



Mapping the environments, motivation and sport through bibliometric analysis from 2004 to 2024

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Abstract: In order to create a better environment for sport activities, bibliometric research exploring the relationship between environment, motivation, and sport globally. This study investigates the significant increase in scientific publications on the topic from 2004 to 2023, with a noted decline in 2024. This research using VOSviewer to analyse the trend and relationship refer to the scientific publication of the environment, motivation and sports topics. The International Journal of Environmental Research and Public Health emerged as a major contributor, accounting for 35 articles published. Significant patterns of author collaboration were uncovered, with an average of 2.67 authors per article, highlighting a concentration among a select group of top authors. Dominant research themes such as “Motivation,” “Sports,” “Health,” and “Education” were identified through the keyword co-occurrence network, indicating robust interrelationships. Analysis of co-author relationships between countries underscores the pivotal contributions of nations including the United States, United Kingdom, China, Germany, and France, underscoring the importance of cross-country collaboration in research advancement. This research offers insights into the evolving landscape of environmental and motivational factors in sport, providing a comprehensive overview of international trends, collaborations, and research foci. These findings serve to guide future research endeavors and inform decisions pertaining to global initiatives promoting healthy and motivated environment for sports activities, grounded in scientific evidence.

Keywords: bibliometric analysis, vosviewer, motivation, environment, sports

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INTRODUCTION

The research in the field of sports has undergone rapid and exponential growth, indicative of the increasing interest in physical activity and health (Kerr et al., 2013; Pike et al., 2015). Over the past two decades, global attention in physical activity and health has been drawn to research exploring the relationships between sports, the environment, and motivation (Ondric & Furjan-Mandić, 2013; Mouratidis et al., 2008; Standage et al., 2005). The necessity for a profound comprehension of how sport environments influence engagement in physical activity has become a focal point in recent research advancements (Fairclough et al., 2012). Concerning sports participation, a solid foundation is established with approximately 27% of active participants, encompassing more than 40 million children and adolescents (Kerr et al., 2013). The significance of engaging in sporting activities extends beyond promoting a healthy lifestyle, encompassing substantial implications within the realms of the environment and individual motivation (Bull et al., 2020).

Within the sports environment, various factors come into play, with the shortage of time emerging as a prominent impediment hindering individuals from regularly participating in physical activities (Murillo et al., 2021). Additionally, a lack of social support has been recognized as a determinant impacting the extent of involvement in sports (Fathi et al., 2021). Conversely, physical discomfort stands out as a barrier, dissuading individuals from embracing physical activity due to discomfort or, in some cases, outright pain (Baillot et al., 2021). Establishing environments conducive to diverse populations



is imperative for enhancing physical activity engagement (Milton et al., 2018). Such initiatives are requisite across various domains, encompassing educational institutions, workplaces, urban landscapes, and communities. Crafting an environment that fosters physical activity demands meticulous attention not only to safety but also to considerations of accessibility and sustainability. The transportation milieu assumes a pivotal role, where judicious planning can yield secure and sustainable alternatives for individuals (Milton et al., 2020; Strain et al., 2020).

In an environmental context, the motivational climate established by the coach emerges as a crucial social determinant believed to foster fundamental needs (Edmunds et al., 2006). Coaches wield significant influence in shaping the psychological and emotional milieu in sporting contexts, thereby affecting athletes' motivation, commitment, and performance outcomes. This motivational climate encompasses the attitudes, behaviors, and communication styles exhibited by coaches (Ondric & Furjan-Mandić, 2013; Muniandy et al., 2023), which can either facilitate or impede athletes' sense of autonomy, competence, and relatedness (Reinboth & Duda, 2006). Motivation is defined as an individual's driving force that facilitates the implementation of various behaviors with the aim of achieving specific goals.

In the context of exercise motivation, this study aimed to assess factors influencing individuals' motivation for engagement and consistency in physical activity (De Man et al., 2022; Tao et al., 2019). Intrinsic motivation serves as a catalyst for maintaining discipline, consistency, and focus in achieving sports goals. Conversely, extrinsic motivation or amotivation tends to be associated with disruptive behavior or a lack of discipline (Antonio et al., 2007). Correspondingly, in youth sports, there are recent trends that indicate an increased emphasis on the activity. These changes are occurring as the youth sport environment adapts to meet societal demands for a more elite environment and more intense competition. As a result, one trend that has been highlighted is the increasing prevalence and promotion of specialization in youth sports, which is triggered by social factors and reinforced by a high interest in training (Edison et al., 2021). Although achievement goal orientation is high, the level of self-confidence in sport is expected to vary depending on the individual's perception and attitude towards accepting mistakes. Therefore, the way individuals perceive mistakes in a competitive sport environment is considered a factor that can affect self-confidence (Lee et al., 2021).

Motivation plays a substantial role in determining individual achievement, especially in situations where a person has the physical ability to complete a specific task but faces uncertainty regarding their capabilities. Psychological factors involved include the experience of flow, vitality, positive affect, enjoyment, satisfaction, interest, concentration, effort, persistence, sportsmanship, and adherence to sport. Motivation can also be negatively related to aspects such as anxiety, fatigue, and boredom (Moreno et al., 2010). This phenomenon reflects the complexity of interactions between motivation and various psychological variables influencing athlete performance in a sports context. Frequently, this phenomenon becomes an obstacle that encourages individuals to delay or even avoid initiating the sports activity they have chosen (Ondric & Furjan-Mandić, 2013). Sport is not only a physical activity, but it is also a very important element in maintaining the physical health, mental health and social skill development of individuals (Safitri et al., 2023). It is widely recognized that sport and physical activity have a significant role in the human development process (Merma-Molina et al., 2023). Through engagement in sports, individuals can optimize their overall well-being, improve their mental resilience, and strengthen their social interactions (Wang et al., 2024). Sport increases self-confidence and conflict resolution abilities, but also helps individuals overcome personal and professional barriers (Wu et al., 2023). Through participation in competitive and collaborative sports, individuals can resolve conflicts more effectively. In addition, sports foster lasting friendships and social bonds, and encourage diversity and inclusion in society (Carter-Thuillier et al., 2023). By promoting active and healthy activities, sport plays an important role in maintaining the physical and social health of individuals.

In alignment with this, a preceding cross-sectional study conducted with athletes revealed that the characteristics present in the established sports environment, including autonomy support, emphasis on improvement, and social support, exhibited positive correlations with the three fundamental needs of autonomy, competence, and relatedness (Reinboth et al., 2004). These factors, in turn, were predictive of indices of well-being, such as subjective vitality and physical symptoms (Reinboth et al., 2004). Based on previous research, our aim is to map the literature on environment, motivation and sport by analyzing the influence of different countries, authors, journals and terms using bibliometrics in this study to search the trend and relationship of the study referring to the topics. The findings from this study

can provide a broad perspective and recommendations regarding the current state of research on environmental and motivational factors in sport globally.

METHOD

This research employs a methodology, encompassing quantitative approaches, gathers statistical data of recent study with relevant topics between the environment, motivation, and sports. A total of 825 documents were gathered in the Scopus database. Subsequently, bibliometric analysis was undertaken utilizing the VOSviewer software, aimed at visualizing and analyzing bibliographic data. VOSviewer serves as a software tool designed for constructing and visualizing bibliometric networks, enabling researchers to explore and analyze large-scale bibliometric data, including citation and co-citation networks. Offering features such as network maps, cluster analysis, and density visualization, VOSviewer allows researchers to uncover the structure and dynamics of scientific fields, identify key authors and publications, and trace the development of research topics over time (Muniandy et al., 2023).

The analysis spans the period from 2004 to 2024, facilitating a longitudinal exploration of research trends and patterns. The data collected from scopus during 5th to 10th of February 2024 commenced with querying the Scopus database using keywords such as "environment," "motivation," and "sports," followed by a descriptive analysis using microsoft excel to find the trend of the topics, top five and top ten authors. Subsequently, bibliographic data was imported into VOSviewer for network mapping, encompassing total publications, keywords, author relationships, international collaborations, and topic interconnections. The resulting network maps were comprehensively analyzed to ascertain the strength of relationships between nodes, delineate research clusters, and elucidate the semantic meaning of network topologies. Overall, the result of the maps successfully present the trend of the topics in relation with the countries and co-authors throughout the years.

RESULT AND DISCUSSION

The bibliometric analysis of the topics related to environment, motivation, and exercise from 2004 to 2024 reveals a substantial increase, rising from 8 articles in 2004 to 89 in 2023, despite a decline in 2024. The publication trends exhibit exponential growth (see Figure 1), mirroring the heightened interest in physical activity and health. These findings offer profound insights into the progression of scientific literature in this domain.

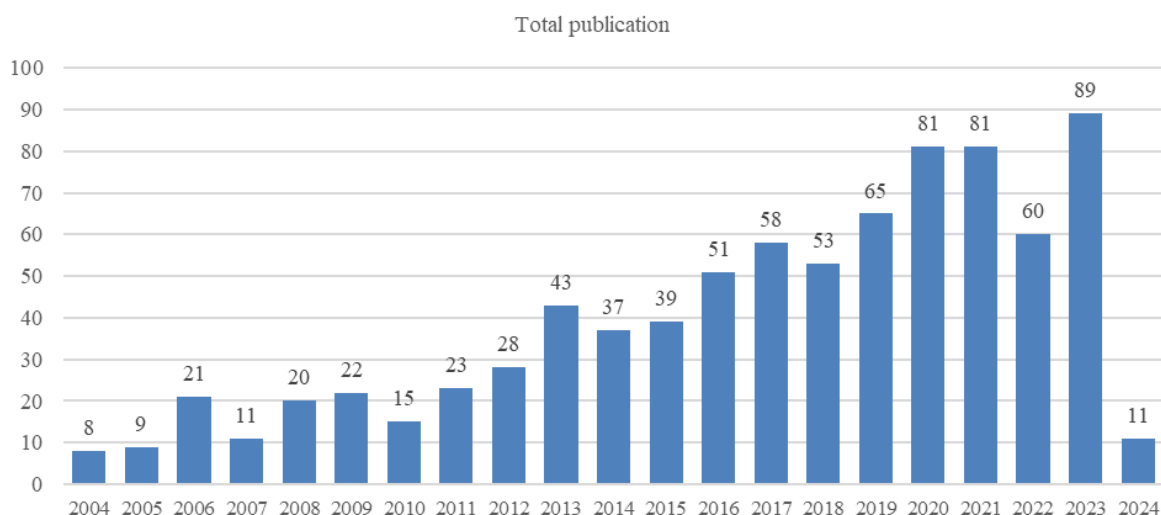


Figure 1. The evolution of scientific research on environment, motivation and sport

An in-depth examination of the 825 gathered documents, originating from international journals, reveals a predominant concentration on the subjects of environment, motivation, and sport. Notably, a significant proportion of scholarly investigations within these domains find their dissemination in journals characterized by a multidisciplinary focus. This proclivity can be attributed to the intricate nature of the subject matter, spanning diverse disciplines such as environmental science, motivational psychology, and sports studies. The interplay of these varied fields underscores the complexity inherent

in the research landscape and underscores the necessity for a multidisciplinary approach in scholarly pursuits related to environment, motivation, and sport.

Figure 2 shows the percentage of the top five published journals that published articles on a particular research topic based on the volume of articles published. The International Journal of Environmental Research and Public Health is the leading journal in terms of the number of articles published on the topic. It publishes 35 study of all 128 publications by top five published articles. The higher publication due to the highest volume and index of all top five articles. Followed by Teoriya I Praktika Fizicheskoy Kultury ranked second with 30 study of the total articles, followed by Psychology of Sport and Exercise with 19 study, Journal of Sports Sciences with 10 study, and Journal of Physical Education and Sport with 5 study.

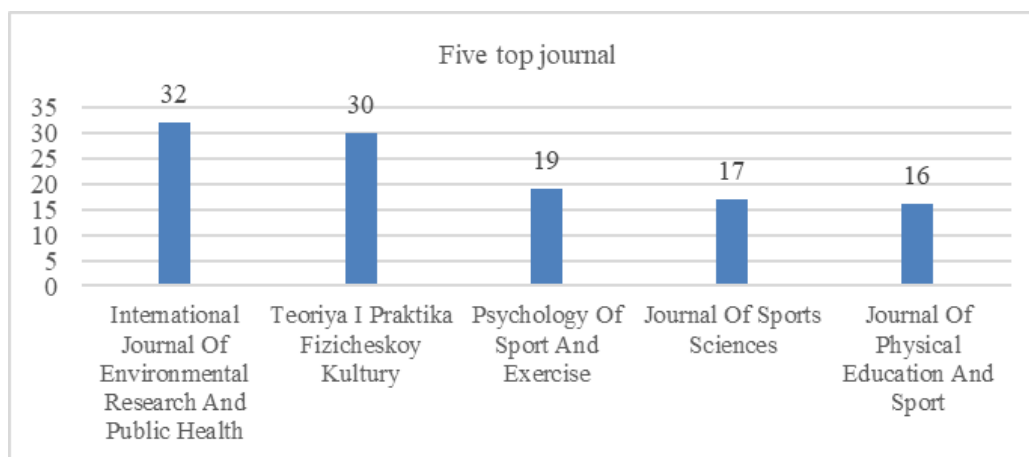


Figure 2. Five top journals

Analysis of the distribution of publication contributions in Figure 2 reveals significant inequalities among key journals in certain research areas. The leading International Journal of Environmental Research and Public Health shows a dominant role in the dissemination of scientific literature related to the topic. In contrast, Teoriya i Praktika Fizicheskoy Kultury, Psychology of Sport and Exercise, Journal of Sports Sciences, and Journal of Physical Education and Sport contribute decreasing percentages. This suggests an inequality in the distribution of contributions between journals, where a small number of journals have a major impact on shaping the scientific literature, while most other journals make a more limited contribution.

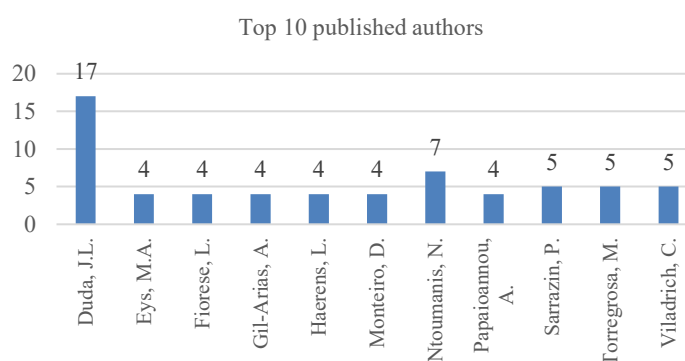


Figure 3. Top 10 authors who write the most about the environment, motivation and sports

Participation in research within the domains of environment, motivation, and exercise has revealed notable patterns of scholarly collaboration. On average, each scholarly article enlisted the involvement of 2.67 authors, indicative of the elevated level of cooperative engagement amongst researchers. Nevertheless, an in-depth analysis of author distribution underscored a conspicuous asymmetry. A mere 10% of the aggregate articles emanated from individual scholarly endeavors, while the preponderance, amounting to 60%, emanated from collaborative efforts involving 2-5 authors (see

Figure 3). Regarding scholarly output, a discernible gap exists between the top decile of authors, with the cumulative contributions from other authors remaining undisclosed. This discernment intimates that a diminutive cohort of authors wields a substantive influence on the entirety of publications, thereby substantiating the discernible disparateness in contributions.

In the context of this study, we looked at the relationships formed between co-authors in order to explore the research topic at hand. In our analysis, we see that the relationships between co-authors reflect complex scientific collaborations and networks among researchers.

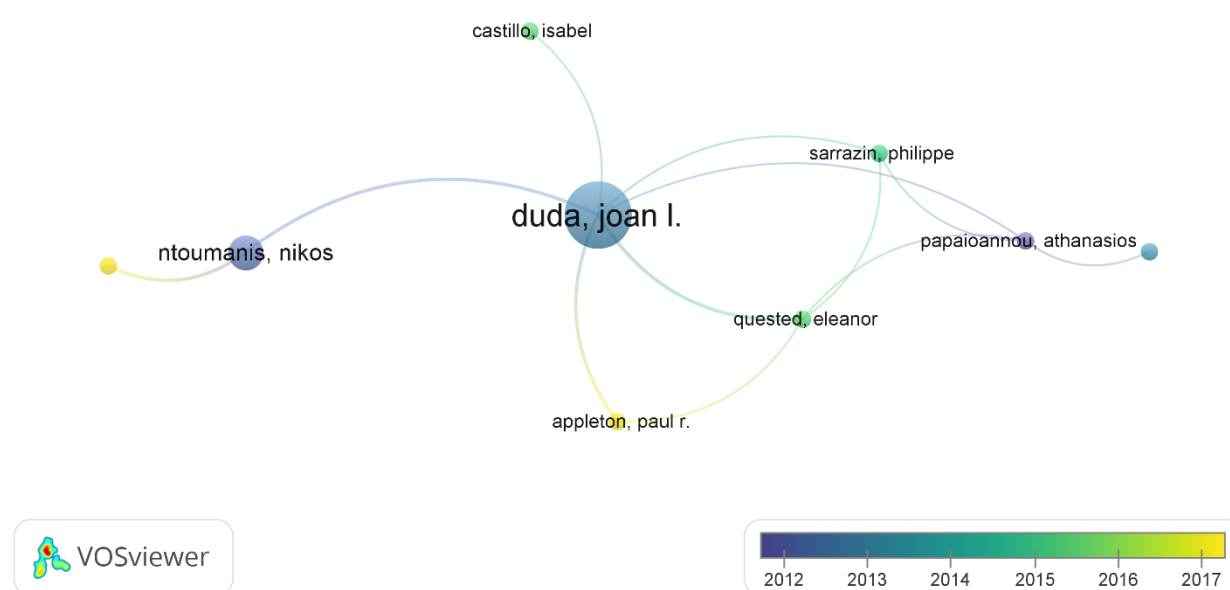


Figure 4. Relationship between Co-Author on topic

Figure 4 provides a comprehensive visualization of the intricate relationships between co-authors within the study. Through this graphical representation, the dynamics of collaboration and scholarly networks among researchers are elucidated, offering valuable insights into the dissemination and evolution of research within the field. The presence of strong connections between certain co-authors, exemplified by the relationship between Isabel Castillo and Philippe Sarrazin, underscores the depth of their collaborative efforts. Their prolific partnership, as evidenced by the publication of several joint articles in 2012 and 2013, reflects a shared commitment to advancing knowledge and scholarship within the domain under investigation. This robust relationship not only fosters the exchange of ideas and expertise but also contributes to the enrichment of the scholarly discourse through collaborative inquiry and mutual support.

Conversely, the relationship between Joan I. Duda and Daniel F. Gucciardi appears comparatively weaker. While their collaboration may be less extensive in terms of output, it nonetheless represents a meaningful contribution to the research landscape, highlighting the diversity of collaborative partnerships and the myriad ways in which researchers engage in scholarly inquiry. Eleanor Qusted emerges as a central figure within the co-authorship network, connected to several other researchers across multiple articles. This interconnectedness suggests a growing network of collaboration and scholarly exchange, indicative of the dynamic nature of research within the field.

As researchers forge new connections and expand their collaborative networks, the potential for innovation and knowledge creation is enhanced, fostering a vibrant and dynamic research community. The analysis of keyword occurrence within the diagram further enriches our understanding of the underlying structure of the research topic. Keywords serve as markers of thematic focus within scholarly discourse, reflecting the prevailing trends and areas of inquiry within the field. The dimensions of each node provide insights into the frequency of occurrence, highlighting the prominence of certain themes and concepts within the research landscape. The lines connecting the nodes represent the frequency of co-occurrence between keywords, illustrating the strength and density of relationships between different

thematic elements. By tracing the connections between keywords, researchers can uncover underlying patterns of association and identify emerging areas of interest and inquiry within the field.

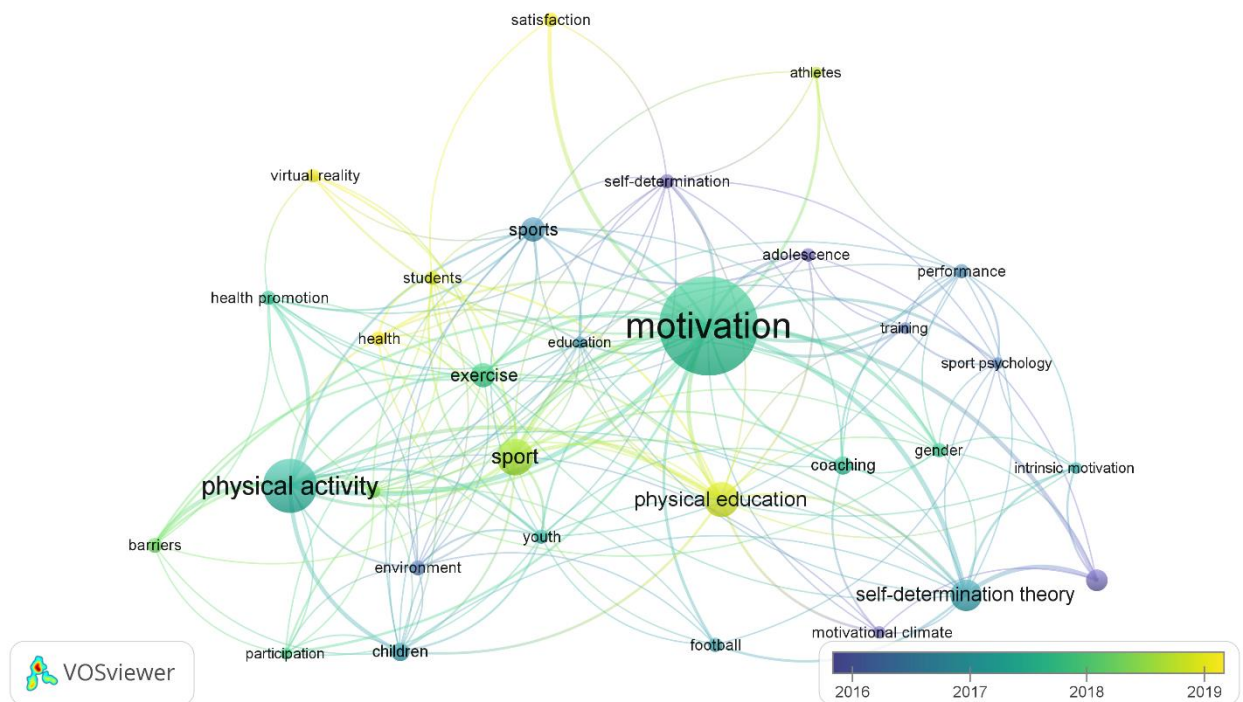


Figure 5. Keyword co-occurrence network (2004-2024). Source: Prepared by the author using VOSviewer, based on WoS data

Figure 5 reflects a total of 41 keywords and displays the co-occurrence rate within them. Nodes that have larger dimensions represent the most frequently occurring keywords. The intensity of the relationship between keywords can be inferred from the closer distance between their nodes. The closer the distance between two different nodes, the higher the strength of the relationship between the keywords. Through the interpretation of Figure 4 above, popular research topics are clearly identified. Topics such as "Motivation," "Sports," "Health," and "Education" stand out with large node sizes and close connections with other topics. The presence of strong lines between nodes signifies the frequency of co-occurrence, creating a visual trail that exposes the network of relationships between research topics.

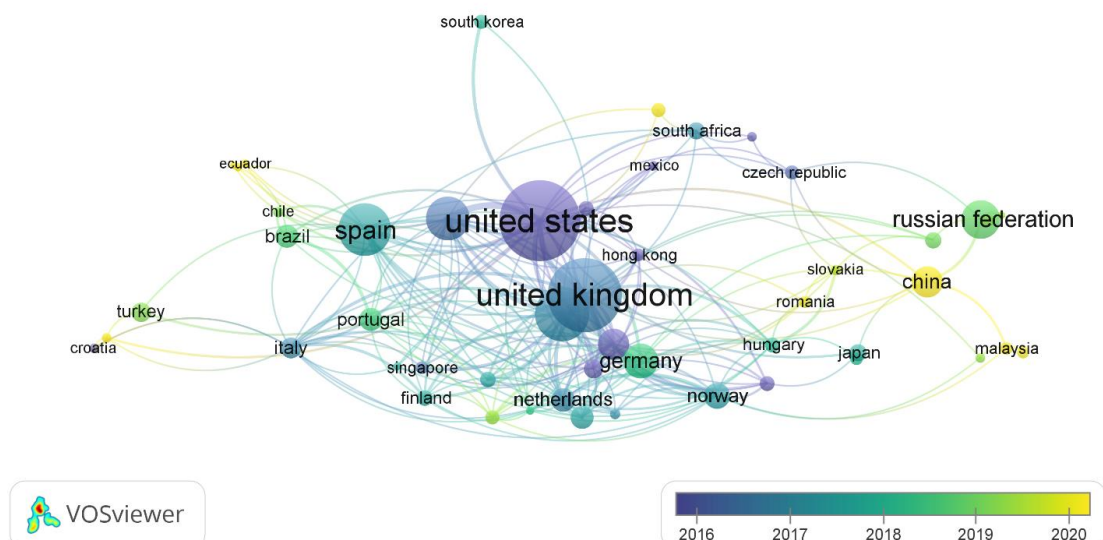


Figure 6. Co-author relations between countries

Figure 6 shows the involvement of countries in co-authoring scientific publications indicating significant contributions from the United States, United Kingdom, Germany, China, and France. The strongest relationship analysis shows close collaboration between the United States-Canada, United Kingdom-Australia, Germany-France, China-Hong Kong, and Japan-South Korea. The increasing trend of joint scientific publications, especially in developing countries such as China and India, signifies the importance of cross-national collaboration in sharing knowledge and expertise. It can be concluded that cross-country co-authorship is an integral element for researchers to improve the quality of research and contribute solutions to global problems. The data used was obtained from Scopus, a bibliographic database of abstracts and citations, and visually represented using VOSviewer software, where the size of the circle reflects the number of co-publications, and the thickness of the line reflects the strength of the relationship between countries. The main sources of information are VOSviewer and Scopus as platforms that provide data access and in-depth visualization.

Discussion

The discussion of these findings delineates the trajectory of scientific research concerning the environment, motivation, and sports from 2004 to 2024. The data reveals a substantial escalation in the quantity of reviewed articles, underscoring an augmented interest in physical activity and health. Despite a minor dip in publications in 2024, the overarching trend denotes a significant upsurge, signifying heightened attention towards physical activity and health-related endeavors. This surge reflects the inherent nexus between environmental factors, motivational drivers, and sports engagement, emblematic of a concerted endeavor to unravel the intricate influences shaping individual involvement and participation in physical activities (Liu et al., 2023).

The prevalent focus on topics such as autonomy support, emphasis on enhancement, and social (Sheng et al., 2024) reinforcement underscores these pivotal role of environmental determinants in facilitating individuals' fundamental requisites for autonomy, competence, and interpersonal connection (Granero-Jiménez et al., 2022). This amalgamation of factors emerges as predictive markers of subjective vitality and physical well-being, accentuating the holistic essence of the sports environment and its profound ramifications for individual welfare (Lee et al., 2021; Murillo et al., 2021). Furthermore, scrutiny of scientific contributions accentuates the interdisciplinary nature of research in the realms of environment, motivation, and sports (Granero-Jiménez et al., 2022; Wu et al., 2021). A discernible trend towards collaborative endeavors emerges, with a substantial proportion of scientific endeavor emanating from cooperative engagement among researchers. This collaborative ethos underscores the significance of interdisciplinary discourse and knowledge exchange in unraveling the intricacies intrinsic to the research landscape. Nonetheless, a conspicuous disparity in author distribution intimates a concentration of scientific influence among select groups of authors, necessitating concerted endeavors to promote inclusivity and diversity in the scientific discourse.

Analysis of country-level contributions unveils a diverse array of collaborative endeavors, with significant inputs emanating from countries such as the United States, United Kingdom, Germany, China, and France. The escalating trend of joint scientific publications underscores the significance of cross-border collaboration in advancing knowledge and expertise across geographical boundaries. Particularly noteworthy is the burgeoning involvement of developing countries such as China and India, signaling the democratization of knowledge production and its global dissemination. Cross-country cooperation emerges as an efficacious means of enhancing research quality and addressing pressing global challenges, emphasizing the imperative of fostering collaborative partnerships across diverse geographic and cultural contexts. The findings stemming from the analysis proffer profound implications for both research and praxis in the domains of environment, motivation, and sports. The exponential surge in scientific investigations underscores the escalating focus on physical activity and health-related pursuits, necessitating sustained investment in research initiatives aimed at elucidating the intricate influences shaping individual engagement and participation in physical activity. Moreover, the prevalence of collaborative endeavors underscores the exigency of adopting multidisciplinary approaches and interdisciplinary dialogue to untangle the complexities inherent in the research terrain. In praxis, the insights gleaned from this study underscore the significance of engendering environments conducive to physical activity engagement, with particular emphasis on autonomy support, social reinforcement, and accentuation of improvement. By fostering collaborative partnerships and embracing

a multidisciplinary approach, practitioners can harness insights derived from research to inform evidence-based interventions aimed at fostering physical activity and well-being across diverse populations and contexts.

The research on bibliometric has unveil the potential for future studies related to environment of the sports activities. This study provide information that many countries and scientist had contributed through research in regards of sports environment which contributes to the motivation of athletes that would perform in a tournament. Further research in these topics would support the development of sports environment through legitimate science based.

CONCLUSION

The thorough research of this study explores the complex interactions between motivation, environment, and exercise, providing insight into the changing dynamics, patterns, and trends in this complex field. Using a combined methodology that includes a qualitative systematic literature review and quantitative bibliometric analysis, this study offers comprehensive knowledge of the relationships between these important variables and how they affect research and practice. In conclusion, the findings from this study offer profound insights into the evolving trends, patterns, and dynamics within the domain of environment, motivation, and sports. By leveraging a dual methodology encompassing quantitative bibliometric analysis and qualitative systematic literature review, this research provides a nuanced understanding of the intricate relationship between environmental determinants, motivational factors, and individual engagement in physical activities. Moving forward, continued investment in interdisciplinary research initiatives and collaborative partnerships holds the key to advancing knowledge and fostering holistic interventions aimed at promoting physical activity and well-being on a global scale.

CONFLIC OF INTEREST

There are no conflicts of interest related to this research or the publication of this manuscript

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