader sociocultural changes and the growing influence of technological advancements across the field.

Citation analysis reveals notable differences across thematic areas, with medical-oriented keywords showing higher average citation counts than organizational or managerial terms. This pattern likely reflects structural distinctions between biomedical and physical sciences—where citation rates are typically higher—and the social sciences, which tend to accumulate citations more gradually. Keywords with above-average citation impact, such as "physical fitness and sport," "tourism," and "policy," appear to function as conceptual bridges, linking more specialized research communities to broader foundational themes. Additionally, due to citation-accumulation cycles, newer themes such as "big data" and "machine learning" have not yet garnered substantial citation counts within the database. However, these terms are poised to become high-impact topics in the near future as scholarship around them continues to expand.

The thematic analysis indicates that physical-oriented keywords such as "exercise," "physical activity," and "athletes" are prominent and well-developed themes within the sport management literature. This suggests that progress within the field is closely associated with the physical dimensions of sport. "Concussion" and "management" fall within the category of moderately developed themes, reflecting their foundational role yet highlighting the need for continued conceptual refinement. Themes such as "sport medicine" and "risk management" are classified as developed but fragmented, indicating that although these areas are conceptually important, they require further consolidation and theoretical integration. The concept of "football" appears highly fractured, suggesting a substantial yet dispersed body of research within this specific domain. Finally, the positioning of "sport management" and "sport marketing" within the Emerging/Declining quadrant likely reflects a transition away from traditional, broad conceptual labels toward more specialized or interdisciplinary areas of inquiry within the field.

The conceptual mapping holds significant implications for guiding future research directions within the field. Its impact spans key areas such as education, policy, and practice. First, the educational implications highlight the need for more integrated curricular models that extend beyond traditional management-focused frameworks and incorporate the multidimensional nature of the field. Such curricula would better reflect the interdisciplinary structure of sport management as revealed by the thematic domains. Second, the mapping provides practitioners and policymakers with evidence-based insights that can support skill development and strategic planning. By identifying emerging research avenues and highlighting areas of growth or fragmentation, the conceptual map helps stakeholders align their decisions with current and future trends in the field.

These findings not only broaden the overall understanding of sport management but also offer valuable direction for future research. By outlining the field's intellectual structure and identifying established, emerging, and fragmented domains, the study provides academics, practitioners, and policymakers with an evidence-based foundation for future development and strategic decision-making. At the same time, several methodological constraints warrant acknowledgment. First, the exclusive reliance on Scopus as the sole data source may omit relevant literature indexed in other repositories such as Web of Science or Google Scholar, potentially narrowing the breadth of the corpus. Second, the decision to limit the dataset to English-language publications inherently reduces the visibility of non-English scholarship and may introduce cultural bias into the thematic patterns

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observed. Despite these limitations, the methodological framework employed in this study—supported by rigorous validation procedures and established scientometric tools—offers a strong and replicable foundation for mapping the knowledge structure and thematic landscape of Sport Management research.

Several promising research directions emerge from examining the interconnections among established thematic domains. First, greater scholarly attention is needed in the core "management" areas of the discipline, which remain comparatively underdeveloped despite their conceptual centrality. Strengthening research in these domains can help reinforce the theoretical foundations of the field. Second, the observable shift from conventional themes toward technology-oriented subjects signals substantial opportunities for innovation. Future studies may benefit from integrating machine learning, artificial intelligence, data analytics, and other digital technologies into sport management research. Such interdisciplinary approaches not only align with global trends but may also increase the visibility and relevance of scholarly work. Third, scientometric research offers multiple pathways for further exploration. Replicating this study using additional bibliometric techniques could yield richer insights into the structure and evolution of the field. Potential avenues include co-authorship network analysis, co-citation and bibliographic coupling analyses, identification of influential authors, countries, and journals, and the mapping of highly cited or foundational publications within the discipline. Collectively, these directions can help advance both the theoretical development and practical relevance of sport management research.

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