

Article

Development of the Diversity Concept for the Construction Sector: A Bibliometric Analysis

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Abstract: The significance of a diverse workforce in organizations has been increasingly recognized over the past two decades due to its substantial impact on both organizational and employee performance. This study conducted a bibliometric analysis of research articles on workforce diversity in the construction sector using the Scopus and Web of Science databases. A total of 197 articles were included in the review, revealing a marked increase in research on diversity in the construction industry, with 147 articles published between 2011–2023 compared to 50 articles between 2000–2010. The University of New South Wales emerged as the most productive institution with eleven articles, followed by Loughborough University with eight articles and Universidad De Sevilla with seven articles. This study found that 459 authors contributed to the production of 197 articles. This study underscores the critical importance of diversity in the construction sector and calls for further research to devise effective diversity management strategies. It contributes to the literature by being the first bibliometric review of its kind in this sector, offering valuable insights for researchers, policymakers, and industry practitioners. It enhances our understanding of the existing literature and helps identify potential avenues for future research. This original contribution to the field is expected to stimulate further scholarly discourse and practical advancements in managing workforce diversity in the construction industry.

Keywords: bibliometric analysis; workforce diversity; construction sector; biblioshiny; science mapping



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1. Introduction

Sustainability, diversity, and inclusion are topics of global importance that affect a range of industries and sectors [1]. Implementation of sustainable construction management practices could influence productivity in construction projects [2]. In turn, the social sustainability of an organization depends on how well it maintains friendly and welcoming relationships with its stakeholders and employees. Organizations are socially sustainable when they have positive and lasting connections with their employees [3]. In the face of a tightening labour market, companies should be focusing their strategies on hiring, developing, and training a more diverse workforce. More research is needed to understand how organizations can use sustainable construction effectively [4].

In the context of the present-day globalised and multicultural society, the importance of diversity within the workplace has been magnified. This phenomenon can be attributed to the imperative for organisations to maintain a competitive edge and effectively meet the needs of their diverse clientele. The workforce of today exhibits a remarkable level of diversity, encompassing a wide array of social categories including age, gender, ethnicity, and nationality. Based on current observations and available data, it is anticipated that this trend will persist in the foreseeable future [5]. Diversity, as defined by [6], is a trait that pertains to multiple individuals and specifically encompasses a range of demographic

distinctions among all participants. The text explores the various resemblances and distinctions observed among employees, such as gender, age, race, cultural background, religion, physical abilities and disabilities, and sexual orientation [7]. The rationale for advocating diversity is complex and has multiple dimensions. The phenomenon not only reflects the diversity present in society but also provides a multitude of advantages to organizations. The aforementioned benefits encompass heightened levels of creativity, higher problem-solving aptitude, improved decision-making procedures, and increased availability of a broader range of skilled individuals [8,9].

Diversity can be categorized into surface-level and deep-level diversity. Surface-level diversity refers to overt attributes such as age, gender, and race, while deep-level diversity refers to subtler qualities such as attitudes, values, and personality traits [10–12]. Diversity can have both positive and negative effects on team performance. On the one hand, diversity can enhance teams' collective intelligence, creativity, and innovation by bringing different perspectives, experiences, and skills to the table. On the other hand, diversity can also create challenges for team performance, such as communication barriers, cultural clashes, and coordination difficulties [13,14]. Organizations that recognize the potential downsides of diversity and proactively address them through proper training, policies, and inclusive practices are more likely to reap the rewards while mitigating the challenges [15].

The construction sector (CS) is widely recognized as a key driver of economic growth and development [16], as well as a major contributor to environmental and social impacts [17], and has been actively addressing challenges related to diversity and inclusion [18,19]. Therefore, the CS has a significant role and responsibility in addressing the challenges and opportunities related to sustainability and the Sustainable Development Goals (SDGs). The SDGs are a set of 17 goals and 169 targets that aim to end poverty, protect the planet, and ensure peace and prosperity for all by 2030 [20]. Among the SDGs, several goals are directly or indirectly related to diversity and inclusion, such as SDG 4 (Quality Education), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 10 (Reduced Inequalities) [21]. Despite the industry's dependence on a wide array of skills and positions, encompassing labourers, engineers, and architects, it has come to attention that the composition of the workforce does not adequately mirror this diversity. According to the United States Bureau of Labor Statistics, 87.3% of construction workers identify as white and 89% are male [22]. Moreover, it is worth noting that the involvement of women in the United Kingdom (UK) construction workforce is approximately 15%, with an astonishingly low percentage of only 2% actively engaged in on-site work. The representation of Black, Asian, and Minority Ethnic (BAME) individuals appears to be relatively low, estimated at around 6% [23]. These figures underscore the pressing need for increased diversity and inclusion in the sector. A diverse workforce in construction is vital not only for addressing social equity but also for sustainability [24,25]. A diverse workforce fosters creativity, innovation, and enhanced problem-solving capabilities, which are vital for addressing sustainability challenges encompassing environmental, social, and economic aspects [17]. Properly managed workplace diversity positively impacts productivity and workplace sustainability [7,26]. However, the attainment of this diversity presents numerous challenges, such as the presence of gender bias [27], the existence of language barriers [28], and the impact of cultural differences [29]. Therefore, it is essential to understand the current state of research on workforce diversity in the CS and identify the gaps and directions for future research. This can help address the challenges, leverage workforce diversity opportunities in the CS, and improve its sustainability and performance. However, there is a lack of a comprehensive and systematic review of the literature on workforce diversity in the CS that can provide a clear overview of the trends, patterns, themes, authors, journals, countries, institutions, and networks of research on this topic. This will be achieved through a bibliometric analysis of research articles published on workforce diversity in the CS. Bibliometric analysis is a research method that uses quantitative techniques to analyse the published literature on a particular topic. It can be used to track the development of a field of study, identify the most influential authors and journals, and

map the relationships between different research areas [30]. It is of utmost importance to conduct this research to bridge the gap between the industry's current state and the pressing need for diversity and inclusion.

The following research questions were used to track down the evolution of the concept of workforce diversity in CS.

- What are the most influential articles, authors, and institutions in the field of workforce diversity in CS?
- Which journal is the most productive in the area of workforce diversity in CS?
- Which countries and regions have produced the most research on workforce diversity within the realm of CS?
- What are the main themes and concepts associated with workforce diversity in CS?

2. Methodology

Bibliometric analysis is a research methodology that utilizes mathematical and statistical techniques to assess and scrutinize scientific literature [31]. This analysis is bifurcated into two primary approaches: performance and science mapping analysis [32,33]. Performance analysis focuses on evaluating the activities of scientific entities such as authors, institutions, countries, and scholarly journals. It involves the examination of publications, citations, and collaborations to measure their impacts [34]. On the other hand, science mapping concentrates on the interrelationships among various research elements [32,33]. Its objective is to pinpoint research fronts and emerging trends by analysing co-citation and co-occurrence patterns [35].

The methodology adopted in this study involved collecting relevant papers from online sources and analysing them using an appropriate bibliometric tool. The subsequent sections provide a detailed explanation of this procedure.

2.1. Data Retrieval

A comprehensive search was conducted on the online databases Scopus and Web of Science (WOS) for the literature on workforce diversity in the CS. Initially, a preliminary search was conducted on the topic 'workforce diversity in the CS' to identify the relevant keywords to be included in the search string for the analysis. The search string consisted of two sections, keywords pertaining to the CS and keywords related to workforce diversity. The keywords were related using the Boolean operators "OR", "AND". The search string used for this study is as follows: ("Construction industry" OR "Construction sector" OR "Construction company" OR "Construction firm" OR "Construction site" OR "Construction organization") AND ("workforce diversity" OR "workplace diversity" OR "diversity management" OR "diversity and inclusion" OR "equality and diversity" OR "gender diversity" OR "age diversity" OR "cultural diversity" OR "ethnic diversity" OR "job related diversity" OR "physical disability" OR "LGBTQ" OR "job-related diversity" OR "functional diversity" OR "tenure diversity" OR "experience diversity" OR "gender" OR "race" or "ethnicity" OR "demographic diversity" OR "surface level diversity" OR "deep level diversity" OR "regional diversity" OR "gender identity"). The string was searched in the 'Article title, Abstract, Keywords' field of each database. The search period was limited to records from 2000 to 2023 (June 2023) and the language was limited to English. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method was adopted to screen the documents [36]. The PRISMA flowchart used for the data refinement process is shown in Figure 1.

Based on the search string, Scopus retrieved 804 documents and WOS recovered 442 documents, totalling 1246. These documents include articles, conference papers, book chapters and reviews. From this result, 381 bibliometric records related to book chapters, conference papers, and reviews were excluded, and peer-reviewed articles in English were considered. Also, 247 similar documents available in both databases were identified and excluded. Thus, the total number of records included in the screening process was reduced to 618. The authors read the abstracts independently and excluded 421 irrelevant

documents to narrow the search to ensure accuracy. The final count included in the review process was 197. The inclusion criteria for the articles were those focused on diversity in the CS and those related to construction workers and professionals. The irrelevant records were those that did not focus on diversity [37], articles belonging to other disciplines like medicine [38] or the electrical industry [39], and those articles that do not relate to construction workers or professionals [40].

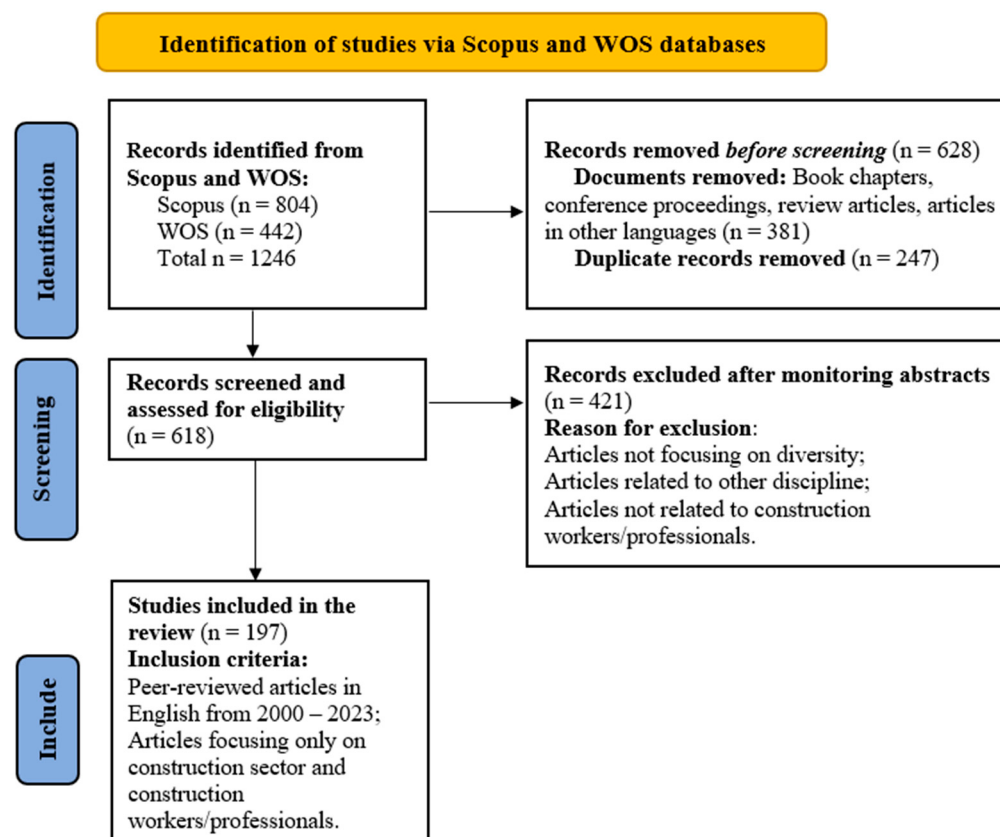


Figure 1. PRISMA flowchart.

2.2. Analytic Procedure

Several of the latest data analytic tools, like VOSviewer, CitNetExplorer, Bibliometrix, SciMat, Bibexcel, and CiteSpace, are accessible to researchers for data analysis and visualization. However, choosing a particular tool depends on the nature of the analysis that needs to be performed [41,42]. This study used Biblioshiny, a web interface for Bibliometrix (v 4.1.3), an R package designed for bibliometric and co-citation analysis, to analyse and present the bibliometric data obtained from Scopus and WOS. Bibliometrix has the capability to analyse and map bibliographic data concurrently. Bibliometrix (v 4.1.3), being an open-source software written in R packages, allows knowledge workers to examine, modify, and enhance it [41]. Biblioshiny facilitates data importation, conversion into a data frame, filtering data, conducting analytics, and generating plots for sources, authors, and documents [42].

3. Analysis

3.1. Performance Analysis

Performance analysis is designed to scrutinize and evaluate the influence of scholarly research components on a particular discipline. This type of descriptive examination is frequently utilized in review studies to demonstrate the efficacy of various research elements, such as authors, countries, institutions, and sources.

3.1.1. Growth in the Publication

The publication growth trend of the literature from 2000 to 2023 is shown in Figure 2. The total number of articles published in this period is 197, with an annual growth rate of 7.69%. The document's average age is 7.62, indicating a relatively recent and active research field. The distribution of articles over time shows a significant increase in the number of publications from 2011 to 2023, with 147 articles published in this period, compared to only 50 articles from 2000 to 2010. This shift indicates a dynamic research landscape in recent years. The peak year for publications was 2022, with 28 articles, while the lowest was 2003, with no articles. The citation analysis of the literature on workforce diversity revealed that the most cited article was by Watts (2009) [43], who explored how women civil engineers in the United Kingdom (UK) construction industry balance their work and personal lives in a male-dominated profession that values long hours and socializing. This article received 204 citations, indicating its high relevance and influence in the field. The second most cited article was by Dainty et al. (2000) [44], who explored the gender-based barriers and challenges women face in their careers in the UK construction industry. This article received 189 citations, reflecting its contribution to understanding gender diversity in a male-dominated industry. The list of top ten most cited articles is shown in Table 1. The findings indicate that there has been a significant increase in the number of publications on workforce diversity in the CS over the past ten years. The most impactful papers have centred on the experiences and obstacles faced by women in this predominantly male industry.

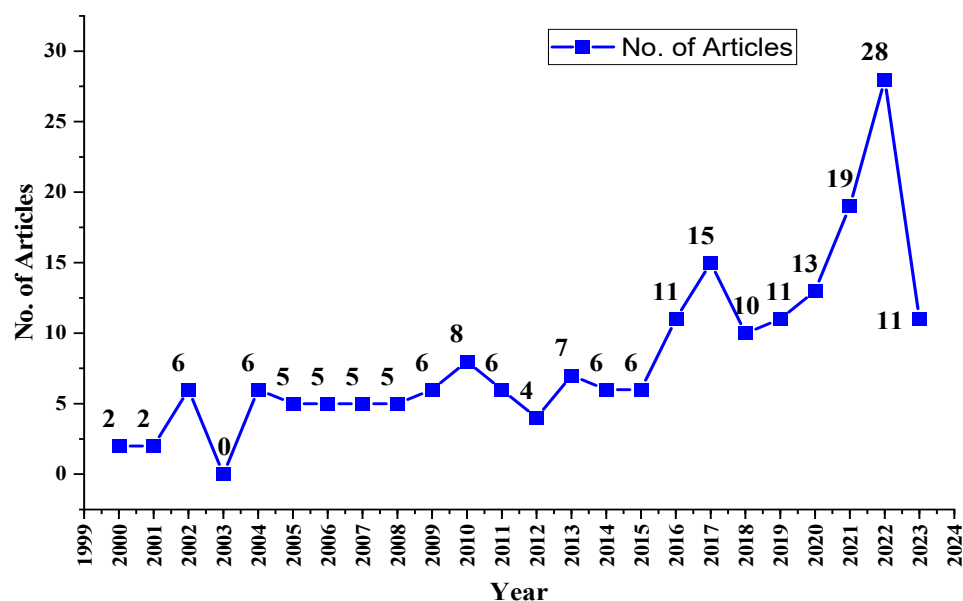


Figure 2. Publication growth trend.

Table 1. Most cited articles.

S. No	Article	Total Citations
1	Watts JH, 2009, Gender Work Organ [43]	204
2	Dainty ARJ, 2000, Constr Manage Econ [44]	189
3	Trajkovski S, 2006, Int J Proj Manage [45]	93
4	Ness K, 2012, Gender Work Organ [46]	88
5	Loosemore M, 2002, Int J Proj Manage [28]	85
6	Sunindijo RY, 2017, J Constr Eng Manage [47]	77
7	Whitlock M, 2002, Constr Manage Econ [48]	76
8	Dainty ARJ, 2006, J Manage Eng [49]	75
9	Wright T, 2016, Gender Work Organ [50]	73
10	Loosemore M, 2004, J Manage Eng [51]	70

3.1.2. Most Productive Authors

A total of 459 authors participated in the creation of 197 papers in the area of workforce diversity. The top 10 contributors to the research field are shown in Figure 3. Martin Loosemore was the most prolific author, with twelve publications, followed by Andrew Dainty with eight. Natalie Galea and Tessa Wright each had five publications in this field. These authors have made significant contributions to the field through their studies on topics such as culture, gender, identity, and equality. Their research sheds light on the challenges and opportunities faced by women and other minority groups in the industry.

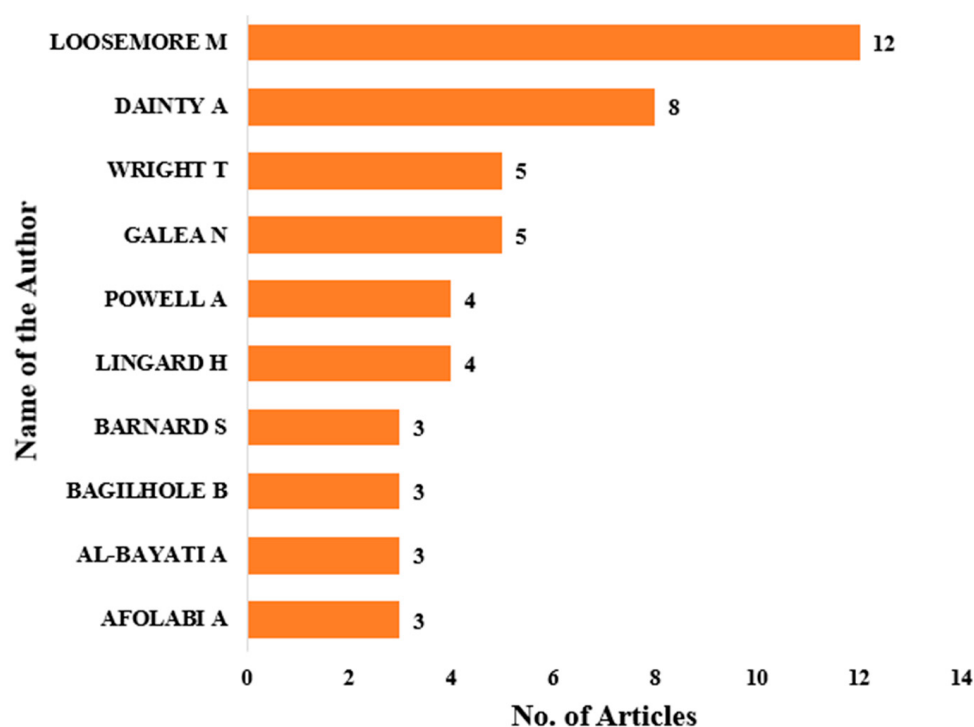


Figure 3. Most productive authors.

The authors' production over time of the top ten authors is shown in Figure 4. The node's size indicates the number of articles, while the node's colour signifies the cumulative citations those articles have received.

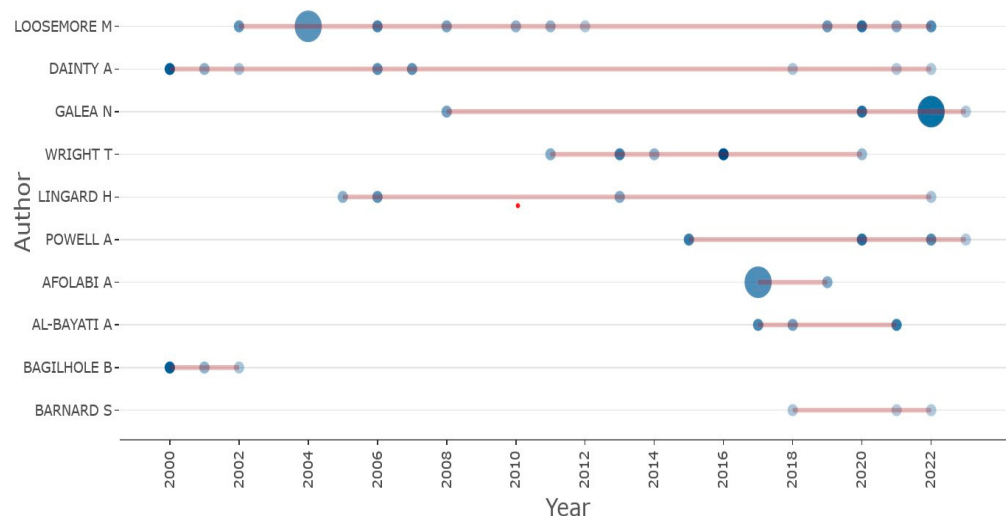


Figure 4. Authors' production over time.

The frequency distribution of author publications in the literature on workforce diversity in the CS was analysed using Lotka's law, which states an inverse relationship between the number of publications and the number of authors who produce them [52]. The results of Lotka's law demonstrate that 395 authors (86.1%) contributed a single article, followed by 45 authors (9.8%) contributed two articles. This indicates a skewed productivity pattern, suggesting that many researchers may not consistently engage in diversity studies.

3.1.3. Most Relevant Sources

The literature on workforce diversity in the CS was published in 115 different sources. Table 2 shows the top ten sources with the most publications in this field. The most prolific source was *Construction Management and Economics*, with twenty-three publications, followed by *Journal of Management in Engineering*, with twelve publications and *Journal of Construction Engineering and Management*, with nine publications. *Journal of Professional Issues in Engineering Education and Practice*, and *Gender, Work and Organization* each had six publications. These sources indicate the main outlets and disciplines interested in workforce diversity in CS.

Table 2. Most relevant sources on the concept of workforce diversity in the CS.

S. No	Source	No. of Articles
1	<i>Construction Management and Economics</i>	23
2	<i>Journal of Management in Engineering</i>	12
3	<i>Journal of Construction Engineering and Management</i>	9
4	<i>Engineering, Construction and Architectural Management</i>	6
5	<i>Gender, Work and Organization</i>	6
6	<i>Journal of Professional Issues in Engineering Education and Practice</i>	6
7	<i>International Journal of Construction Management</i>	4
8	<i>Journal of Construction in Developing Countries</i>	4
9	<i>Equality, Diversity and Inclusion</i>	3
10	<i>Gender in Management</i>	3

3.1.4. Source Dynamics Using Bradford's Law

This study applied Bradford's law of scattering to identify the core sources of the literature on workforce diversity in CS. This bibliometric method describes how journal articles are distributed across different sources in a given research field [53]. Bradford's law divides the sources into several zones based on the number of articles they contain. This study classified the sources into three zones: Zone I, which consisted of seven sources with 66 articles; Zone II, which consisted of 43 sources with 66 articles; and Zone III, which consisted of 65 sources with 65 articles. Figure 5 shows the seven core sources in Zone I, which are *Construction Management and Economics*, *Journal of Management in Engineering*, *Journal of Construction Engineering and Management*, *Engineering, Construction and Architectural Management*, *Gender, Work and Organization*, *Journal of Professional Issues in Engineering Education and Practice*, and *International Journal of Construction Management*. These sources represent the most influential and relevant outlets for publishing research on workforce diversity in CS.

3.1.5. Most Productive Countries

The geographical distribution of the publications on workforce diversity in the construction industry was analysed based on the countries' scientific production. Table 3 presents the top 10 countries that produced the most publications in this field. The United States of America (USA) was the leading country with 48 publications, followed by Australia with 39 publications and the UK with 37 publications. These three countries accounted for more than 60% of the total publications. Spain and India ranked fourth and fifth, respectively, with 24 and 13 publications each.

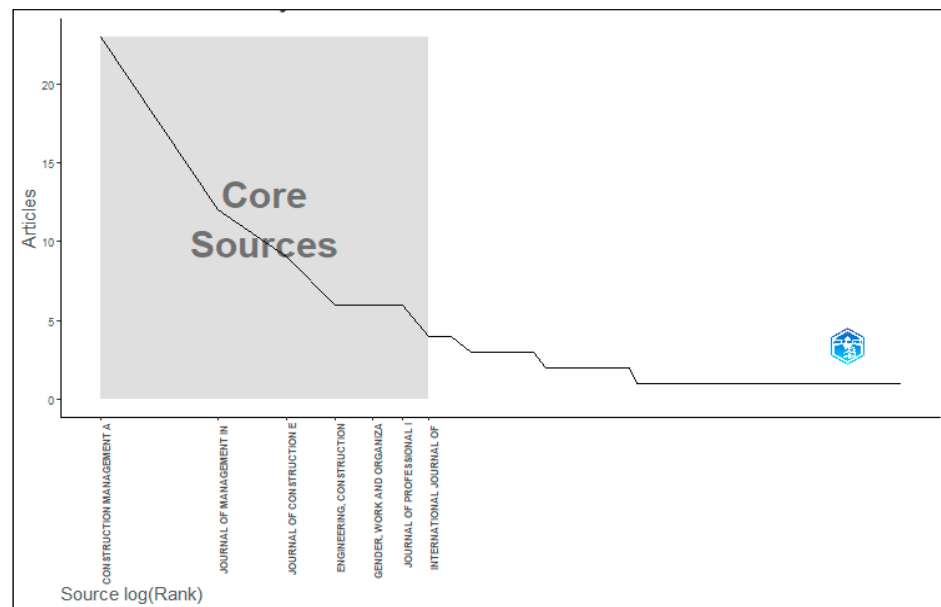


Figure 5. Bradford's law on core sources.

Table 3. Country-wise article production.

S. No	Region	Frequency
1	United States of America (US)	48
2	Australia	39
3	United Kingdom (UK)	37
4	Spain	24
5	India	13
6	New Zealand	8
7	Singapore	7
8	Malaysia	6
9	South Africa	6
10	Brazil	5

3.1.6. Most Relevant Affiliations

The research output on workforce diversity in the CS was also analysed based on the institutional affiliation of the authors. Table 4 shows the top 10 institutions that published the most articles in this field. The University of New South Wales was the most productive institution, with eleven articles, followed by Loughborough University, with eight articles, and Universidad De Sevilla, with seven articles. These institutions represent the leading academic centres for conducting and disseminating research on workforce diversity in the construction industry.

Table 4. Most relevant affiliations.

S. No	Affiliation	Frequency
1	University of New South Wales	11
2	Loughborough University	8
3	Universidad De Sevilla	7
4	Universidad Politécnica de Madrid	5
5	Auckland University of Technology	4
6	Kwame Nkrumah University of Science and Technology	4
7	Mid Sweden University	4
8	Queen Mary University of London	4
9	Queensland University of Technology	4
10	RMIT University	4

3.1.7. Keyword Analysis

This study used frequency to measure word occurrence to identify the most frequently used keywords in the literature on workforce diversity in CS. Figure 6 shows a treemap that illustrates the relative frequency of the top fifteen keywords. The analysis showed that the terms ‘gender’ and ‘construction industry’ were the most common keywords, appearing 96 and 90 times, respectively. The other frequent keywords were diversity, discrimination, cultural diversity, ethnicity, gender equality, and language. These keywords indicate that the research on workforce diversity in the CS has mainly addressed the issues of gender, race/ethnicity, and culture. This is likely because these dimensions of diversity are particularly relevant to the CS workforce, which is predominantly male and white.



Figure 6. Treemap of frequently used keywords.

3.2. Science Mapping Analysis

Science mapping analysis presents a research field’s bibliometric structure and intellectual structure. The techniques used in science mapping analysis include citation, co-citation, co-word, bibliographic coupling, and co-authorship analyses.

3.2.1. Co-Occurrence of Keywords

This study used a co-occurrence analysis of keywords to explore the main topics and trends in the literature on workforce diversity in CS. This method reveals the most frequent and related keywords in a set of documents and shows the intellectual structure of a research field [54]. The co-occurrence analysis counts the number of papers that contain two keywords together [55]. Figure 7 depicts the co-occurrence network of keywords for workforce diversity in the CS. The nodes represent keywords, and the links represent co-occurrences. The node size and label indicate the keyword frequency, and the link thickness indicates the co-occurrence frequency. A thicker link implies a stronger association between two keywords. The node colour denotes the cluster that the keyword is assigned to. Each cluster corresponds to a research theme based on the keywords and their links. The keywords were classified into four clusters in this study. Two clusters in blue and red contain the major keyword co-occurrences. The blue cluster includes the most used keywords ‘gender’ and ‘construction industry’, which were connected with other keywords such as gender equality, gender discrimination, male-dominated work, career barriers, retention, career development, work–life balance, and attraction. This suggests that this cluster focuses on the theme of ‘Gender diversity,’ which includes gender discrimination and obstacles women encounter in their careers in the industry. The second red cluster includes keywords such as cultural diversity, discrimination, ethnicity, race, language, safety, and workplace diversity. This indicates that this cluster is related to the ‘Cultural

diversity' theme, which describes the diversity among workers with different cultures, races, and origins. It also examines the discrimination faced by ethnic minorities and the language barriers they experience in the industry. The other two clusters of keywords were related to accidents and risk perception among construction workers and the use of association rules to analyse the patterns of accidents and injuries in the industry.



Figure 7. Co-occurrence network of keywords.

3.2.2. Co-Citation Analysis

When two publications are cited together in an article, it is known as co-citation [56]. When two publications are often co-cited by other papers, these two references likely share some common information [57]. The co-citation network of the documents is visualized in Figure 8. The nodes in the network represent publications, and were labelled with the initial author and publication year. Edges between nodes represent co-citation relationships, and the thickness of an edge symbolizes the strength of the co-citation relationship. The size of a node represents the number of local citations received by the publication. The node's colour identifies the cluster that the document belongs to. The figure consists of six clusters and the first cluster is represented by a red colour. This is the largest cluster with 24 documents. The top three most cited articles in this cluster include French and Strachan (2015) [58], Dainty et al. (2000) [44], and Fielden et al. (2000) [59]. The second largest cluster is blue, with eighteen documents. Ness (2012) [46], Dainty and Lingard (2006) [49], and Navarro-Astor et al. (2017) [60] were the three most cited documents in this cluster. Similarly, Worrall et al. (2010) [61] in the third cluster, Bryce et al. (2019) [62] in the fourth cluster, Blackburn et al. (2002) [63] in the fifth cluster, and Morello et al. (2018) [27] in the sixth cluster were the other most cited references.

3.2.3. Clustering by Coupling

Clustering by coupling represents a bibliometric approach that arranges authors or sources based on their shared references, uncovering patterns and associations in a body of academic literature [64]. This technique provides valuable insights into the interconnectedness and influence of authors or sources in a particular field. As depicted in Figure 9, the analysis employed bibliometric coupling based on sources with common references. The results identified a unique cluster composed of six sources with shared references, indicating a robust thematic link among these sources. These sources, with a centrality value of approximately 16.67, are highly interconnected within this cluster, suggesting their central role in the discourse of this specific field or topic. Moreover, an impact value of

around 1.50 implies these sources have a substantial influence on the network, potentially steering the research direction and focus in this area.

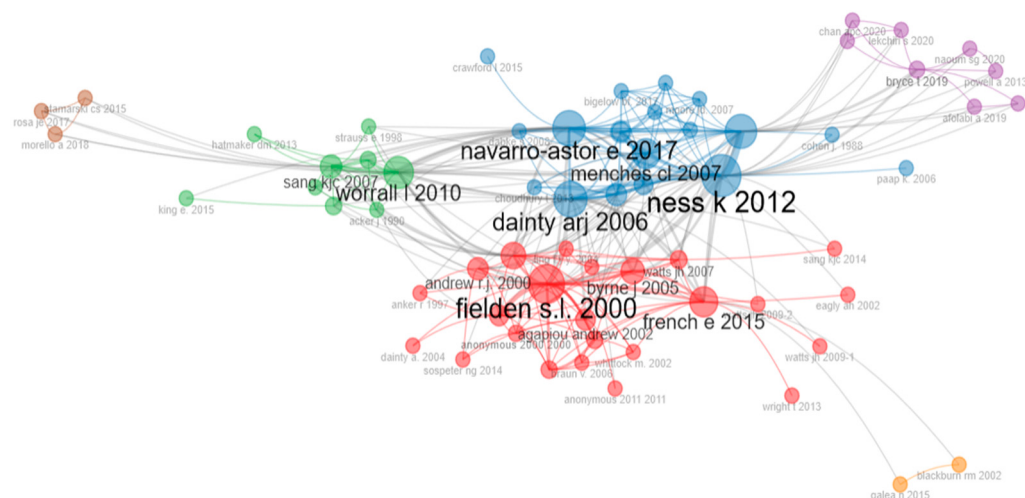


Figure 8. Co-citation analysis of documents.

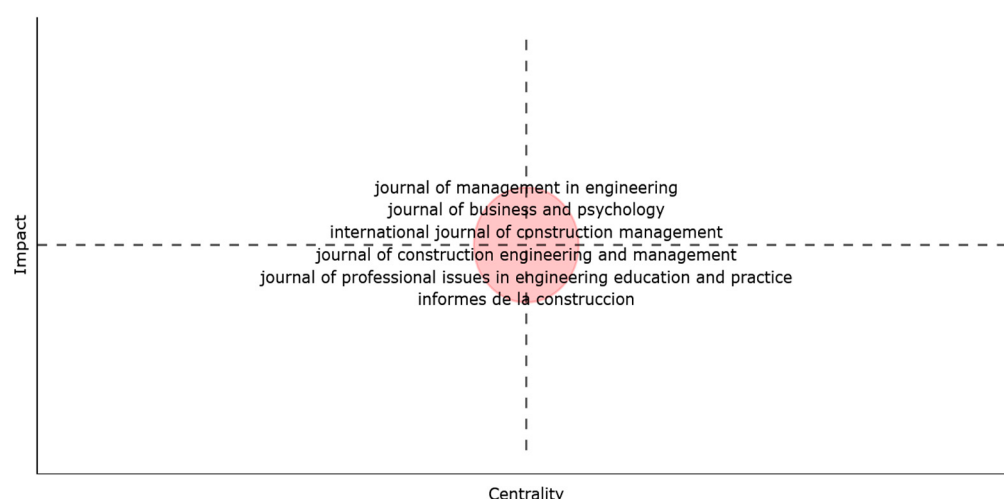


Figure 9. Clustering by coupling based on sources.

The analysis further identified four distinct clusters of authors within the research field, as shown in Figure 10, each sharing common references indicative of thematic similarity. Cluster 1, with a frequency of 4 and high centrality (9.18), is characterized by the collaboration of authors Loosemore M, Baker M, Dorado-Escribano G, and Recalde-Esnoz I, suggesting a strong network of co-authored papers with significant centrality. Cluster 2, also with a frequency of 4, exhibits notable impact (2.32) and involves authors Watts J, Issa R, Lingard H, and Dainty A, indicating a group of authors whose work has made a substantial impact. Cluster 3, with a frequency of 3 and moderate centrality (6.72), features authors Maloney W, Mitnick A, and Real K, implying a smaller but interconnected group of researchers. Cluster 4, with a frequency of 2 and high centrality (7.69) as well as impact (2.27), includes authors Rubio-Romero J and Soto-Hidalgo, indicating a significant collaboration between these two authors. These findings reveal the varying degrees of collaboration, centrality, and impact among different clusters of authors in the bibliographic coupling analysis, providing insights into the dynamics of author relationships within the context of workforce diversity in the construction industry.

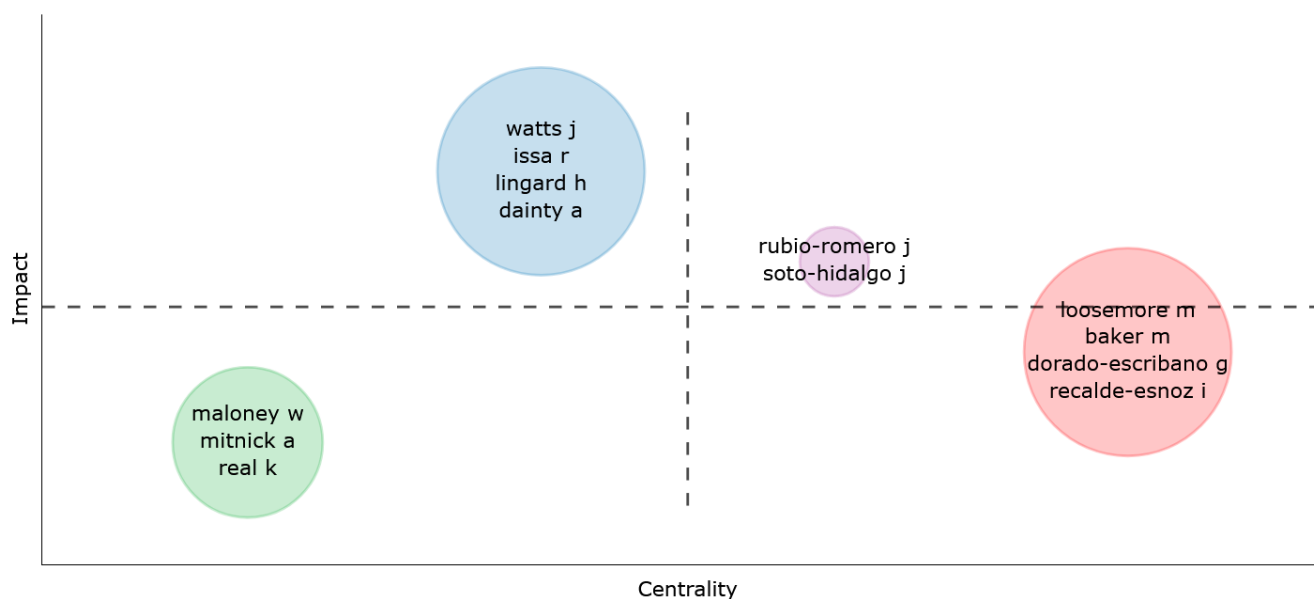


Figure 10. Clustering by coupling based on authors.

3.2.4. Collaboration Network

A collaboration network is a bibliometric network used to analyse the relationships between authors, institutions, or groups based on their collaborations. A collaboration network map can be created in a bibliometric analysis to visually display the connections and collaborations between different entities in a specific field [33]. Figure 11 depicts the collaboration network of authors with fifteen distinct clusters. The most substantial cluster comprises six authors, while eight clusters are made up of only two authors each. Notable scholars who have collaborated with more than two authors include Martin Loosemore from the University of Technology, Andrew Dainty from Loughborough University, and Helen Lingard from RMIT University.

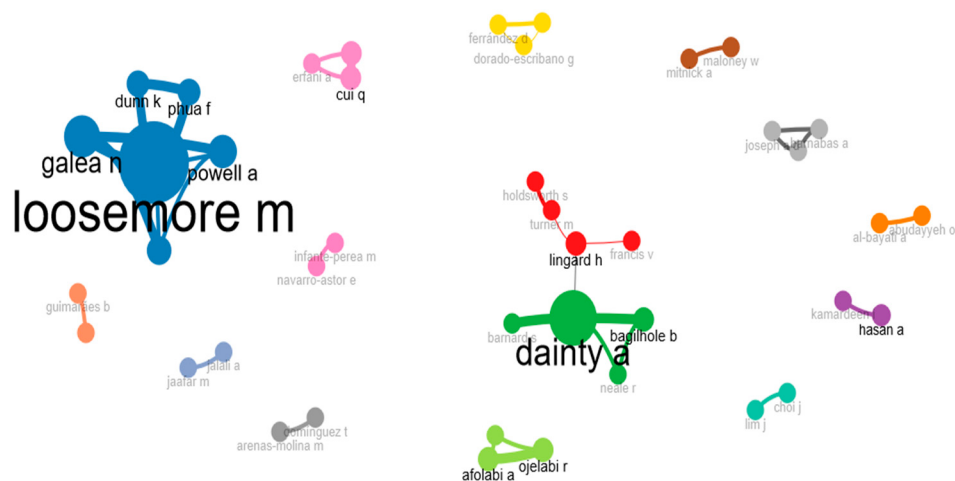


Figure 11. Collaboration network between authors.

Figure 12 illustrates the sixteen clusters showing the collaboration network among the participating institutions. Notable collaborators with more than two institutions include the University of Reading, Queensland University of Technology, University of New South Wales, University of Western Sydney, and the University of Lincoln. Moreover, a thicker edge between the University of New South Wales and the University of Western Sydney signifies more joint publications, indicating a strong collaborative relationship.

Construction Management. These findings suggest that these sources are key players in developing and disseminating research on workforce diversity in the CS.

Watts (2009) [43], Dainty et al. (2000) [44], and Trajkovski and Loosemore (2006) [45] stand out as extensively referenced works in the research literature. The former two contributions delve into the experiences of women in the construction industry, elucidating the multifaceted challenges they confront within this sector. The works provide valuable insights into the unique barriers faced by women in construction, shedding light on gender-related issues in this field. On the other hand, Trajkovski and Loosemore (2006) [45] focused on a distinct yet equally crucial aspect of the construction workforce: the language barriers encountered by migrant laborers. The research investigated the implications of low English proficiency among migrant construction workers, addressing safety concerns and communication difficulties.

The top five institutions that have been actively publishing articles on diversity, inclusion, and equity within the CS are the University of New South Wales (11 articles), Loughborough University (8 articles), Universidad De Sevilla (7 articles), University Politecnico de Madrid (5 articles), and RMIT University (4 articles). In terms of geographical contribution, the US, Australia, the UK, Spain, and India are the top five countries. Together, they have contributed 161 documents to the total corpus of articles on this topic.

The analysis of keywords reveals that ‘gender’ and ‘construction industry’ were the most frequent terms, occurring 96 and 90 times, respectively, making up 24% and 23% of the top 50 keywords. Other notable keywords included diversity, discrimination, cultural diversity, ethnicity, gender equality, and language. These findings indicate that research on workforce diversity in the CS primarily focuses on gender, race/ethnicity, and cultural aspects. Furthermore, two primary clusters emerged when examining the co-occurrence network of keywords, reflecting the thematic concentrations within the research. The first cluster revolves around “gender diversity,” encompassing keywords such as gender discrimination, gender equality, male-dominated work, retention, and career development. This cluster underscores the extensive examination of gender-related issues in the construction industry. The second cluster pertains to “cultural diversity” and includes keywords like discrimination, ethnicity, race, language, safety, and workplace diversity. This cluster highlights the research’s attention to the cultural aspects of workforce diversity, including discrimination and safety issues within diverse construction workplaces.

The bibliometric coupling analysis has revealed distinct clusters of authors and sources, indicating thematic connections based on shared references. The analysis identified a unique cluster of six sources with high interconnectedness and influence, potentially steering the research direction in this area. Additionally, four distinct clusters of authors were identified, each demonstrating varying degrees of collaboration, centrality, and impact. These findings provide valuable insights into the dynamics of author relationships within the context of workforce diversity in the construction industry.

The study of author collaboration in the field of diversity in the construction sector has led to some interesting findings. Fifteen unique clusters were identified, with the most significant one consisting of six authors. Notably, Martin Loosemore, Andrew Dainty, and Helen Lingard have made substantial contributions to this area of research. In terms of institutional collaboration, sixteen clusters were discovered. The University of Reading, Queensland University of Technology, University of New South Wales, University of Western Sydney, and the University of Lincoln emerged as the most active participants. On a country level, four distinct clusters were found, with the UK and Australia leading in terms of active collaboration. It is intriguing to note that despite the diversity in the construction sector being a subject of research, a robust collaborative network among authors and institutions is yet to be established. This could be due to the field being in its early stages, with researchers dispersed across various disciplines and geographical locations. The wide range of topics within this field might also result in smaller, specialized clusters. Institutional factors, such as competition for funding or recognition or policies that do not actively promote collaboration, could also be contributing factors.

However, this lack of extensive connections provides a potential for future collaborations and exchange of ideas. This could further enrich the research and enhance its practical application as the field evolves. These findings underscore the global interest in workforce diversity in the construction sector and highlight the importance of collaborative research in enhancing our understanding of this crucial issue.

5. Research Gap and Future Directions

The current study revealed that the most frequently researched diversity factors in the CS are gender, race, ethnicity, and culture. The majority of the articles focused on issues such as women in the CS [58,65,66], gender stereotyping [67,68], discrimination against women [69] and ethnic minorities [70,71], and cultural diversities and communication problems [29,72] among migrant workers. A limited number of studies have also been carried out on the sexual orientation of employees in the industry [73–75]. However, other dimensions of diversity, such as age, religion, region, physical disability, and other job-related factors, remain largely unexplored. Therefore, future research should examine how these factors affect workforce diversity in the CS and how they interact to create a more inclusive and productive work environment. Furthermore, in the future, researchers may consider conducting comparative analyses exploring the combined influence of surface-level and job-oriented diversity.

While the existing literature primarily investigates the relationship between diversity factors and accidents [76], health and safety [77,78], and project productivity [79–81], there is a need for future research to explore the impact of diversity factors on other outcomes like employee turnover, absenteeism, performance, creativity, organizational commitment, and job satisfaction. Future research should also test the underlying mechanisms and moderators that explain how diversity factors influence these outcomes. For example, how do diversity factors affect the motivation, attitudes, behaviours, and well-being of employees in CS? How do organizational policies, practices, culture, and leadership moderate the effects of diversity factors on these outcomes?

Another gap in the literature is the lack of studies on diversity management in CS. Diversity management refers to the strategies and practices that aim to foster a positive work climate for diverse employees and leverage their potential for organizational success. Diversity management is important for the CS because it can enhance employee satisfaction, engagement, retention, innovation, collaboration, and performance. However, there is little empirical evidence on how diversity management is implemented and evaluated in the CS [82,83] and what its benefits and challenges are. Therefore, future research should investigate the best practices and models of diversity management in the CS and how they can be adapted to different contexts and situations.

Moreover, most of the current research is conducted in the context of developed countries (e.g., USA, UK, Australia), with limited studies from developing nations (e.g., India, Singapore, Malaysia) where migrant workers form a significant part of the labour force. This indicates a need for more inclusive research that encompasses developing countries and compares the similarities and differences in workforce diversity across different regions and contexts. Future research should also consider the historical, political, economic, social, and cultural factors that shape workforce diversity in different countries and how they affect the challenges and opportunities for managing diversity in CS.

Lastly, this study was confined to a quantitative analysis of the published literature on workforce diversity in the CS without assessing the quality of the articles. Future research could benefit from incorporating qualitative analysis methods like content analysis for a more comprehensive understanding of workforce diversity in the construction industry. Content analysis could help to identify the main themes, patterns, gaps, and trends in the literature and provide a deeper insight into the perspectives and experiences of various stakeholders involved in workforce diversity in CS. Content analysis could also help to evaluate the rigor, validity, reliability, and generalizability of the existing studies and suggest directions for improving the quality of future research.

6. Conclusions

The concept of workforce diversity in the CS has attracted considerable attention in recent years. However, the research on this topic is still evolving and faces several challenges. This study conducted a bibliometric analysis of the literature on workforce diversity in the CS using two databases, Scopus and Web of Science. The analysis revealed the trends, patterns, and gaps in this field of research. This study found that the research on workforce diversity in the CS has increased steadily over the years, with a noticeable surge in the past decade. This study also identified the most researched dimensions of diversity, such as gender, race, ethnicity, and culture, and the most active authors, institutions, and countries in this field. However, this study also highlighted the lack of a robust collaborative network among researchers and institutions and the need for more research on other aspects of diversity, such as age, religion, physical ability, and other deep-level diversities. This study also noted that the research on workforce diversity in the CS has been mainly conducted in developed countries, suggesting a gap in the literature from other regions of the world where the CS is rapidly growing.

The findings from this study can serve as a useful guide for researchers, policymakers, and industry practitioners to understand the existing literature better and identify areas for future research. This study can help stakeholders to recognize the influential works and contributors in this field and to explore the specialized sub-fields within workforce diversity in CS. This study can also help policymakers and industry practitioners to identify knowledge gaps and develop policies or practices that encourage collaboration and knowledge sharing among researchers and institutions. Furthermore, this study can foster future collaborations and exchange of ideas among researchers and institutions, which could enrich the research and enhance its practical application as the field matures.

However, this study also has some limitations that should be acknowledged and addressed by future research. First, this study only used two databases, Scopus and Web of Science, to collect the articles on workforce diversity in the CS. Although these databases are widely used and cover a large number of journals and publications, they may not capture all the relevant literature on this topic. Future research could use other databases or sources, such as Google Scholar, to expand the scope and coverage of the literature review. Second, this study analysed articles published until June 2023. Future research could update the bibliometric analysis periodically to capture the latest changes and advances on this topic. Third, this study only used quantitative methods to analyse the literature on workforce diversity in CS. Therefore, it may not provide a deep and rich understanding of the content, quality, and implications of the articles. Future research could use qualitative methods, such as content analysis or thematic analysis, to complement the bibliometric analysis and provide a more comprehensive and holistic view of workforce diversity in CS.

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