

A bibliometric insight into sports participation and socio-economic mobility

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ABSTRACT

Researchers investigated the domain of social mobility and sports (SM&S), analyzing the influence of sports on social mobility and socio-economic factors. This study employed bibliometric analysis to examine previous research on the relationship between sports and social mobility. The objective was to identify unexplored areas by reviewing 582 scholarly papers from WoS published between 1992 and 2023. Geographical mapping displays how research activity is spread out in different regions, while keyword co-occurrence mapping identifies important topics. The research highlighted the exponential growth in the number of documents from 1992 to 2023, particularly after 2003. Geographically, the influence of developed nations was evident in the research. Author co-citation analysis classifies authors into four distinct schools of thought. The results indicate a transition towards a broader and more integrated approach in sports research, emphasising the influence of economics, sociology, wellness, and participation factors. For future research, there is a call for more thematic reviews to delve deeper into the four SM&S thematic strands.

KEYWORDS

Sports; Social Mobility; Physical Activity; Bibliometrics

1. INTRODUCTION

Sports and sports participation refers to physical activities and formal or informal competitions catering to individuals at various levels, from amateur to professional (Pankow et al., 2024). In research on sports, exercise, and physical activity, these terms are sometimes used interchangeably, but they represent distinct concepts (Caspersen et al., 1985). Sport and physical activity are closely related because it is a type of leisure-time physical activity that has definitive rules, is competitive and is usually time-bound (Tahira, 2023).

Sports participation is positively associated with physical health, mental well-being, and social mobility (Eather et al., 2023; Eime, Young, et al., 2013). It leads to more physical activity, less sedentary behaviour, and improved physical fitness (Forte et al., 2022), reducing chronic disease risk, promoting well-being, and improving quality of life (Wilson et al., 2022; Fossati et al., 2021).

Understanding the causes of social mobility is crucial for grasping societal dynamics and addressing issues related to social stratification and economic structures. Social mobility is the transition from one social position to another and a person's ability to move between social positions depends on their economic, cultural, human, and social capital.

The association between sports and social mobility is a complex and nuanced issue (Spaaij, 2013; Spaaij et al., 2015). According to Ramón Spaaij, the association between sport and social mobility is influenced by social stratification patterns, with those from privileged backgrounds being more likely to benefit from social mobility opportunities and pathways in sports than others. This pattern is shaped by disparities in access to sports participation opportunities from an early age (Spaaij & Schailée, 2021).

There is a widely held belief that sports can provide opportunities for socioeconomic advancement and upward social mobility (Semyonov & Yuchtman-Yaar, 1981). It can help individuals, particularly those from disadvantaged communities, improve their self-efficacy, self-esteem, resilience, and social capital (Mackin & Walther, 2012). However, Research suggests that while sports can provide opportunities for social mobility, influenced by factors such as race, ethnicity, and socioeconomic status it can also perpetuate existing inequalities (Spaaij, 2009).

Braddock II (1980) outlined two opposing views: "sports-enhances-mobility" and "sports-impedes-mobility," discussing sport's role in social mobility. The debate transcends race/ethnicity, with one camp viewing sport as a path to higher social status and the other seeing it as a dead-end for many, critiqued by scholars like Leonard, Riess and Spaaij. They supported the second position saying that mobility via sport is an overly romanticised myth (Leonard, 1996; Riess, 1980; Spaaij, 2009).

In light of recognizing the importance of sports in facilitating social mobility, we endeavoured to comprehensively examine the field to provide a concise and consolidated body of knowledge that would greatly contribute to the future advancement and expansion of this discipline. Consequently, the subsequent section provides an overview of relevant literature and identifies the research gap that has paved the way for these investigations.

Several review studies have been conducted related to the field of Sports Research, such as the systematic review by Parsons et al. (1999) that highlights the complex interplay of various factors in predicting adult obesity from childhood Physical Activity (PA). While some factors, like parental fatness and social factors, have a consistent relationship with adult obesity, others, like birth weight and timing of maturation, show mixed results. The review emphasises the need for a comprehensive approach to understanding the predictors of adult obesity, considering both biological and environmental factors. The study by Stalsberg & Pedersen (2018) sheds light on the challenges associated with assessing differences in physical activity across socioeconomic groups and underscores the importance of considering various physical activity variables when examining this relationship. Further, research incorporating a broader range of indicators is essential to enhance our understanding of how socioeconomic factors impact adolescent physical activity levels. Baker et al. (2015) work underscores the importance and effectiveness of community-wide interventions in increasing physical activity levels within populations. These interventions not only promote physical activity but also enhance knowledge, intention, and cardiovascular health outcomes. Further, research is needed to address gaps in understanding the optimal components and delivery mechanisms of community-wide campaigns for promoting physical activity. The systematic review and meta-analysis by Owen et al. (2022) provide valuable insights into the relationship between socioeconomic status and participation in organised sports and physical activity among children and adolescents in high-income countries. The study emphasises the need for targeted interventions to address socioeconomic disparities and promote equitable access to sports programs for youth across different socioeconomic backgrounds. O'Donoghue et al. (2018) literature review sheds light on the socio-economic determinants of physical activity across the life course.

The aforementioned studies revolve around the intersection of physical activity, sports participation, and socio-economic factors across various age groups. These studies are based on a systematic review of the literature (Table 1), as outlined in the methodology manual. Our focus is on exploring the relationship between sports participation and social mobility, which has not yet been thoroughly investigated through a bibliometric lens. This reflects a knowledge gap that exists in the current literature (Miles, 2017). Furthermore, we employed bibliometrics as a methodology, which has not yet been utilised in this context. This represents a methodological gap that needs to be addressed (Miles, 2017). To address these gaps, we have formulated the following research questions:

RQ 1: What is the growth trajectory?

RQ2: what are the major contributors?

RQ 3: What is the geographic distribution?

RQ 4: What is the Conceptual and Intellectual Structure?

Table 1. Related review articles

Authors/	Document Type	Database employed	WoS Categories/ Domain
(James et al., 2023)	Systematic review conducted according to the PRISMA framework.	Science Direct, PubMed, and Sportdiscus A total of 19 studies were included, with a total of 6788 participants	Physical activity, academic performance, school-aged children.
(Owen et al., 2022)	Systematic Review and meta-analysis	Scopus, SportDiscus, PubMed, Medline, APA Psych Info	Socioeconomic disparities, physical activity and sport participation, children, adolescents
(O'Donoghue et al., 2018)	Umbrella literature review.	Medline, Embase, ISI Web of Science, Scopus and SPORTDiscus	Socioeconomic determinants of PA and PA
(Stalsberg & Pedersen, 2018)	Review of individual studies	MEDLINE, ISI Web of Knowledge, SPORTDiscus databases.	Socioeconomic status (SES) and physical activity (PA)
(Baker et al., 2015)	Review of 33 studies total of 267 communities were included	The Cochrane Library, MEDLINE, EMBASE, SPORTDiscus, etc.	Community wide interventions for increasing physical activity.
(Stalsberg & Pedersen, 2010)	systematic Review	PubMed, ISI Web of knowledge, and SPORT-Discus (Sixty-two articles)	Physical activity, socioeconomic status (SES), adolescents
(Stodolska & Alexandris, 2004)	Review	1324 students	Sport, ethnic minorities
(Parsons et al., 1999)	Systematic Review	Medline, Embase, CAB abstracts, Psyclit and Sport Discus	Risk factors for obesity, parental fatness, social factors, birth weight, timing or rate of maturation, physical activity, dietary factors, behavioural or psychological factors.

2. METHODS

The approach bibliometric was used to address the research questions of this study which is one of several methods to conduct a systematic literature review of a particular research field to summarize and conceptualize the body of literature (Mukherjee et al., 2022). It analyses

bibliographic data of publications such as their authors, keywords, citations, journals, etc. that can be extracted from different databases (e.g. Scopus, Web of Science, Dimensions, etc.) (Donthu et al., 2021; Gan et al., 2022). The involvement of quantitative, and statistical measures, and technology in this method ensures the objectivity and comprehensive coverage of the study (Mukherjee et al., 2022). Bibliometrics offers mainly two categories of analysis namely, performance analysis, and science mapping (Donthu et al., 2021). The former is used for the analysis of research constituents (e.g. authors, institutions, countries, and journals) whereas the latter explores the relationships between constituents. In this work, both performance mapping and science mapping have been used to answer the predefined research questions. Ethical approval for this study was obtained from Departmental Research Development Committee (DRDC).

2.1. Data Extraction and Curation

This work is focused on the different aspects of socioeconomic mobility through sports. We extracted documents from the database 'Web of Science' where most of the reputed journals with high impact factors are indexed. For the extraction of data, we made a list of multiple keywords and the various combinations of that. The combination of keywords that provide the most appropriate results is as follows:

Results for ("sport*" or "sports participation" or "athletic participation") and ("social mobility" or "income mobility" or "socio-economic transformation" or "economic change" or "socio-economic status" or "socioeconomic change" or "socio-economic").

This combination of keywords applied in the database results in a total of 634 documents. Further, available filters of the Web of Science database were used for the curation of data and reaching out to the exact number of sample articles for the analysis. The steps to get the sample documents are illustrated through Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Kovačević & Hallinger, 2019) (see Figure 1).

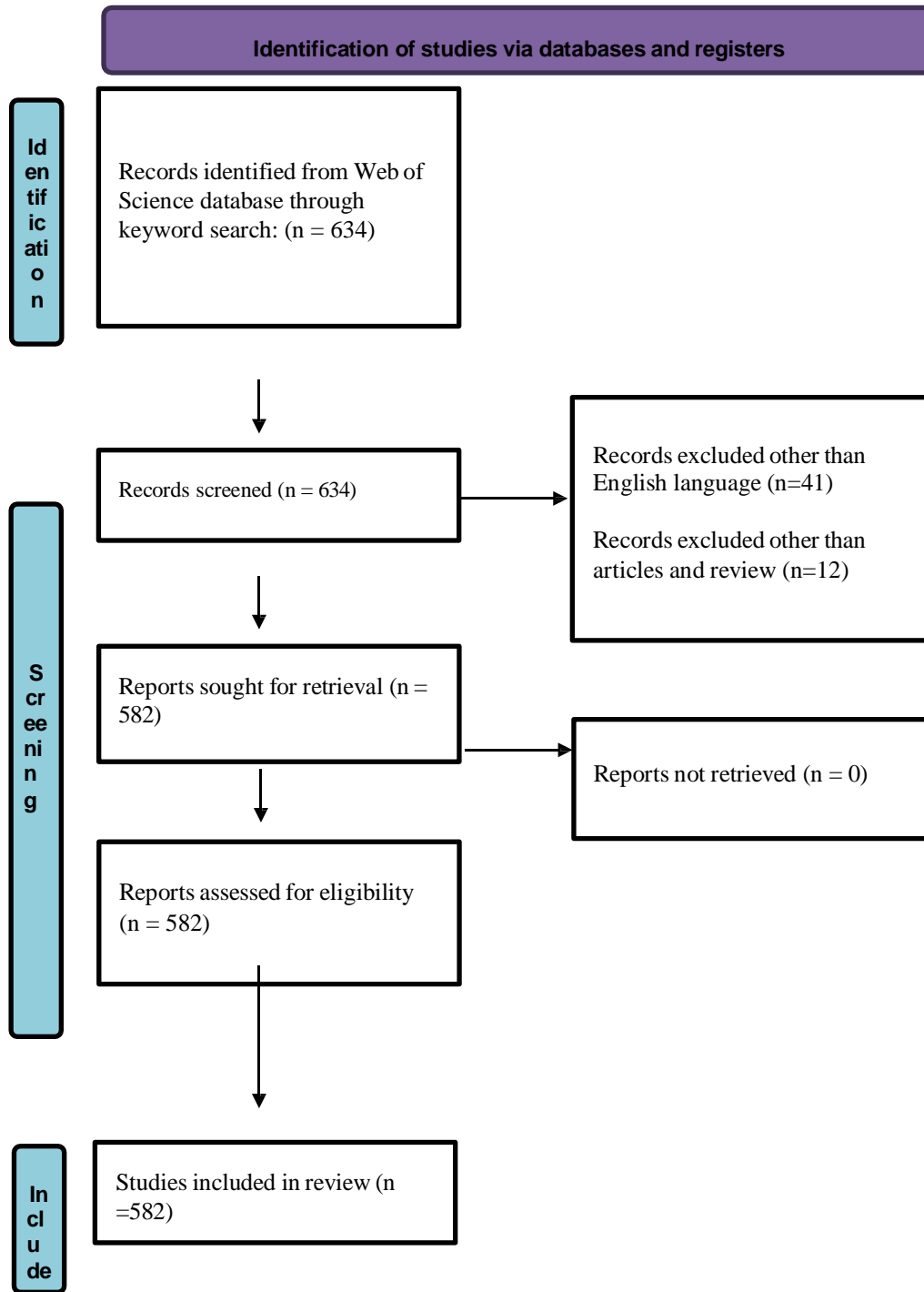


Figure 1. PRISMA flow chart

2.2. Data Analysis

This work uses various analyses to address the predefined research questions, for the analysis biblioshiny of R package and VOS viewer were used. Firstly, we provided growth trajectories to ascertain the growth and development of the field. Secondly, we offer the performance of research constituents namely, authors, journals, and countries. Lastly, the relationship between research constituents was analysed through keyword co-occurrence and author co-citation analysis. All together these analyses provide a holistic picture of the field that contributes to the existing body of literature and helps to further navigate.

3. RESULTS

Figure 2 shows how the number of scientific publications on sports and social mobility changed over time.

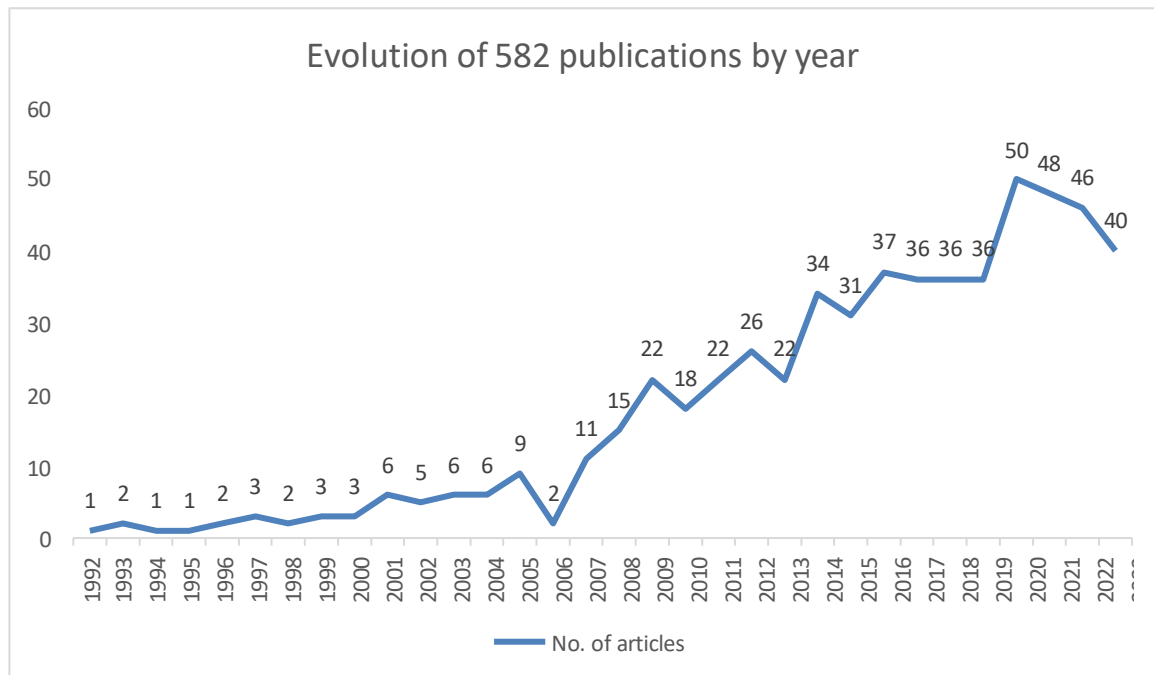


Figure 2. Growth trajectory of publications in sports and social mobility (1992–2000).

Note. Source: Authors' own elaboration

The progression of scholarly activity in sports and social mobility can be delineated into three distinct stages. The initial phase, encompassing the years 1992 to 2000, witnessed minimal engagement in academic endeavours. However, the number of published articles experienced a notable upsurge during this period. In 1992, the publication count stood at a mere one article, but by 2000, it had escalated to six. The total number of publications during this timeframe amounted to 18.

The subsequent stage, referred to as the Pre-Expansion Stage, spanning from 2001 to 2010, witnessed an increasing recognition of the significance of delving into the domain of sports and social mobility as a combined field of scholarly inquiry and practical application. The number of published articles exhibited a substantial growth trajectory over time, surging from six in 2001 to eighteen in 2010. The total number of publications during this period reached 100. The final phase, known as the Expansion Stage, spanning from 2011 to 2023, showcased a consistent number of articles, signifying a period of steady advancement. The number of articles remained relatively stable, fluctuating between 22 in 2011 and 40 in 2023, except for a peak of 50 articles published in 2020, summing up to a total of 464. Recently, there has been a slight downturn in the field, most likely attributable to the repercussions of the COVID-19 outbreak. Nevertheless, it is anticipated that the field will persist in expanding in the foreseeable future.

3.1. Influential Journals

Table 2 presents a comprehensive overview of the academic work done in the realm of sports and social mobility. It includes details such as the number of articles, H-Index, 2019-22 documents, 2019-22 citations, Cite Score, affiliation, and scope of different journals.

Table 2. Influential journals ranked by local number of articles

S.no.	Journals	Articles Local	H-INDEX (Scimago)	2019-22 Documents (SCOPUS)	2019-22 Citations (SCOPUS)	Cite Score (SCOPUS)	Affiliation (SCOPUS)	Scope (SCOPUS)
1.	BMC Public Health	29	178	8324	51163	6.1	United Kingdom	Public Health, Environmental and Occupational Health
2.	International Journal of Environmental Research and Public Health	18	167	44775	241049	5.4	Switzerland	Public Health, Environmental and Occupational Health
3.	Sport Education and Society	17	74	296	2057	6.9	United Kingdom	Education
4.	International Journal of Behavioral Nutrition and Physical Activity	15	142	612	7722	12.6	United Kingdom	Physical Therapy, Sports Therapy and Rehabilitation
5.	Journal Of Science and Medicine in Sport	14	117	778	6038	7.8	Netherlands	Physical Therapy, Sports Therapy and Rehabilitation
6.	International	13	24	353	193	0.5	United	History Sports

	Journal of the History of Sport						Kingdom	Science Social Sciences
7.	International Review for the Sociology of Sport	11	66	244	1339	5.5	United Kingdom	Social Sciences (miscellaneous)
8.	Plos One	10	404	63236	377961	6	United States	Multidisciplinary
9.	Public Health Nutrition	10	156	1601	9171	5.7	United Kingdom	Public Health, Environmental and Occupational Health
10.	Sustainability	10	136	48,515	2,81,274	5.8	Switzerland	Geography, Planning and Development
11.	Sport In Society	9	46	529	1554	2.9	United Kingdom	Cultural Studies
12.	Social Science & Medicine	8	270	2703	21470	7.9	United Kingdom	History and Philosophy of Science
13.	Dental Traumatology	6	90	294	1498	5.1	Denmark	Oral Surgery
14.	European Sport Management Quarterly	6	45	150	1109	7.4	United Kingdom	Strategy and Management
15.	Leisure Studies	6	74	228	1014	4.4	United Kingdom	Geography, Planning and Development

The United Kingdom and Switzerland are notably prominent affiliations in this domain, with several journals based in each country. The journals cover a wide range of topics, including public health, environmental and occupational health, education, history, social sciences, and multidisciplinary studies. Across the 299 journals identified in the Web of Science (WOS) search, it is interesting to note that the top 15 journals accounted for 31 per cent of the entire corpus, indicating a concentration of sports and social mobility knowledge. It is important to mention that although “BMC Public Health” is the top contributor to research on sports and social mobility in terms of the number of publications in the WOS database, the last four years of the Scopus Database of journals show that “Sustainability” has published the highest number of articles and has had the greatest impact in terms of citations. The significant number of citations received by articles published in these journals serves as compelling evidence of their scholarly impact, which in turn reflects positively on the excellence and influence of research in the field of sports and social mobility.

3.2. Influential Authors

Table 3 provides a comprehensive overview of prominent researchers in the realm of health, physical activity, and sports sciences. It showcases their published articles, total citations, h-index, i10-index, Google Scholar citations, institutional affiliations, nationality, and areas of research interest. These are the frequently published and cited authors ranked by total Google Scholar citations, with a minimum of 4 WoS documents published further considered authors having more than 3000 Google Scholar citations.

Table 3. Influential authors ranked by Google Scholar citations

S. no.	Authors	Articles	Local Total Citations	h-index	i10-index	Google Scholar citation	Institutional affiliations	Nation	Research interest
1.	Bauman A	4	31	169	888	161809	Sydney University	Australia	Public health physical activity program evaluation methods mass media campaigns implementation & scale-up
2.	De Bourdeaudhuij I	7	165	135	612	65251	Ghent University	Belgium	Health promotion, intervention studies, social and environmental determinants of behavior
3.	Salmon J	5	80	120	408	57912	Deakin University	Australia	Physical activity sedentary behavior
4.	Mensink GBM	5	238	73	186	57898	Robert Koch Institute	Germany	Nutrition Epidemiology physical activity obesity
5.	Ball K	4	335	99	326	44791	Deakin University	Australia	Women's health physical activity healthy eating health equity socioeconomic disadvantage
6.	Okely AD	5	89	93	275	38875	University of Wollongong	Australia	Physical activity sedentary behaviour child health movement behaviours
7.	Cardon G	5	109	94	329	34983	Ghent University	Belgium	Physical activity sedentary behaviour health promotion

8.	Foster C	4	220	73	195	23960	University of Bristol	Australia	Physical Activity Research
9.	Lechner M	4	197	58	124	14923	Swiss Institute for Empirical Economic Research (SEW)	Switzerland	Sports Economics
10.	Breuer C	7	298	58	197	11154	German Sport University Cologne	Germany	Non-profit managements port management organizational economics
11.	Harvey JT	4	308	45	99	9747	Federation University Australia	Australia	Participation in sport and physical activity
12.	Eime RM	4	308	44	89	9448	Victoria University and Federation University	Australia	Investigating sport participation and facilities, and health outcomes, for evidence-based decision making across the sport and recreation sector
13.	De Waure C	5	51	47	156	9108	Università degli Studi di Perugia	Italy	Epidemiology Clinical Epidemiology Biostatistics Meta-Analysis Public Health
14.	Wicker P	8	285	53	150	8872	Bielefeld University	Germany	Sport Management and Sport Sociology
15.	Hallmann Kirstin	4	150	36	62	5029	German Sport University Cologne	Germany	Consumer Behaviour in Sport and Tourism Sport Management Sport Marketing
16.	Poscia A	5	51	35	67	3787	Public Health Institute, Catholic University "Sacro Cuore", Rome		Public Health Epidemiology Health Service Research Active aging Vaccine
17.	Belton S	4	20	28	59	3156	Dublin City University	Ireland	Physical Activity Physical Education Health Physical Literacy Health Literacy

Based on the data, it is evident that P. Wicker and Breuer C. from Germany have achieved significant total citations and h-indices. Similarly, De Bourdeaudhuij has an exceptionally impressive h-index of 135. The researchers have a wide range of interests, including non-profit management, sports economics, epidemiology, clinical trials, physical activity, sedentary behaviour, and other areas of study. Their affiliations with institutions in Germany, Belgium, Italy, Australia, Switzerland, Poland, Spain, Ireland, and the United Kingdom emphasise the international scope of the research. Several Australian researchers, including Dr. Salmon, Dr. Ball, and Dr. Bauman, have made significant contributions. These authors bring together a wide range of expertise from various fields, offering valuable perspectives on topics like health promotion, epidemiology, and sports economics. Their affiliations with universities, research institutes, and governmental bodies highlight the global reach of modern scientific investigation. The data showcases a wide range of research impact, with certain researchers building a lasting influence, while others make significant contributions early on in their academic journeys.

3.3. Influential Documents

Next in table 4, a citation analysis was conducted to identify the most influential research papers in the field of sports and social mobility. The examination of these influential documents reveals noteworthy patterns in the literature.

Table 4. Influential documents (most highly cited papers) ranked by total citation in WoS

Rank	Paper Title	Source	Type	Total Citations WoS	Google Citations dated 23 jan 2024	Citations
1	Childhood predictors of adult obesity: a systematic review	Int j obesity	Review	824	1880	(Parsons et al., 1999)
2	Impact of climate change on hydrological regimes and water resources management in the rhine basin.	Climatic change	Conceptual	444	821	(Middelkoop et al., 2001)
3	Socio-economic status, dietary intake and 10 y trends: The Dutch National Food Consumption Survey.	European journal of clinical nutrition	Empirical	306	560	(Hulshof et al., 2003)
4	Effects of socioeconomic status on the physical activity in adolescents: A systematic review of the evidence.	Scandinavian journal of medicine & science in sports	Review	262	544	(Stalsberg & Pedersen, 2010)
5	Destinations that matter: Associations with walking for transport	Health & place	Conceptual	212	393	(Cerin et al., 2007)
6	Do features of public open spaces vary according to neighbourhood socio-economic status?	Health & place	Empirical	209	381	(Crawford et al., 2008)

7	COVID-19 social distancing in the Kingdom of Saudi Arabia: Bold measures in the face of political, economic, social and religious challenges.	Travel medicine and infectious disease	Empirical	203	427	(Yezli & Khan, 2020)
8	Assessing the environmental impacts of mega sporting events: Two options?	Tourism management	Conceptual	195	541	(Collins et al., 2009)
9	A Multidimensional Approach to Post-concussion Symptoms in Mild Traumatic Brain Injury.	Frontiers in neurology	Review	193	350	(Polinder et al., 2018)
10	Family support and ease of access link socio-economic status and sports club membership in adolescent girls: A mediation study.	International journal of behavioral nutrition and physical activity	Empirical	190	173	(Eime, Harvey, et al., 2013)
11	Socio-economic determinants of physical activity across the life course: A “DEterminants of Diet and Physical ACTivity” (DEDIPAC) umbrella literature review.	Plos one	Conceptual	158	290	(O’Donoghue et al., 2018)
12	Life-course perspective for physical activity and sports participation	European review of aging and physical activity	Conceptual	148	340	(Hirvensalo & Lintunen, 2011)
13	Long-run labour market and health effects of individual sports activities	J health econ	Empirical	147	376	(Lechner, 2009)
14	Causes and prevalence of traumatic injuries to the permanent incisors of school children aged 12 years in Jaragua do Sul, Brazil	International dental journal	Conceptual	142	354	(Marcenes et al., 2000)
15	Trends in children’s physical activity and weight status in high and low socio-economic status areas of Melbourne, Victoria, 1985-2001.	Australian and New Zealand journal of public health	Empirical	138	299	(Salmon et al., 2005)

Out of the top 20 most cited papers, 4 are categorised as review articles (Parsons et al., 1999; Stalsberg & Pedersen, 2010), indicating a growing trend in utilising research reviews as foundational references for comprehending key trends in sports and social mobility research. 9 are categorised as conceptual papers (Cerin et al., 2007; Collins et al., 2009; Hirvensalo & Lintunen, 2011; Marcenes et al., 2000; Middelkoop et al., 2001; O’Donoghue et al., 2018; Polinder et al., 2018; Spaaij, 2012; Stalsberg & Pedersen, 2018; Tuinstra et al., 1998). This suggests a prevalent interest in theoretical frameworks, conceptualizations, and models within the sports and social mobility research community. The inclusion of conceptual papers indicates a focus on developing and refining theoretical foundations and frameworks to guide empirical research and advance understanding in the field. These conceptual works likely contribute significantly to shaping the discourse and providing a theoretical basis for subsequent studies in sports and social mobility.

3.4. Geographic Distribution

As the number of publications in this field has been on the rise, it is evident that sports and social mobility research has gained significant attention from scholars in the field of sports. An extensive and comprehensive geographic distribution of sports and social mobility research articles, for instance, indicates the development of a knowledge base that is diverse on a global scale. The map in Figure 3 illustrates the extensive coverage of the sports and social mobility knowledge base across various regions of the world. However, the field of sports and social mobility research has primarily been influenced by scholars based in economically developed countries. These countries, including the United Kingdom, Australia, Germany, USA, Spain, Netherlands, Italy, and Canada, contribute to 57 per cent of the existing sports and social mobility database.

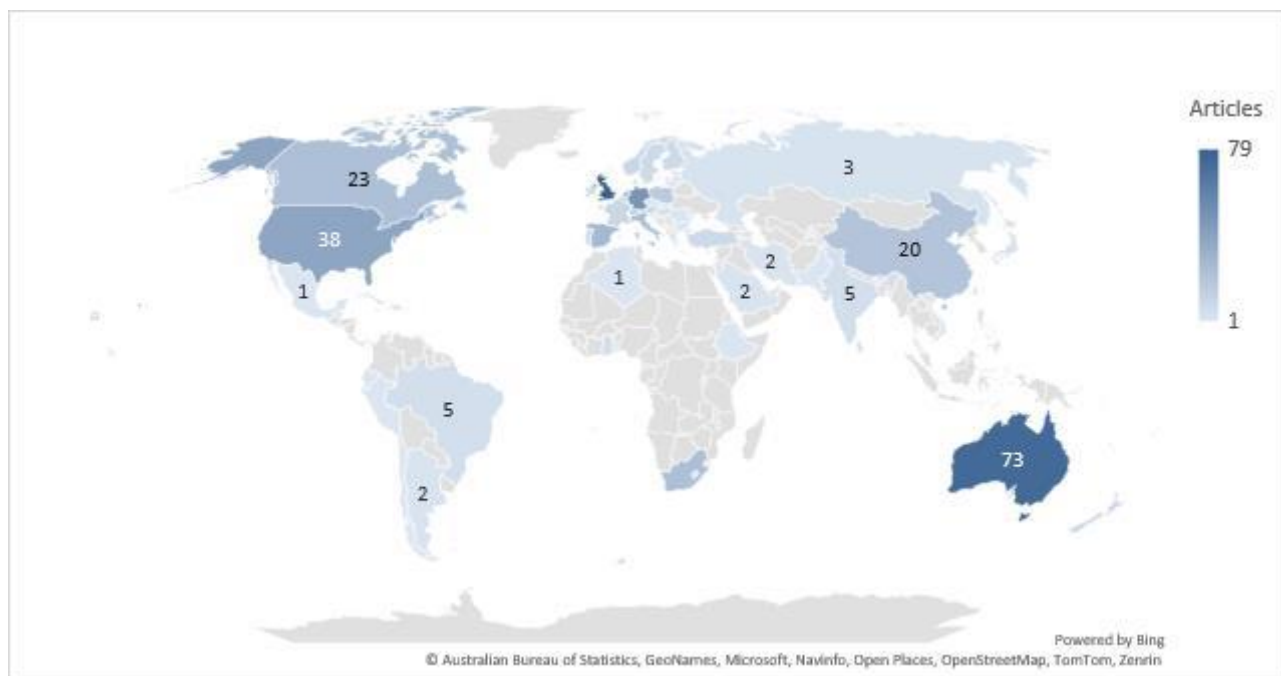


Figure 3. Geographic distribution of the literature, 1992–2023, No. of articles – 582
Note. Source: Authors' own elaboration

3.5. Conceptual and Intellectual Structure

3.5.1. Keywords co-occurrence analysis

We have conducted keyword co-occurrence analysis, to identify trends in the topical foci studied by SM&S scholars. (Zupic & Čater, 2015) highlighted that keyword co-occurrence analysis reveals closely related concepts in documents. Co-word analysis creates a network of themes and their relationships, representing the conceptual space of a field based on keywords. The size of the

nodes represents the frequency of co-occurrence, and the distance represents the conceptual closeness, the thickness of the links represents strength.

The co-word search was set to “All Keywords” with a threshold of at least 10 co-occurrences that resulted in 64 out of 2982 keywords. A thesaurus file was used to reduce duplicate keywords (for instance Adolescents was merged to Adolescent, Sports was merged to Sport), as a result, the 66 most frequently co-occurring keywords remained in the analysis that formed 4 clusters (see Figure 4).

The co-word analysis identified "Physical Activity", "Health", and "Sports" as the most common and central keywords in the SM&S literature. These concepts demonstrate strong relationships across all four clusters, with "Physical Activity" being a key anchoring construct at the core of the map.

The **green cluster** is associated with the subfield of “*Physical Activity and environment*” This cluster explores the impact of involvement in different types of “Physical Activity and sports” (e.g Active travel, Walking, Cycling), on “children and adolescents” of different socioeconomic “environment” (e.g., public open spaces, Urban greenspaces, green school grounds). Also located within this cluster is a set of keywords associated with intervention, policy, school, physical education, sports, walking, inactivity, and association. Active travel, family dynamics, and socio-economic background are identified as important determinants of physical activity levels in children. Overall, policies and interventions are needed to improve access to green spaces and promote physical activity in schools.

The **blue cluster** of the map refers themes related to “*Social mobility and Participation*”. This cluster explores the themes of gender, attitudes, race, benefits, leisure, adolescence, youth, social mobility, and football. This cluster explores the theme's intricate relationship between sport and social mobility, encompassing various aspects such as participation, leisure, and youth engagement. Issues of inclusion and social integration are tackled through the lens of recreational sport, particularly in marginalised communities, emphasising both the potential and limitations of sport in contributing to social capital.

The **Yellow cluster** of the map surface themes related to “*Physical Activity pattern and Long-term health outcome*”. This cluster explores the themes around the keywords “Weight, Overweight, Obesity, sedentary behaviour, children, age, risk factors, predictors”. This cluster explores the multifaceted relationship between socio-economic factors and health-related outcomes, particularly

3.5.2. Collaboration Pattern of Authors

Author co-citation Analysis (ACA) has been conducted to identify the school of thought within a domain similar to these studies (Kovačević & Hallinger, 2019). A total 94 out of 18896 authors meet the threshold of having a minimum of 12 citations by using association normalisation that formed four clusters which further identified as the core themes/school of thought. Each School of Thought is indicated by a different coloured/shaded cluster of authors (see Figure 5).

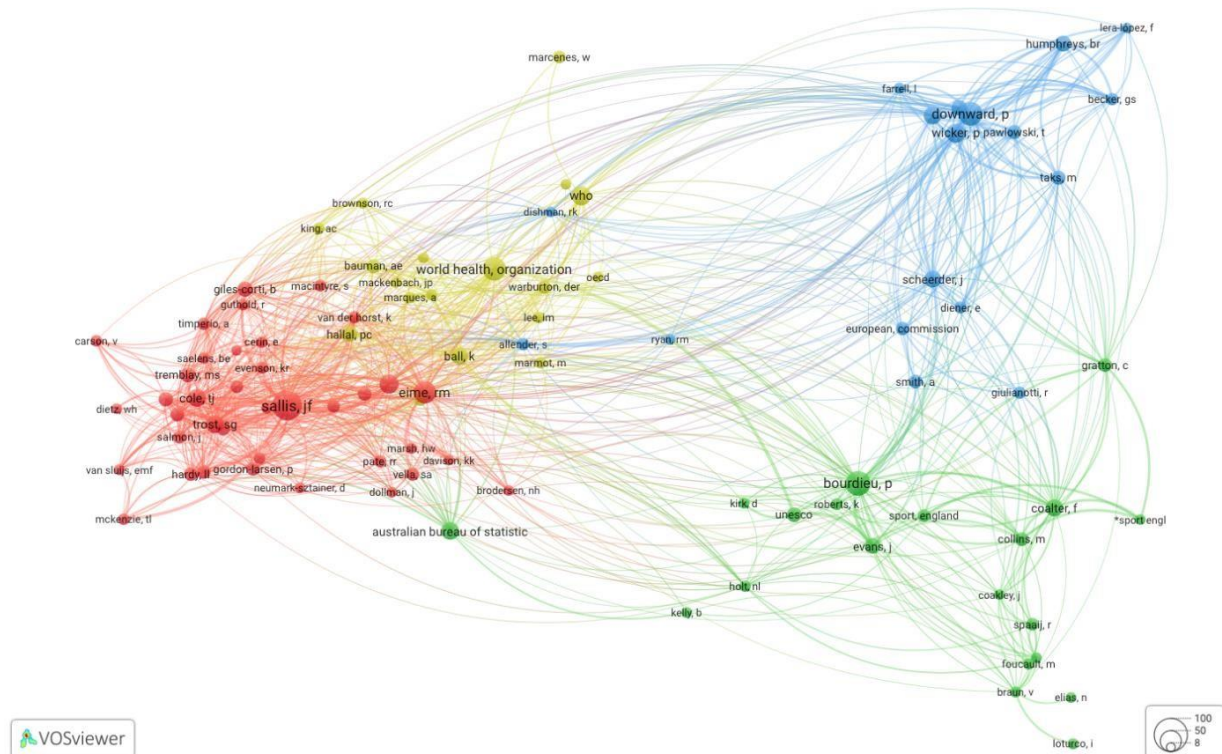


Figure 5. ACA, Total Link Strength – 2664, Total Link- 1633

Note. Source: Authors' own elaboration

The **Blue Cluster**, comprising Christoph Breuer, Tim Pawlowski, Jeroen Scheerder, and Pamela Wicker have researched the “*SEI (Sports Economics Influence)*”. Research on sports participation and its relationship with income and time expenditure has found that income has a positive effect on both time and money spent on sports, with variations across different sports (Scheerder et al., 2005). However, the price of time, calculated by the wages earned by participants, does not significantly influence the choice of sport (Taks et al., 1994). Breuer et al. (2010) and Davison & Cowan (2020) both note a decline in sports participation with age, but Breuer also highlights the influence of gender, income, and education. Breuer & Hallmann (2013) and Nicholson

et al. (2011) both highlight the positive impact of elite sports and sports participation on national pride, happiness, and social capital. Breuer & Hallmann (2013) specifically identifies women, individuals with low educational backgrounds, low income, and those with a migration background as the segments of the population that benefit most from elite sporting success. Social inequalities in leisure-time sports participation persist, with age, gender, and social class being key factors (Scheerder et al., 2005). Schüttoff et al. (2017) and Toftegaard-Støckel et al. (2011) both highlight the positive impact of sports participation on social capital and the influence of parental, socioeconomic, and cultural factors on adolescents' sports participation. Pawlowski et al. (2021) further explores the individual labour market effects of local public expenditures on sports, finding that high annual expenditure levels can lead to additional household net income, particularly for men. Downward et al. (2014) add to this by emphasizing the intergenerational transfer of behaviours, with parental attitudes and behaviours significantly influencing children's sports participation. These studies collectively underscore the multifaceted influence of sports participation on individuals, from social and economic benefits to the role of parental influence. Downward & Riordan (2007) further emphasizes the role of social and personal capital in determining sports participation and the positive impact of sports participation on subjective well-being. Breuer and Pawlowski have investigated the impact of sports infrastructure on sport participation and consumer expenditure. Scheerder's research has focused on the determinants of sport participation and consumer expenditure, including the influence of age, gender, education, and income level. Wicker's work has examined the impact of socioeconomic status on sports participation and future success, highlighting the economic divide that exists in sports participation. Overall, the scholars' research contributes to the understanding of the economic aspects of sports participation, including the influence of socioeconomic status, income level, and social inequalities on sports participation and consumer expenditure.

The **Green Cluster**, consisting of Pierre Bourdieu, Ramón Spaaij, Chris Gratton, John Evans, Frank Coalter, and Michael Collins, focuses on the “SSD (*Sports Sociology Dynamics*)”. Their research covers social and cultural factors, gender-specific considerations, infrastructural influences, policy-driven effects, and societal dimensions, contributing to a comprehensive understanding of the social dynamics within sports. Bourdieu, in particular, is known for his work on the sociology of sport, including his study of social class and sport and his exploration of the dynamics of class and status power in advanced capitalist societies. Spaaij has researched participatory research in sport-for-development (Spaaij & Schailée, 2021). Coalter (2015) has researched the socioeconomic patterns of sports demand and ageing. Evans has researched the social impact of participatory

sporting events. Gratton et al. (2006) has researched the segmentation of participants in a sports event using cluster analysis. MacClancy (1996) and Whannel (2002) both explore the construction of identity in the context of sport, with MacClancy focusing on the role of sport in shaping national and ethnic identities, and Whannel examining the portrayal of sports stars in the media and their influence on societal perceptions of masculinity. Horne & Manzenreiter (2006) delve into the cultural and economic aspects of sports mega-events and the commercialization of sports stars, respectively. These studies collectively highlight the intricate relationship between sport, identity, and media, and the various ways in which these elements intersect and influence each other.

The **Red Cluster**, consisting of James F. Sallis, Rochelle M. Eime, Stewart G. Trost, Billie Giles-Corti, and David R. Lubans, focuses on “*SWI (Sports Wellness Impact)*”. Their research explores the intersection of physical activity and public health, emphasizing environmental and policy factors, urban planning, and community design. Molina-Garcia et al. (2017) is interested in promoting physical activity and understanding policy and environmental influences on physical activity, nutrition, and other health behaviours. Eime aims to create evidence of the health benefits of participation in sports and to provide evidence to inform sports and policymakers on how to promote physical activity (Eime et al., 2013). Trost's research interests include device-based assessment of physical activity and sedentary behaviour, early life prevention of childhood obesity and chronic disease, therapeutic exercise programs for children with chronic health conditions, and the relationships between physical activity and other health behaviours (Trost et al., 2002). Giles-Corti's research focuses on the built environment and its impact on health, including the relationship between the built environment and physical activity (Crawford et al., 2008). Lubans et al. (2022) research interests include physical activity and health promotion in children and adolescents, with a focus on school-based interventions.

The **Yellow Cluster**, consisting of Kylie Ball, Aaron Einstein Bauman, Ragna Strasberg, Wanbun, and P.C., delves into the complex interplay of “*SPF (Sports Participation Factors)*”, with a particular emphasis on children, adolescents, and individuals facing socioeconomic disadvantages. The common theme across these research articles underscores the substantial impact of socioeconomic status on physical activity levels and sports engagement. Interventions, such as voucher programs, emerge as effective strategies for mitigating financial barriers and promoting participation in organized sports and physical activities, especially among children from socioeconomically disadvantaged backgrounds. These studies help us learn more about the complicated factors that affect peoples’ physical activity habits across a wide range of age groups and

genders. They do this by using systematic reviews, longitudinal analyses, and in-depth looks at personal, social, and environmental factors. The findings collectively emphasize the need for targeted interventions to address socioeconomic disparities and foster greater inclusivity in sports and physical activity initiatives.

4. CONCLUSIONS

The review of research on SM&S aimed to analyse the evolution of research in this field over the past three decades. The study encompassed 582 WoS-indexed documents, indicating a substantial knowledge base on SM&S. The research highlighted the exponential growth in the number of documents from 1992 to 2023, particularly after 2003. Geographically, the influence of developed nations was evident in the research. The study identified key topics such as physical activity and environment, social mobility and participation, physical activity patterns and long-term health outcomes, mental health, and Exercise as significant areas of discussion. Noteworthy authors in this field include Bauman A, De Bourdeaudhuij I, and Salmon J, with highly cited articles by Parsons et al. (1999); Middelkoop et al. (2001); Hulshof et al. (2003). Through co-citation analysis, the study identified four major schools of thought: SEI (Sports Economics Influence), SSD (Sports Sociology Dynamics), SWI (Sports Wellness Impact), and SPF (Sports Participation Factors).

5. LIMITATIONS AND FUTURE RESEARCH

The limitations of the review on SM&S research include focusing solely on WoS-indexed documents, which may have excluded studies from major journals not covered by WoS. To address this limitation, co-citation analysis was used to mitigate the exclusion of impactful studies not included in the data collection. Additionally, the bibliometric synthesis method was limited to general research directions and development rather than reviewing specific document results. Another constraint was the use of only English language documents from WoS, excluding publications in other languages like Spanish.

For future research, there is a call for more thematic reviews to delve deeper into the four SM&S thematic strands. By employing bibliometric and content analysis methods, researchers can map the development of SM&S research across different geographic regions. Future studies could explore understudied areas such as sports as a tool of social mobility in developing countries and the significance of physical fitness for all individuals within the SM&S framework.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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