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Research Article

A Bibliometric Analysis of Global Footwear Industry

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ABSTRACT

Footwear plays a crucial role in safeguarding and providing comfort to human feet, making it an object of interest for both fashion and health considerations. Over recent years, there has been a notable surge in footwear research, spanning various domains such as biomechanics, materials science, design, and comfort. The objective of this bibliometric analysis is to scrutinize the trends and patterns prevalent in footwear literature. The methodology employed entailed a systematic exploration of academic publications pertaining to footwear, utilizing the Scopus database, renowned for its comprehensive coverage of scholarly works. Employing search terms like "footwear industry," "shoes," "boots," and "sneakers," articles were selected if they featured any of these terms in their title, abstract, or keywords. The data analysis was executed using Rstudio and VOSviewer software, facilitating the visualization of keyword co-occurrences and citation networks. The findings underscore a remarkable expansion in footwear studies, evident through a diverse array of research themes and contributions originating from various countries. Indeed, footwear research has experienced substantial growth over the past two decades, as evidenced by the escalating number of publications and citations. Leading the charge in footwear literature contributions is the United States, closely followed by China and Italy. Footwear emerges as an intriguing and indispensable subject of inquiry, garnering increased attention and significance in recent times. This bibliometric analysis furnishes an overview of the prevailing research trends and patterns within footwear literature, offering valuable insights for researchers and practitioners alike to discern research lacunae and chart future research trajectories.

Keywords: footwear, footwear industry, shoes, footwear manufacturers

Introduction

The global footwear industry stands as a pivotal segment within the broader fashion and apparel sector, encompassing a diverse range of products designed to cater to varying consumer needs, preferences, and demographics. This industry not only reflects the dynamic interplay of fashion trends and technological advancements but also serves as an essential component of everyday life, providing both functional and aesthetic value. The history of footwear can be traced back to ancient civilizations where early forms of shoes were crafted primarily for protection and utility. Over centuries, footwear evolved from rudimentary designs made from natural materials to intricate creations showcasing the craftsmanship of various cultures. The industrial revolution marked a significant turning point, introducing mechanized production methods that allowed for mass production and standardization of sizes, thereby making footwear more accessible to the general populace. The footwear industry holds significant importance within India's leather industry. India stands as the second-largest footwear producer globally, trailing only behind China (Szubert et al., 2001). Over time, the Indian footwear sector has established robust connections within the global production network. Notable transformations have occurred in the structure and dynamics of the world economy in recent decades. The conventional model of developing nations exporting primary products to industrialized counterparts in exchange for manufactured goods has evolved. Presently, industrialization results from a tightly integrated global trade and production system. Within this emerging framework, production capacity is distributed across

an unprecedented number of both developing and developed nations. Often, the production of a single product involves multiple countries (Barak et al., 2023; Rathee & Chhikara 2023). For instance, the Ford Escort is recognized as a "world car," its components sourced and assembled in 15 countries across three continents (Gereffi, 1989:97; Gereffi and Korzeniewicz, 1990). This shift is attributed to core economies redirecting a greater portion of their activities towards the distribution and consumption phases of commodity networks, activities yielding higher profit margins (Gereffi and Korzeniewicz, 1990). In the global economy, advancing requires continual progress beyond the ongoing expansion of distributional and consumption activities within commodity networks. However, the footwear industry remains predominantly under the control of firms focused on serving the domestic market through artisanal production methods. Within traditional footwear clusters, specific centers and segments of firms have cultivated strong ties with the export market (Sarkar, 2003). There is a prevalent belief that the globalization of industries like footwear has been driven by a product life-cycle characterized by sequential exploitation of increasingly inexpensive labor sources (Froebel, Heinrichs & Kreye, 1980; Safa, 1986; Sklair, 1993). The Indian footwear industry stands among the 25 sectors prioritized by the Government of India under the "Make in India" initiative. Over time, the Indian footwear sector has exhibited significant growth. In 2009, the industry's total value stood at 7.8 USD billion, a figure that escalated to 12.8 USD billion by 2014, with projections suggesting it could reach 80 USD billion by 2030. Approximately 40 percent of footwear in the Indian market is distributed through modern retail channels, while the remaining 60 percent is handled by the unorganized sector. In India, footwear sales consist of 20 percent leather footwear and 80 percent synthetic footwear. Despite India holding the position of the second-largest footwear industry globally, Indian footwear manufacturers have yet to establish any notable global brands or achieve market leadership in footwear production and export (Khanna & Studies, 2018). Indeed, footwear production is characterized by several factors that underscore the significance of labor. Shoemaking typically involves the intricate assembly of numerous components through sewing and/or cementing processes, performed individually and in sequence. The competitiveness of quality shoes hinges on factors such as design, high-grade leather, and stringent quality control, prompting a preference for in-house production situated in close proximity to key fashion markets (Lowder, 1999). Agra stands out as India's most diverse and closely interconnected footwear cluster, retaining the characteristics of an artisan-rooted, low-tech cluster primarily comprised of small producers. The competitiveness of Agra's footwear industry hinges significantly on the availability of skilled artisan labor, which is abundant in the region. Manufacturers in the footwear sector leverage this large, skilled, and adaptable labor force, predominantly sourced locally, although some migration from neighbouring districts and other states may occur (Sarkar, 2003). Despite notable advancements in shoemaking technology over the past decade and a half, labor remains the most significant recurring cost component for footwear production in advanced economies (AEs). Estimates indicate that labor costs constitute a substantial proportion of shoe production expenses, ranging from approximately 40% for trainers manufactured in the Far East (Donaghu & Barff, 1990) to around 33% in Korea in 1990 (Lim, 1994). Similar figures were reported for UK manufacturers, averaging around 33% in 1990 and decreasing slightly to 25% by 1996 (BFMF, 1992; Martinson, 1996). Notably, in Indonesia, where a significant portion of materials was imported, labor costs dropped to 12% (Lim, 1994). Footwear small and medium-sized enterprises (SMEs) exhibit significant potential for value addition and employment generation. These enterprises play a pivotal role as drivers of commercial expansion, catering to both domestic and international markets while offering employment opportunities at relatively low costs. Despite the considerable potential of footwear SMEs, they encounter numerous challenges that must be addressed to fully realize their capabilities.

1. Objective of the study

This study aims to analyze the leading authors, highly cited documents, yearly scientific output, and the most frequently occurring keywords.

2. RESEARCH METHODOLOGY

To carry out this bibliometric analysis, a comprehensive search was conducted in the Scopus database using the keyword 'footwear' to identify relevant scholarly publications. The search was restricted to documents categorized as articles, reviews, and conference proceedings, published between the years 1983 and 2024. This time frame was chosen to ensure a broad and historical perspective on the scientific output related to footwear research.

The retrieved data were exported and subsequently analyzed using RStudio (with the Bibliometrix package) and VOSviewer software. These tools facilitated an in-depth exploration and visualization of various bibliometric indicators (Chhikara et al., 2024; Poonam et al., 2022). Specifically, the analysis focused on examining annual scientific production trends, identifying the most frequently occurring keywords, mapping keyword co-occurrence networks, constructing citation networks, and highlighting influential authors and countries with the highest citation impact. The visual outputs generated through this process provided meaningful insights into the evolution, current landscape, and emerging themes in footwear-related research.

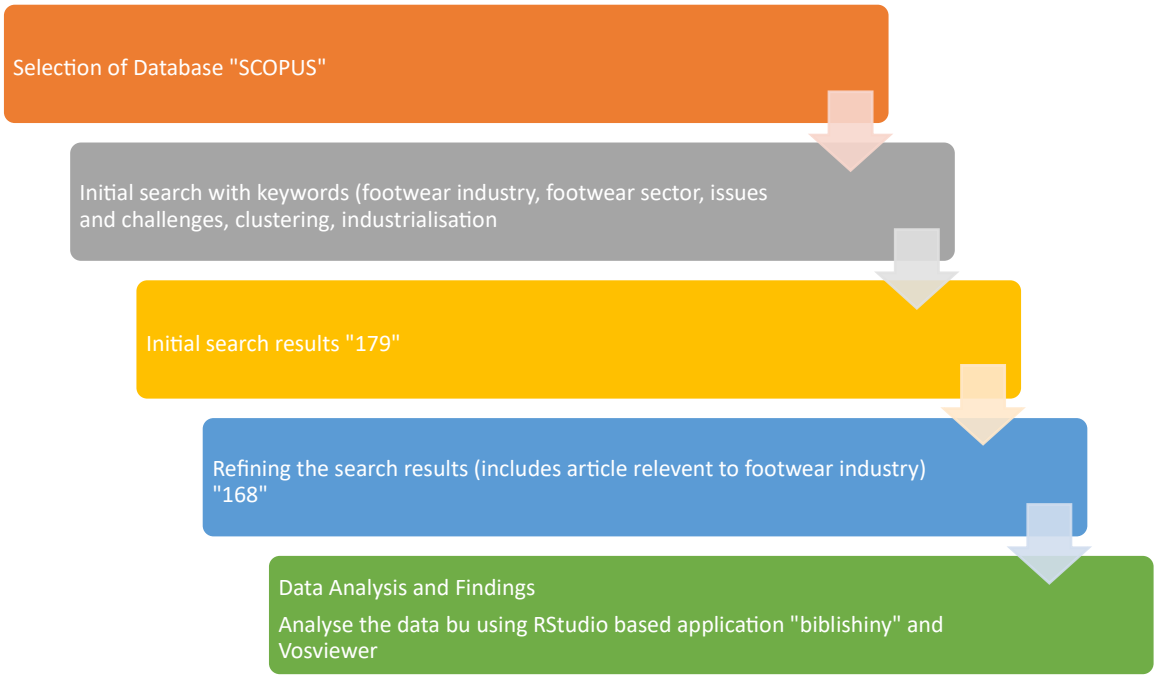

Figure1: proceeding of the study
Sources: Author's compilation

3. Data Analysis

3.1 Key information

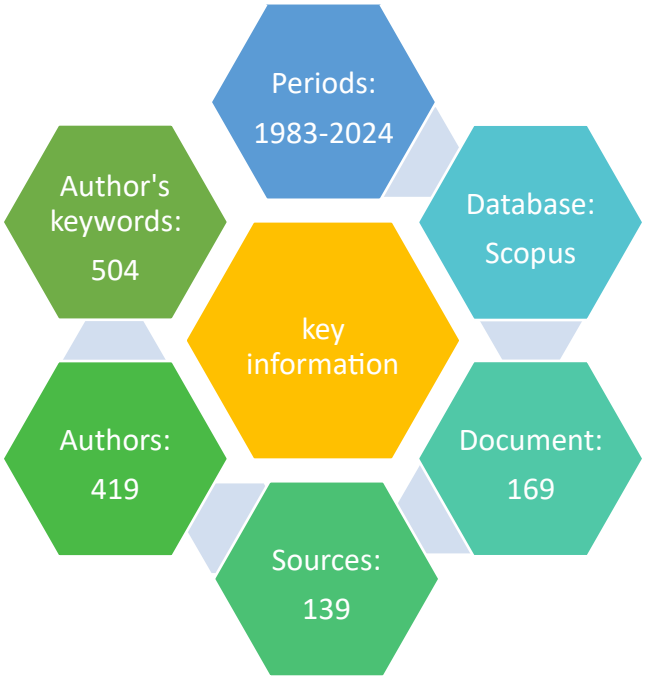

Figure2: key information
Source: Author's compilation by using RStudio

Figure 2 presents essential details of the bibliometric analysis, highlighting the scope and scale of the study. The analysis is based on a comprehensive dataset spanning 41 years, from 1983 to 2024, sourced from the Scopus database. In total, 168 scholarly documents—comprising articles, reviews, and conference proceedings—were identified as relevant to the topic of footwear. These publications collectively reflect the academic community's sustained interest and research output in this domain over the decades.
The dataset represents the scholarly contributions of 419 unique authors, indicating a diverse and collaborative research landscape. This level of authorship suggests active participation from multiple institutions and disciplines, further reinforcing the multidisciplinary nature of footwear-related research.
Moreover, the dataset includes a rich and varied set of keywords, totaling 504 unique terms. These keywords

were used to index, classify, and explore the thematic structure of the literature. The wide range of keywords reflects the breadth of topics covered in the field, encompassing areas such as materials science, biomechanics, sustainability, design, production, and environmental impact. This diversity underscores the complexity and multifaceted character of research within the footwear sector.

3.2 Annual scientific production

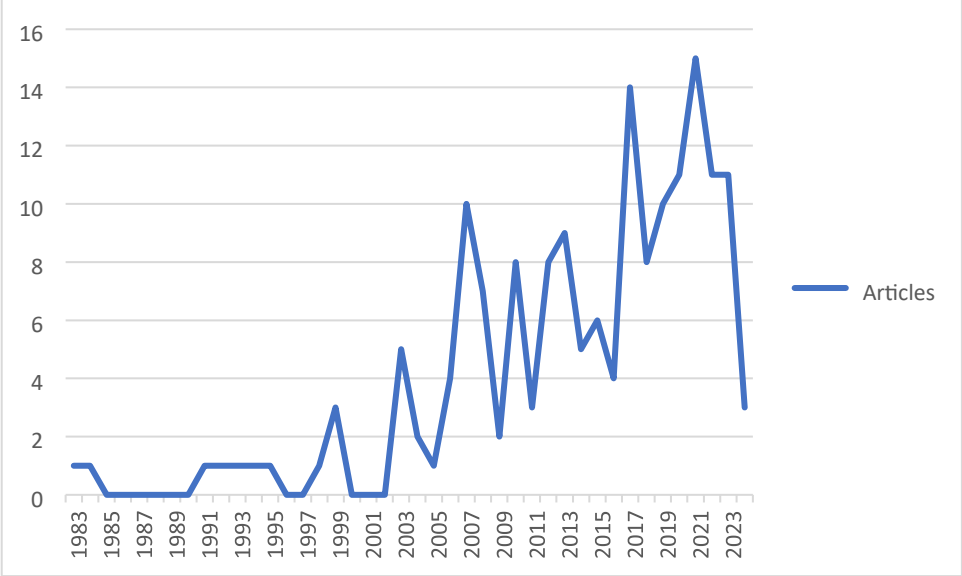

Figure3: Annual scientific production
Sources: Authors compilation by using RStudio

Figure 3: illustrates fluctuating nature of the annual scientific production from 1983 to 2024. From initial years (1983-1989) there was minimal to no scientific article production, with only one article production. late 1990's (1996-2000) there was the dip in production during these years with no article being produced in1996, 1997, 2000, 2001 and 2002. From (2003 -2007) the year 2003 marked a notable increase with 5 articles being published, there was surge in production in 2007 with 10 articles which was the highest until that point. From (2008-2013) there was the mix of years with moderate production. Notably 2011 and 2012 saw three and eight articles respectively. From (2014-2018) production remained relatively consistent with the number of articles fluctuating between four to ten per year. In recent years from 2019- 2024, the last few years have shown an increasing trend in scientific article production over the years, with periods of minimal activity followed by bursts of increased production, particularly in 2021 have shown notable increase in research output.

3.3 Keyword Analysis

keywords	frequency	keywords	frequency
Footwear industry	62	shoes	7
Shoe manufacture	42	textiles	7
leather	12	Article	6
Sustainable development	11	Europe	6
Waste management	10	foot	6
Environmental impact	9	Manufacture	6
footwear	9	Manufacturing	6
Decision making	8	Manufacturing industries	6
industry	8	Supply chains	6
Product design	8	Child	5
Human	7	Costs	5
Life cycle	7	Industrial economics	5

Table 1: most occurred keyword
Sources: Authors compliation using R Studio

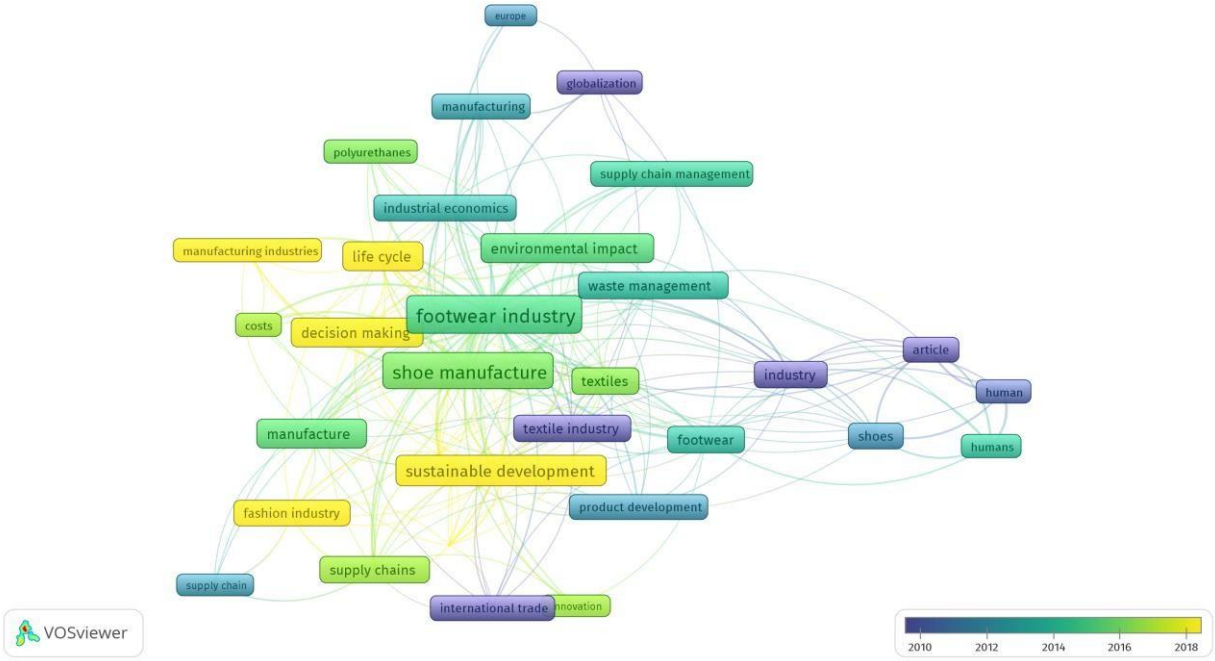

Figure 4: Co-occurred keywords
Source: authors compilation using vosviewer

Figure 4 and **Table 1** present a detailed analysis of the most frequently occurring keywords within the selected dataset, offering valuable insight into the thematic focus and research trends in the footwear industry. This analysis identifies the most relevant and commonly used terms, which help delineate the intellectual structure of the field (Ratee et al., 2023). Notably, the keyword 'footwear industry' appears most frequently, with 62 occurrences, indicating its central role in related scholarly discourse. The second most frequent term is 'shoe manufacturing,' which appears 42 times, further underscoring the industry's manufacturing dimension as a key area of interest.

Other recurring keywords highlight critical and emerging themes such as sustainability, environmental impact, waste management, leather usage, and supply chain management. These suggest a strong research emphasis on sustainable development and environmental considerations in footwear production and design.

Figure 4 visualizes six distinct clusters comprising a total of 33 co-occurring keywords, revealing interconnected research topics and thematic groupings:

Cluster 1 (15 keywords) focuses on industrial and environmental aspects of the footwear sector. It includes terms such as costs, decision making, environmental impact, footwear industry, industrial economies, leather, life cycle, manufacture, manufacturing industries, polyurethanes, shoe manufacture, supply chain management, and textile industry. This cluster suggests a comprehensive investigation into the economic and environmental footprint of footwear production.

Cluster 2 (6 keywords) centers around sustainability in the fashion and supply chain sectors, including fashion industry, international trade, supply chain, sustainability, and sustainable management. It highlights the growing integration of sustainable practices in global trade and fashion-related components of footwear production.

Cluster 3 (6 keywords) includes more general and foundational terms such as article, footwear, human, humans, industry, and shoes, which appear to reflect broader themes and essential vocabulary used across a range of publications.

Cluster 4 (3 keywords)—Europe, globalisation, and manufacturing—suggests a geographic and macroeconomic perspective on footwear production, possibly examining regional trends, globalization effects, and manufacturing shifts.

Cluster 5 (2 keywords)—product design and product development—reflects a focus on innovation and creativity in the design and development stages of footwear products.

Cluster 6 (1 keyword) consists solely of innovation, indicating its standalone prominence and relevance in the dataset, despite not being strongly linked to other co-occurring keywords.

Overall, the keyword analysis and clustering demonstrate the multidisciplinary nature of footwear research, encompassing industrial engineering, environmental science, economics, and design. This thematic mapping enables a deeper understanding of the field's evolution and the current areas of focus among researchers.

3.4 Top- Cited Documents

S. No.	Title	Authors	Publication	Total citation
1	"Present and Future of Flexible Automation: Towards New Paradigms"	F. Jovanel (I), Y. Koren2 (I), C.R. Boer' (Jovane et al., 2003)	CIRP Annals	149
2	"Stakeholder	Haesun Park-Poaps	Journal of	145
	Forces of Socially Responsible Supply Chain Management Orientation"	Kathleen Rees(Park-Poaps & Rees, 2010)	Business Ethics	
3	"A new marketing approach to mass customisation"	FRANK T. PILLER and MELANIE MU LLER	International journal of computer integrated manufacturing	96
4	"Agra: An Old Cluster Facing the New Competition"	PETER KNORRINGA(Knorringa, 1999)	World Development	89
5	"Prioritization of Drivers of Corporate Social Responsibility in The Footwear	Md. Abdul Moktadir	Journal of Cleaner Production	82
	Industry in an Emerging Economy: A Fuzzy AHP Approach"			
6	"How Do Italian Footwear Industrial Districts Face Globalization?"	ALESSIA AMIGHINI & ROBERTA RABELLOTTI	European Planning Studies	76
7	"Enablers of social sustainability in the supply chain: An example of footwear industry from an emerging economy"	Azmina Akter Munny, Syed Mithun Ali, Golam Kabir , Md. Abdul Moktadi, Towfique Rahman ,Zuhayer Mahtab (Munny et al., 2019)	Sustainable Production and Consumption	70
8	"Interoperability	Claudia-Melania Chituc,	Computers in	61
	in Collaborative Networks: Independent and industryspecific initiatives – The case of the footwear industry"	Ce´sar Toscano, Americo Azevedo(Chituc et al., 2008)	industry	
9	"A decisionmaking model for waste management in the footwear industry"	T. STAIKOS* and S. RAHIMIFARD(Staikos & Rahimifard, 2007)	International Journal of Production Research	60
10	"A Longitudinal Examination of the Relationship Between Team Leadership and Performance"	Vishal K. Gupta1 , Rui Huang1 , and Suman Niranjan(Gupta et al., 2010)	Journal of Leadership & Organizational Studies	58

Table 2: Top 10 globally cited documents Source: Author's compilation using R Studio

Table 2 presents the 10 top cited documents globally in the research domain of footwear industry. "Present and Future of Flexible Automation: Towards New Paradigms" (Jovane et al., 2003), C.R. Boer') has 149 citations and is the most cited of the 168 documents. The second most cited document is "Stakeholder Forces of Socially

Responsible Supply Chain Management Orientation" (ParkPoaps & Rees, 2010), which has 145 citations, followed by "A new marketing approach to mass customisation" (96 citations). Furthermore, the chart shows that "Agra: An Old Cluster Facing New Competition" (FRANK T. PILLER and MELANIE MULLER) has 96 citations. Along with several more authors whose works are among the top ten most cited documents.

3.5 Top Relevant Authors

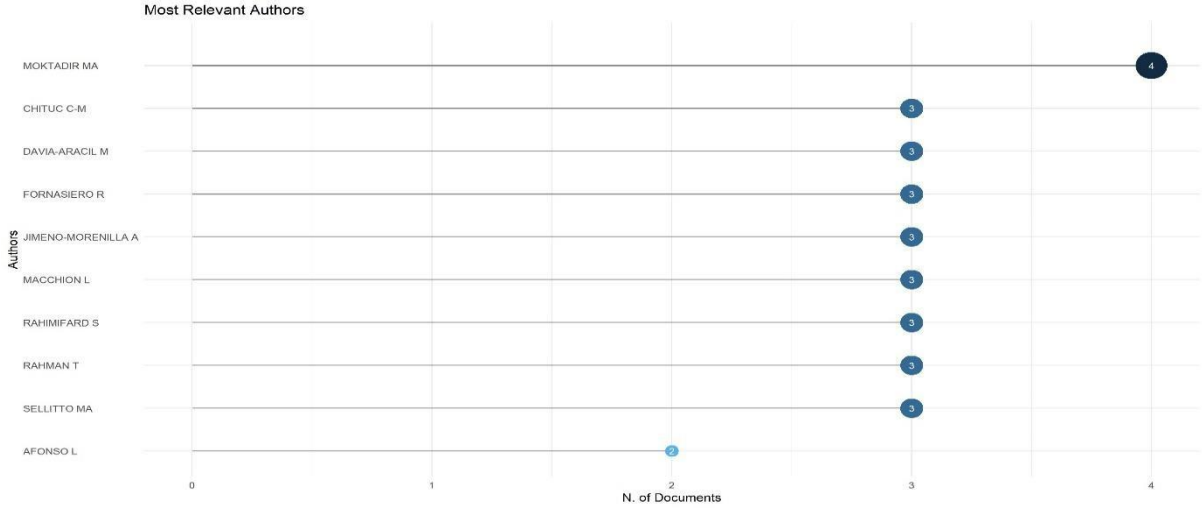

Figure 5: Top cited authors
Sources: Author's compilation using R Studio

Figure 5 illustrates top 10 relevant authors in the research field of footwear industry globally. MOKTADIR M.A is the most relevant author, with four publications, followed by CHITUC C-M, DAVIA-ARACIL M, FORNASIERO R, JIMENO-MORENILLAA A, MACCHION L, RAHIMIFARD S, RAHMAM T, SELLITTO MA, each with three publications, and AFONSO L with two publication.

3.6 Top Productive country analysis

S. No.	Country	Total Citations	Total Publication
1	USA	319	27
2	ITALY	243	64
3	PORTUGAL	153	43
4	CANADA	152	5
5	UNITED KINGDOM	145	24
6	BRAZIL	133	46
7	GERMANY	97	5
8	SPAIN	76	37
9	AUSTRALIA	68	14
10	FRANCE	54	5

Table 3: Top productive countries with total citations
Sources: Author's compilation using R Studio

Table 3 presents 10 top productive countries based on total citations along with total publications in the field of footwear industry. The analysis of the table reveals that USA with 316 citations and 27 publications, Italy with 243 citations and 64 publications, Portugal with 153 citations and 43 publications, Canada with 152 citations and 43 publications, U.K with 145 citations and 24 publications, Brazil with 133 citations and 46 publications, Germany with 97 citations and 5 publications, Spain with 76 citations and 37 publications, Australia with 68 citations and 14 publications, France with 54 citations and 5 publications. The comparison between total citations and total publications of the countries indicates that there is no relationship between citations and publications of the countries. A country with fewer publications gets more citations (Canada, France, Germany, USA) and a country with more
publications and fewer citations (Italy).

4. Findings of the study

Our search yielded a total of 179 publications, of which were 169 articles, were reviews and proceedings. The number of publications on footwear has been steadily increasing since 1983, with a sharp increase in the past decade. The most productive countries were the Italy (64 publications), and United states (27 publications) .

The most cited article on footwear based on countries are U.S.A.(319), Italy(243), Portugal(153).We used keyword co-occurrence analysis to identify the main research themes in footwear studies. The most common themes were "footwear industry," "shoes," "leather," "product design," and "manufacturing." Other prominent themes included "sport," "material science," "sustainability," "industrialisation," and "foot shape."The citation network analysis revealed that the most influential authors in footwear studies were MOKTADIR M.A with 4 publications, followed by CHITUC C-M,
DAVIA-ARACIL M, FORNASIERO R, JIMENO-MORENILLAA A, MACCHION L, RAHIMIFARD S, RAHMAM T, SELLITTO MA, each of whom has 3 publication and AFONSO L with 2 publications. The most influential journals were Journal of Biomechanics, Footwear Science, Applied Ergonomics, and Journal of Foot and Ankle Research. Our bibliometric examination reveals a substantial expansion in footwear research over the past twenty years, characterized by a notable surge in publications and citations. Foremost among contributors to footwear literature is the United States, trailed by China and Italy. Predominant themes in footwear research encompass biomechanics, design, and comfort.

5. Discussions

The bibliometric analysis conducted on footwear research provides a comprehensive overview of the scholarly landscape within the field, offering valuable insights into trends, patterns, and emerging themes. This discussion explores the key findings of the analysis and their implications for academia, industry, and policy.

Interdisciplinary Nature of Footwear Research: One of the prominent findings of the bibliometric analysis is the increasing interdisciplinary nature of footwear research. Traditionally rooted in fashion design and apparel studies, footwear research has expanded to encompass diverse disciplines such as biomechanics, material science, ergonomics, and sustainability. This interdisciplinary approach reflects the evolving needs of the industry, as stakeholders seek to develop footwear solutions that integrate functional, ergonomic, and environmental considerations alongside aesthetic preferences. By embracing interdisciplinary collaborations, researchers can leverage insights from diverse fields to drive innovation and address complex challenges within the footwear industry.

Global Distribution of Scholarly Activity: The analysis also highlights the global distribution of scholarly activity in footwear research. While historically dominated by Western countries, particularly the U.S.A and Europe, and clear uptick in research output is observable from emerging economies like China, India, and Brazil. This diversification underscores the universal relevance of footwear as a cultural artifact and economic commodity, with implications for both local and international markets. Moreover, the growing contribution from emerging economies presents opportunities for collaboration and knowledge exchange, facilitating cross-cultural perspectives and inclusive approaches to footwear design, production, and consumption.

Emerging Research Themes and Hotspots: The identification of key research themes and hotspots within the literature offers valuable insights for academia, industry, and policymakers. Themes such as sustainable materials, digital fabrication technologies, wearable sensors, and personalized footwear solutions have emerged as focal points of research activity, signaling areas of significant innovation and investment. By understanding these trends, stakeholders can prioritize research funding, foster collaboration, and drive technological advancements that address the evolving needs of consumers and society. Additionally, emerging themes such as the integration of artificial intelligence and 3D printing in footwear design present opportunities for disruptive innovation, revolutionizing traditional manufacturing processes and consumer experiences.

Limitations and Future Directions: Despite its comprehensive approach, the bibliometric analysis is not without limitations. Factors such as language bias, publication bias, database coverage, keyword variability, timeframe limitations, and the interdisciplinary nature of footwear research may impact the interpretation and generalization of findings. Moving forward, addressing these limitations through complementary methods such as qualitative analysis, expert consultation, or broader database coverage will be crucial for enhancing the robustness and reliability of research conclusions. Moreover, future research directions could explore emerging topics such as circular economy principles in footwear production, the integration of smart technologies for enhanced performance and customization, and the socio-cultural implications of footwear design and consumption.

6. Conclusions

The footwear industry represents a dynamic and multifaceted domain that intersects with various disciplines, ranging from fashion and design to biomechanics and materials science. Through the bibliometric analysis conducted in this study, a comprehensive overview of the scholarly landscape surrounding footwear research has been elucidated. This analysis has provided valuable insights into the trends, patterns, and emerging themes within the field, offering a roadmap for future research directions and industry innovation. One of the notable findings of this bibliometric analysis is the increasing interdisciplinary nature of footwear research. Traditionally confined within the realms of fashion and apparel studies, footwear research has expanded to encompass diverse areas such as biomechanics, ergonomics, sustainability, and material science. This interdisciplinary approach reflects the evolving needs of the industry, as stakeholders seek to develop footwear

solutions that not only satisfy aesthetic preferences but also address functional, ergonomic, and environmental considerations. Furthermore, the analysis has shed light on the geographical distribution of footwear research, with contributions emanating from various regions across the globe. While historically dominated by Western countries, particularly the Europe and U.S.A, there is a conspicuous increase in research output is observed from emerging economies such as China, India, and Brazil. This global diversity underscores the universality of footwear as a cultural artifact and economic commodity, with implications for both local and international markets. Moreover, the identification of key research themes and hotspots within the literature offers valuable insights for academia, industry, and policymakers alike. Topics such as sustainable materials, digital fabrication technologies, wearable sensors, and personalized footwear solutions have emerged as focal points of research activity, signaling areas of significant innovation and investment. By understanding these trends, stakeholders can prioritize research funding, foster collaboration, and drive technological advancements that address the evolving needs of consumers and society. However, it is essential to acknowledge the limitations of bibliometric analysis in capturing the entirety of footwear research. While comprehensive in scope, bibliometric data may overlook niche or emerging research areas that have yet to gain significant traction within the academic community. Additionally, the reliance on bibliographic databases may introduce biases towards Englishlanguage publications or journals indexed within specific databases, potentially omitting valuable contributions from non-English-speaking regions or alternative publication outlets. In conclusion, this bibliometric analysis provides a comprehensive overview of the scholarly landscape in footwear research, highlighting trends, patterns, and emerging themes within the field. By synthesizing and analyzing large volumes of academic literature, this study has contributed to our understanding of the interdisciplinary nature of footwear research, the global distribution of scholarly activity, and key research themes driving innovation within the industry. Moving forward, leveraging these insights will be instrumental in shaping the trajectory of footwear research, driving technological advancements, and meeting the evolving needs of consumers in an increasingly dynamic and competitive market landscape.

7.Limitations

It is essential to recognize its limitations in capturing the entirety of this complex and multifaceted field. The following are some key limitations inherent in the bibliometric analysis of footwear research:

Language Bias: One of the primary limitations of bibliometric analysis is the potential bias towards English-language publications. Many bibliographic databases primarily index English-language journals, which may lead to the underrepresentation of research published in other languages. This bias could result in overlooking valuable contributions from non-English-speaking regions, leading to an incomplete understanding of the global footwear research landscape.

Database Coverage: The choice of bibliographic databases used for analysis can significantly impact the results and conclusions drawn. Although databases like Scopus and Web of Science provide comprehensive coverage of scholarly literature, it's important to note that they may not include all pertinent publications within the footwear domain. Some niche journals or conference proceedings may be excluded from these databases, potentially overlooking valuable research contributions.

Publication Lag: Bibliometric analysis relies on existing publications, which may not reflect the most recent developments or trends in footwear research.

There is often a publication lag between research conducted and its eventual publication in scholarly journals, particularly in fields with lengthy peer-review processes. Consequently, the analysis may not capture emerging topics or research directions that have yet to be disseminated through peer-reviewed publications.

Limited Metadata: Bibliographic databases may not provide comprehensive metadata for all publications, limiting the depth of analysis. Information such as author affiliations, funding sources, or keywords may be missing or inconsistently reported, hindering the identification of collaboration patterns, funding trends, or thematic clusters within the literature. Moreover, inconsistencies in data entry or indexing errors could introduce noise or inaccuracies into the analysis.

Interdisciplinary Nature: Footwear research spans multiple disciplines, including fashion design, biomechanics, materials science, and ergonomics. Bibliometric analysis may struggle to capture the interdisciplinary nature of research, as publications may be categorized differently across disciplinary boundaries. Consequently, the analysis may overlook connections or synergies between seemingly disparate fields, leading to an incomplete understanding of the research landscape.

Quality Assessment: Bibliometric indicators such as citation counts or journal impact factors are often used as proxies for research quality or impact.

However, these metrics have inherent limitations and may not accurately reflect the significance or influence of individual publications. Additionally, citation patterns can be influenced by factors such as self-citations, citation cartels, or citation cascades, which may distort the perceived importance of certain research works.

Subjectivity in Analysis: Despite efforts to standardize bibliometric methodologies, the interpretation of results remains subjective and may vary depending on the researcher's perspective or expertise. Different analysts may apply varying criteria for inclusion/exclusion, keyword selection, or data interpretation, leading to inconsistencies in findings. Moreover, subjective judgments may influence the identification of research trends, thematic clusters, or influential authors within the literature. In conclusion, while bibliometric analysis

offers valuable insights into the scholarly landscape of footwear research, it is essential to acknowledge its inherent limitations. Addressing these limitations requires careful consideration of methodological choices, critical interpretation of results, and triangulation with other research methods to deliver a further precise view of the field. By acknowledging and mitigating these limitations, researchers can enhance the validity and reliability of bibliometric analyses and contribute to a more nuanced understanding of footwear research and innovation.

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