Value management in construction projects: Insights from recent research and bibliometric analysis

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Abstract

Research in Value Management (VM) in construction projects has increased significantly, particularly as the construction sector encounters complex projects and resource constraints. The current bibliometric study aims to analyze the evolution, trends, and global research landscape of VM application in construction projects from 2010 to 2025. The study employed VOSviewer to examine collaboration links among authors, countries, universities, and keywords, identifying five primary clusters. A total of 449 articles related to value management in construction projects, sourced from the SCOPUS database, were analyzed using bibliometric methods. Results show that nearly 50% of publications occurred in the last five years, indicating a rising interest among researchers in this field. The most influential journals publishing papers on value management include the Journal of Construction Engineering and Management, Buildings, and Construction and Architectural Management. Malaysia emerged as the leading country in publication volume, with 52 papers, and the Federal University of Technology, Akure ranked highest in publication count. The keywords Value Management and Project Management are the most frequently used, reflecting current primary research directions and their increasing importance in recent years. This study offers valuable insights for policymakers and researchers to develop effective strategies for the future application of value management in construction projects.

Keywords: Bibliometric analysis, Construction, Project management, Value management, VOSviewer.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

1. Introduction

Building projects have increased rapidly due to the rising population in developing countries [1-4]. These projects play a vital role in providing the main living conditions for people [5, 6]. In developing nations, the building sector is essentially uncompetitive due to the lack of ability to meet the international standards necessary for sustainable growth [7-9]. In construction and building projects, several difficulties are often encountered, including non-completion, delays in schedule, financial problems, subpar quality, and a significant risk of not meeting the planned objectives [10-12]. Considering the low level of investment in this industry, projects that encounter these difficulties may be stopped or canceled [13, 14].

The significance of value management (VM) becomes even more pronounced in view of the above observations [7]. VM is defined as a multi-disciplinary, team approach, organizational, systematic, and analytical tool that should be used by both owners and suppliers in attaining its goals and objectives [15, 16]. It is a proven tool from project planning to project completion, aiming to minimize unnecessary costs through incorporation into sustainable growth [17]. In the majority of developed nations, VM is a reliable method for resolving the previously listed problems [18].

In the past few decades, the construction industry has been increasingly challenged to deliver construction projects that meet the expectations of stakeholders in cost, quality, functionality, and sustainability [19-21]. In this regard, VM is one of such well-structured, function-based management approaches designed to optimize the value of a project by equilibrating performance with cost [22]. VM has grown out from the production industry in the middle of the 20th century to become an essential tool for decision-making in construction, oriented towards interdisciplinary cooperation and the establishment of values [23].

Bibliometric analysis is an effective method that allows for a systematic exploration of research trends, influential authors, institutions, and changes in thematic focus in a given area of knowledge [24, 25]. It is a statistical technique that offers both quantitative and qualitative insights into scientific endeavors [26]. In addition, bibliometric studies evaluate the features of literature, including books, journal papers, patents, and conference papers, along with their references, which include citations and co-citations [24, 25, 27]. This tool is further enhanced by co-citation analysis, which examines citation linkages between papers and enables researchers to identify and explore quantitative relationships within their areas of interest [26]. Bibliometrics can be divided into two main categories: one that emphasizes research activity levels and highlights important topics, countries, and journals, and the other that investigates relationships between keywords, countries, and institutions using social network analysis and relationship indicators [24, 28]. Together, these categories clarify both major and minor themes in a specific area and show how they change over time. As a result, bibliometric analysis helps researchers better understand the current state of knowledge, identify significant publications, and assess trends in a particular scientific field, all of which indicate areas that need further research [29-32].

Taking a focus on the period from 2010 to 2025, this paper aims to reflect contemporary trends and developmental paths for VM studies in the construction sector. It explores major topics, collaboration connections, and core literature, thus adding a structured and quantitative review to the previous narrative and conceptual reviews. The main objective of this study is to conduct a bibliometric analysis of the application of VM in construction projects, with a focus on the years 2010 to 2025. The most active authors and nations, the top journals by publication output, the quantity of publications, affiliations, subject areas, co-authorship networks among nations, and the identification of new thematic areas and research gaps in the field are just a few of the features that make this study unique in its thorough approach. A thorough and up-to-date assessment of the literature on VM utilization in construction projects was ensured in this study using extensive data sources from the Scopus database.

This overview not only outlines dominant research directions but also points out new challenges and opportunities for future studies. It is important to understand the knowledge structure around VM in construction to orient academic research towards practical needs, in particular, segmentations such as the Middle East and Asia-Pacific, where construction represents a key sector of the economy [33].
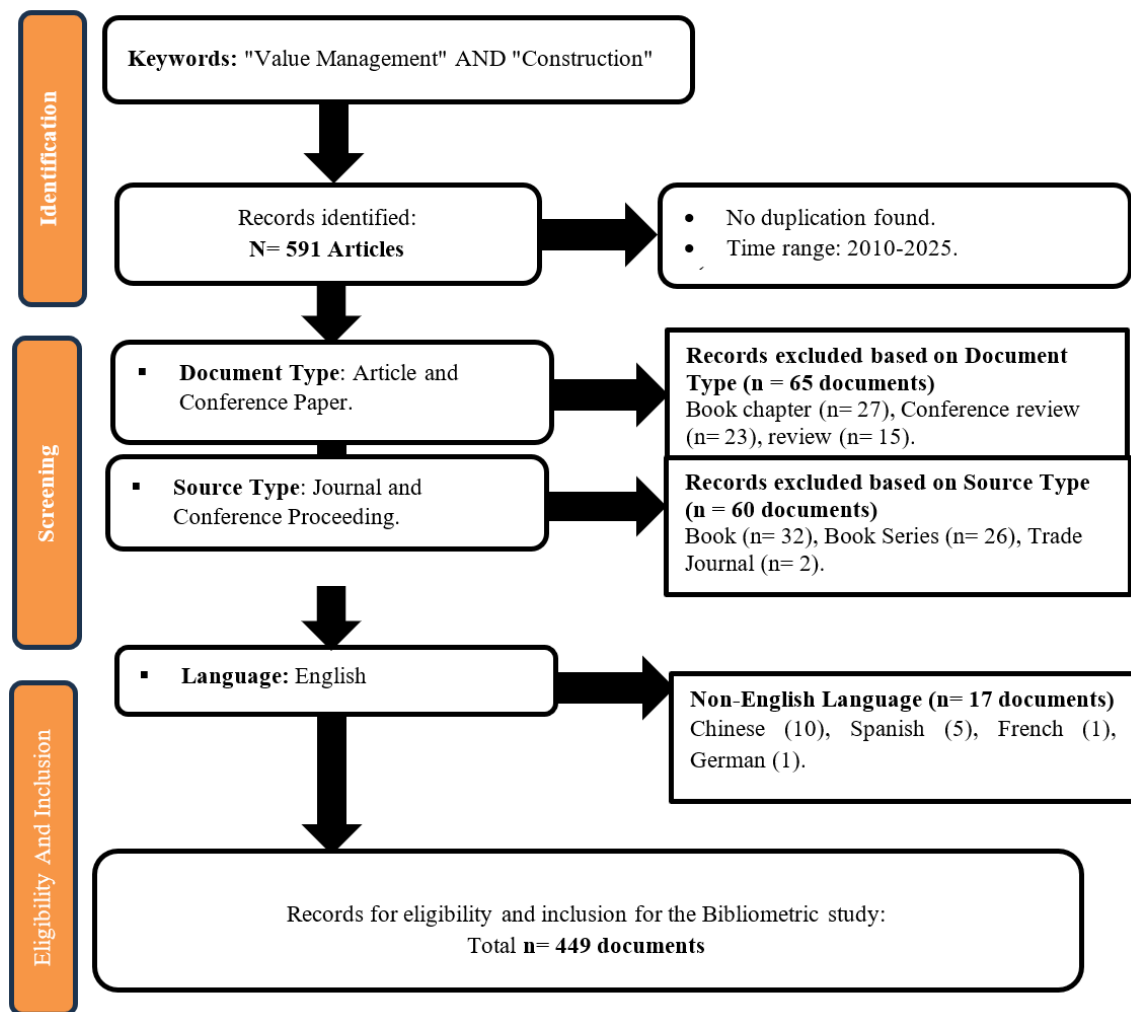
2. Research Methods

2.1. Data Sources and Bibliometric Approach

This study applied Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as the method of literature review and based its methodology strictly on PRISMA, other than the exclusion of the meta-analysis methods from this study. Bibliometric analysis is a necessary method for the performance of a systematic literature review and for the creation of a robust and reproducible bibliographic database [34]. This is widely accepted because it can offer approaches for interacting with information related to research domains, outputs, institutions, and trends in a combined view [35]. This strategy is more powerful when applied to large-scale academic literature data, thus revealing relationships within journal citations and leading to knowledge in previously established and new fields of research [35]. Moreover, bibliometrics contributes to the development of ongoing research and development by highlighting its implications, and that is what makes it popular in various scientific disciplines [36].

To analyze the evolution and development of value management in construction, this study adopted the method of bibliometric analysis. Records were obtained from the Scopus database from 2010 to 2025. The Scopus database was chosen because of the large number of relevant published papers and the extensive coverage of quality and peer-reviewed documents [37-40]. This ensures the accuracy and applicability of our analysis, which makes it the best option for this study. The query string and keywords used in the literature search were as follows: "(TITLE-ABS-KEY (("Value Management") AND ("Construction")) AND PUBYEAR > 2010 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE,"English")) AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"cp")) AND (LIMIT-TO (SRCTYPE,"j") OR LIMIT-TO (SRCTYPE,"cp")))". A targeted and pertinent data set for the examination of current

developments in the area was ensured by this analytical approach. A total of 591 articles were identified in the records. No duplicate publications were available between 2010 and 2025. A total of 65 documents were excluded from the analysis based on document types, categorized as book chapter (27), conference review (23), and review (15). Additionally, another 60 documents were excluded according to their source, categorized as book (32), book series (26), and trade journal (2). Non-English documents (17) were also excluded from the analysis. After data collection and organization, specifically, the extraction of data from the Scopus database, CSV files were created for data analysis. To ensure the consistency and accuracy of the data, several filtering operations were performed during the selection process. After sorting and evaluating the records, a systematic search of the source name, author, and affiliation for each year was conducted. Furthermore, the documents' quality was assessed through their titles, abstracts, and keywords. Suspected incomplete or incorrect records were systematically removed through a careful screening process to improve dataset quality. Therefore, we have further narrowed down the date set to only papers published in English, resulting in 449 publications as shown in Figure 1.

Figure 1.
Research Methodology Flow Diagram.

2.2. Visualization Procedure

In bibliometrics studies, the construction and presentation of bibliometric maps greatly enhance the readability and understanding of the relationship between sources [41]. This method makes the results easy to analyze and helps researchers recognize the structural dynamics of bibliometric results [42]. To analyze the above information and literature patterns, we used open-source, user-friendly software (VOSviewer version 1.6.20) for visualizing and networking bibliometric data [43].

VOSviewer was selected for this study because it is capable of handling large networks efficiently and has advanced text-mining capabilities [35]. Such software supports discovery from the literature by providing global-level analysis of relationships and patterns in the literature through bibliometric maps reflecting relationships between sets of articles that have been selected [35]. One distinctive feature of VOSviewer is that it has dynamic label control and can control and reduce the number of labels according to the algorithm, which is key to the effective display of co-occurrences [44]. We focused on the following main features during the analyses: journals, author keywords, and countries. These considerations offer a more complete picture of the research field and, therefore, are essential for bibliometric analysis [45]. The main parameters (publication counts, average normalized citations, and total link strength (TLS)) were analyzed. The criteria are important and necessary to evaluate the visibility and impact of the articles among the academia [46].

After the initial literature search, a total of 449 documents (journal papers and conference papers) were found. These articles were from 214 distinct sources. Significantly, the literature base in the field was enhanced by the input of 978 authors from 711 institutions. From a geographical perspective, researchers from 60 countries contributed substantially to this domain of knowledge. The main effect of these 449 documents is demonstrated by a total of 4,844 citations, indicating the relevance of these works within the academic field. Documentation analysis of the keywords provided by the authors offered additional insights into the researched themes, resulting in a broad spectrum of 1024 unique terms. The main bibliometric findings related to the application of value management in construction projects are summarized in Table 1.

Table 1.
Summary of key bibliometric results (2010-2025).

Description	Results
Documents (articles and conference articles)	449
Author Keywords	1024
Total Citation	4,844
Authors' Affiliations	711
Document Venues	214
Countries	60
Authors	978

3. Results and Discussions

3.1. Publication Trend of the Research on Value Management in Construction Projects

The studies on the application of value management in construction projects from 2010 to 2025 serve as a valuable source of information for examining trends in publishing activities and citation impact within this research area. During this period, the number of annual publications and the overall number of citations vary significantly, reflecting the evolution of scholarly interest and the reception of research contributions as shown in Figure 2.
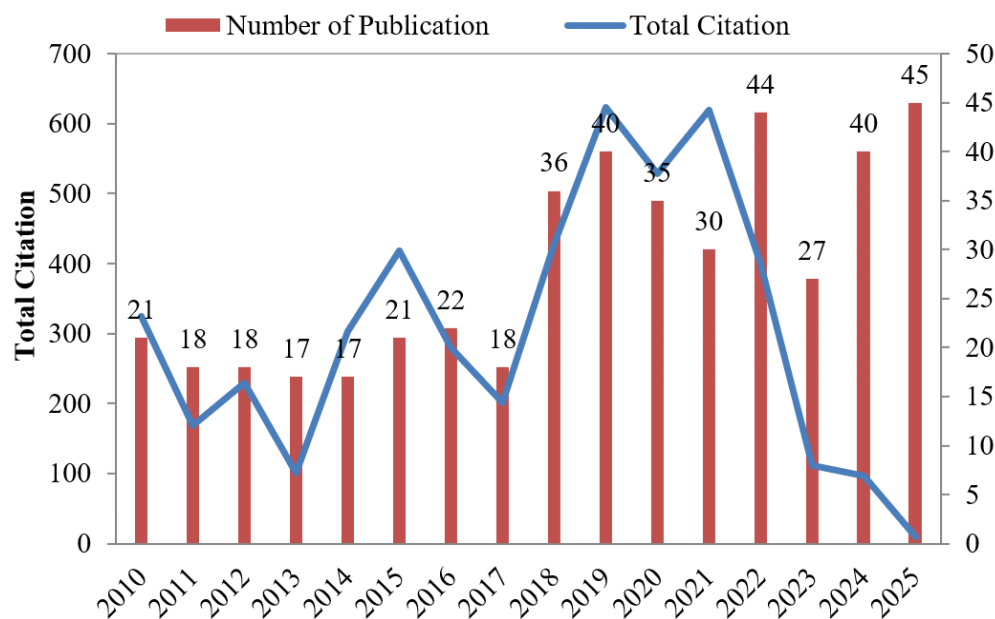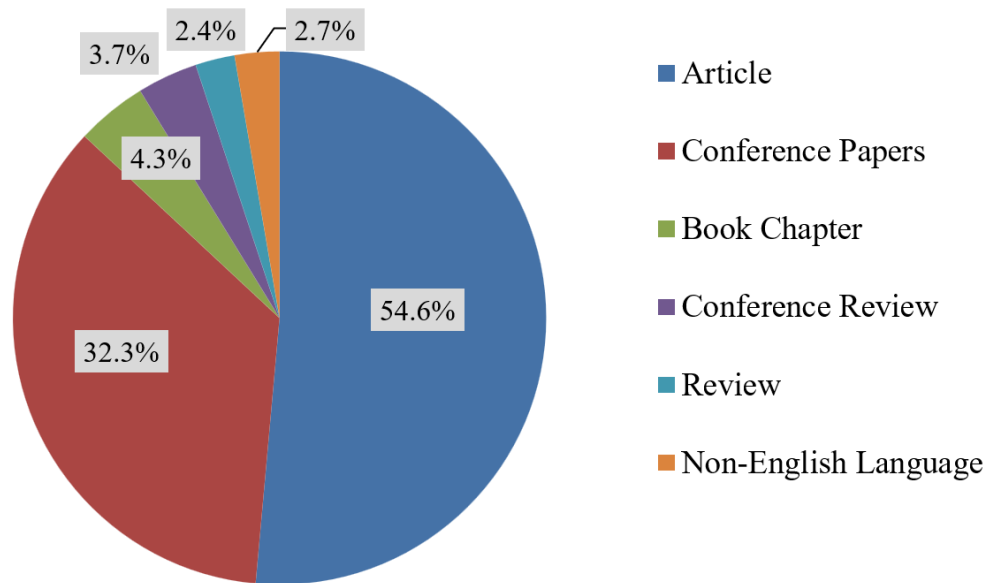

Figure 2.
Analysis of annual trend of publication on value management in construction for the last 15 years.

Beginning in 2010, there were the first attempts of 21 papers which were cited 325 times. This early stage reflects the establishment of foundational research that probably involved key theories in value management. Similarly, the years 2011 and 2012 have approximately equal numbers of publications (18 papers per year) but with fluctuating citation numbers. Of these, 2012 was the year with the highest number of citations (230), indicating that some of the studies were widely accepted in the academic field. The number of publications decreased slightly between 2013 and 2014, with just 17 papers produced each year. Nonetheless, the number of citations increased to 303 in 2014, suggesting that the publications released during this period had a notable influence and could have addressed important knowledge gaps. However, the number of publications rose to 21 in 2015 and 22 in 2016. As a result, the citations increased to 418 in 2015, reflecting the high importance of this field. Yet, this number dropped to just 280 in 2016, which could mean that papers published afterward did not have the same impact as those initially. A significant rebound was observed in 2018, where publications rose to 36 and citations to 428. This growth reveals a renewed interest in value management and possibly reflects new

challenges within the construction industry, such as sustainability and cost reduction. In 2019, the number of publications reached 40 articles and a remarkable 624 citations, highlighting the importance of the research in this year.

The output for publications in 2020–2022 remained constant, although there were some changes for the citation yields. The peak of 620 citations in 2021 suggests that there is still high-quality research to be published. Yet, the approximately 50% decline to 400 citations in 2022 may have raised questions as to whether the topic has reached a point of saturation or whether scholarly horizons regarding the topic may have shifted. In 2023, 27 articles yielded merely 111 citations, suggesting that subsequent research has so far been challenged to achieve the same success as earlier works. This indicates that although more research is being published, its impact is not necessarily keeping pace, raising questions about the relevance and quality of recent work. Though it has gone through growth and its share of significant impacts, current and future projections show that there are issues that must be addressed. Exploration of these issues through targeted research will assist in determining if and how VM can best address those issues in the construction industry.

The frequency of document types identifies diverse perspectives on research outputs in relation to value management in construction (Figure 3). The research articles were most abundant and accounted for 54.6% (323) out of the total of 591 documents examined. This large percentage highlights the importance of original research in the spread of knowledge and in the further development of the domain.

Figure 3.
Document type percentage of reports for value management in construction.

Because of their significant contribution, only research articles and conference papers are considered for detailed analysis, and other forms of documents are excluded. The high ratio of research articles is consistent with the fact that it is through the original work that new discoveries are brought forward and new techniques are presented. These papers typically report empirical evidence, case studies, and novel value management methodologies that contribute to the development of value management practices.

Conference papers, comprising 190 papers (32.3%) of overall publications, provide a critical venue for disseminating tentative results and new hot topics. They facilitate rapid academic exchange and cooperation opportunities for participants, enabling discussions of ideas and results. The large percentage of conference papers indicates a vibrant academic community that emphasizes quick dissemination of research findings. Focusing on these two types of documents, the study highlights the importance of original research and ongoing academic debate in the development of value management. The limited representation of other document types, such as book chapters and review articles, suggests that extensive synthesis of existing knowledge has not been widely conducted. This may be due to the fast pace of research, which favors quick publication routes in journals and conference proceedings. Additionally, the absence of industrial reports or patents indicates that teaching and research are disconnected from practical applications within the construction industry. Despite strong research output, there exists a gap between research findings and their application in the community and practice.

3.2. Co-Citation Network of Authors in Value Management in Construction Projects

Co-citation author network analysis represents a powerful bibliometric method for systematically mapping the present literature [47]. This approach determines the authors that tend to be cited together to reveal conceptual debates and thematic relations in a specific field of study. In this study, we further used VOSviewer for a deep co-citation network analysis on value management in construction projects. We present our findings with a ranking of authors, including the number of publications and citation frequency.

Table 2 summarizes a list of top authors in the field of value management in the construction sector in terms of both publication output and citations. The findings confirm the possibility of the Matthew Effect, observed in those established

writers being more favored and supported, as they are the ones who have published the most. This could lead to unequal visibility and impact in the academic world.

Table 2.
Co-occurrence map of researcher collaboration (2010-2025) in value management in construction projects: publication count and citation impact.

Author	No. of Publications	Author	Total Citation
Oke and Aigbavboa [48]	11	Oke and Aigbavboa [48]	444
Leung et al. [49]	11	Othman et al. [50]	426
Kineber et al. [51]	8	Vanhoucke [52]	378
Othman et al. [50]	8	Kineber et al. [51]	350
Vanhoucke [52]	8	Kineber et al. [53]	326
Shen and Liu [17]	7	Shen and Liu [17]	217
Kineber et al. [53]	7	Ibrahim et al. [54]	196
De Marco and Narbaev [55]	6	Batselier and Vanhoucke [56]	169

The co-occurrence map of author collaborative relationships in terms of publication number and citation influence is shown in Table 2, ordered by publication quantity from 2010 to 2025. This double-aspect classification allows for a better understanding of the description of academic success, differentiating between the output of research contributions and success in citing those contributions.

The first column of the table presents the top authors based on publication counts. It can be seen that Oke and Aigbavboa [48] contributed with 11 publications each. The following are Kineber et al. [51], also demonstrating clear literature presence with 8 publications. Kineber et al. [51] contributed with 7 publications, followed by De Marco and Narbaev [55] with 6 papers. This focus on publication production demonstrates the involvement and dedication of active researchers to expand our understanding of value management in the construction industry. A high publication number often reflects ongoing research efforts and the pursuit of novel approaches.

The second column considers the total citation count, which is a clear indicator of how much impact and influence these researchers have had. It is interesting to note that Oke and Aigbavboa [48] lead the pack with 444 total citations, followed strongly by Othman et al. [50] (426 citations). Vanhoucke [52] (378 citations) is next, indicating significant appreciation of their work. Kineber et al. [1] (350 citations) and Kineber et al. [1] (326 citations) also demonstrate significant citation impact; while Shen and Liu [17] (217 citations), Kineber et al. [1] (196 citations) and Batselier and Vanhoucke [57] (169 citations) also contributed to the overall field of citations.

It is noteworthy that some of the authors are listed in both groups (e.g., Oke and Aigbavboa [48]), suggesting that many published papers might also be related to a high impact on citation. This intersection reflects the more iterative relationship of prolific authors and their work. The overlap of these fields represents, for these researchers, a dual function regarding their contribution to literature and ongoing debate.

3.3. Leading Countries of Research Value Management in Construction

Table 3 reveals the contributions of different countries in the field of research of value management in construction. The data involves the necessary statistics such as the frequency of publication on the topic and the quality of the research, which reflect the contribution of each country to the development of knowledge in the field.

Table 3.
Leading countries publishing on value management in construction research, ranked by total link strength (TLS).

Country	TLS	Documents	Citations
Nigeria	125	18	546
Malaysia	123	52	825
South Africa	113	18	319
Hong Kong	106	36	711
Australia	91	29	781
Saudi Arabia	81	15	169
United Kingdom	73	40	1109
China	39	48	382
Egypt	38	16	289
United States	33	34	234
Iran	28	24	241
India	17	19	128
Canada	13	16	151

As illustrated in Table 3, Nigeria is identified as a leading country, with a TLS of 125 and 18 published works and citations of 546. This indicates that Nigeria has a low publication volume but a very high research impact, and its research demonstrates a good level of integration with the global research network. The impact of Nigerian researchers on value

management highlights that the academic community in Nigeria is responding effectively to the challenges faced by the construction industry. The greatest contribution was from Malaysia, with a TLS of 123 over 52 papers and 825 citations. This significant output demonstrates that Malaysia has strong research expertise and leadership in the field. The high volume of publications, as well as the citations of these publications, show that Malaysian studies are not only numerous but also influential, reflecting a commitment to advancing methods in value management.

In the third rank, South Africa has contributed 18 articles with a total of 319 citations and a TLS of 113. This suggests a focused and emerging area of research. Nevertheless, some research has indicated that there is still a lack of knowledge and adoption in the South African construction professional field regarding VM practices, and thus there is potential for development in the area.

Hong Kong is the next behind South Africa with a TLS of 106, with 36 documents and 711 citations. This is indicative of a relatively vibrant research scene given its developed construction industry and its degree of international networking. The Hong Kong Institute of Value Management plays an important part in advocating value management and enriches the regional contribution to the subject.

Australia also demonstrates a solid presence with a TLS of 91, 29 publications, and 781 citations. This indicates active engagement in value management research, suggesting that Australian researchers are making significant strides in advancing knowledge and practices in construction. The United Kingdom, with a TLS of 73, has published 40 documents and received a remarkable 1,109 citations. This underscores the UK's substantial influence and contribution to value management research, with its studies being highly recognized within the academic community. The UK's historical context, as a pioneer in value management, continues to shape its research landscape.

China, having a TLS of 39 and 48 papers, has a citation of 382. Although the relative citation impact is lower than that of some leading countries, it suggests an increasing interest in value management research and involvement, given the ongoing construction sector growth within the country. Egypt shows a TLS of 38, with 16 documents and 289 citations, reflecting a moderate level of research activity and impact. The recognition of value management principles is growing among stakeholders in the Egyptian construction industry, indicating potential for further development.

The situation in the United States differs, with a TLS of 33, 34 published papers, and 234 citations. Although it is the origin of value management ideas, its lower citation impact may be related to fewer publications in the academic field. Iran and India show moderate engagement in value management, with TLS of 28 and 17, respectively. Iran has 24 published documents that have received 241 citations, while India has 19 publications with 128 citations, indicating a need to expand and develop their research efforts. Canada has 16 documents and 151 citations, demonstrating active research in value management.

Meanwhile, countries such as Malaysia, Hong Kong, and the UK are among the top in both metrics, demonstrating their significant role in advancing knowledge in the field of value management. As the world's focus on value management increases, responding to local demands and stimulating collaboration between different countries will be necessary to enhance the impact of the field on construction industry practices globally.

Figure 4 shows the link between global networks in value management in construction. This visualization reveals the importance of international collaboration to share knowledge and address the different challenges within the construction sector. Countries that show strong connections in this network often leverage their established research institutions and industry capabilities to drive advancements in value management.

As shown in Figure 4, the nodes characterize different elements of the keyword co-occurrence network, where the shapes of the nodes and the positions of the nodes display the degree of co-occurrence between these elements. Based on the scatter plot, two clusters (denoted with different colors) are identified, representing different aspects of value management in construction. Node size is proportional to the frequency of occurrence, while line width reflects the relationship strength between nodes.
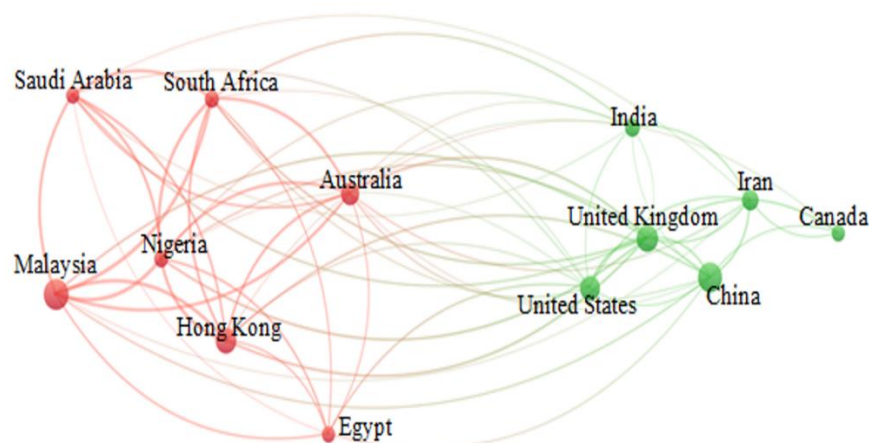
Figure 4.
Mapping visualization of countries in the investigation of the countries in value management in construction.

The VOSviewer map shown in Figure 4 reflects the collaborative networks between the countries, indicating that the research in this area is interconnected. Malaysia plays a central role in this network, which reflects its high involvement and

strategic investments in value management research. The country's capacity to strategically adopt the use of local resources makes it a major stakeholder in advancing innovative construction technologies and processes. The strong research evidence suggests a sustained effort to tackle both local and global challenges in industry.

Nigeria and South Africa, on the other hand, are also prominently featured countries in the network, demonstrating their active participation in regional efforts. However, their linkages could suggest that they need more integration into larger international research efforts to maximize their impact. These countries are developing their construction sectors while simultaneously contributing to knowledge on a global scale.

Strong country connections on the network are illustrated by Australia and Hong Kong as major contributors to value management research. Their highly reputable academic institutions and innovative practices contribute to Australia's enhanced influence, while Hong Kong's favorable location allows it to cooperate with other advanced countries. The UK and US are highlighted as major nodes in this network, which is unsurprising given their established leadership in VM research. Their established research structures and shared interest in new practices ensure their status as important contributors to the debate on value management in construction.

Lastly, India, China, Iran, and Canada demonstrate a variety of contributions and journeys to the global debate, adding a variety of perspectives and resources. India's preference for environmentally friendly practices and China's growing construction industry make them the new entrants in this area.

Table 4 presents an overview of the top seven institutions according to authors' affiliation, highlighting those universities that have at least three publications in the subject of value management and construction. This table is very important to understand the engagement of various academic institutes in research areas.

Table 4.
Leading institutions based on authors` affiliation with a minimum of 3 published documents in the value management research field.

Affiliation	Department	Country	TLS	No. of Documents	Total Citations
Federal University of Technology, Akure	Department of Quantity Surveying	Akure, Nigeria	429	4	46
City University of Hong Kong	Department of Architecture and Civil Engineering	Kowloon Tong, Hong Kong	416	3	18
Ghent University	Faculty of Economic and Business Administration	Belgium	350	3	104
Vlerick Business School	Technology and Operations Management	Belgium	350	3	104
University College London	UCL School of Management	London, United Kingdom	350	3	104
University of Moratuwa	Department of Building Economics	Sri Lanka	35	4	6
Shahed University	Department of Industrial Engineering, Faculty of Engineering	Tehran, Iran	24	3	31

At the top of this list is the Federal University of Technology, Akure, Nigeria, with a TLS of 429, contributing 4 papers and gaining 46 citations. This tight TLS indicates that the university largely contributes to collaborative research within the discipline. The Department of Quantity Surveying plays a critical role in this contribution, suggesting that more effort regarding value management in construction would be beneficial.

The City University of Hong Kong is closely behind with a TLS of 416, three published documents, and 18 citations. The School of Architecture and the Built Environment at this university illustrates the university's dedication to incorporating value management into building and engineering activities, although its citations suggest more impact is needed.

Ghent University and Vlerick Business School, Belgium, have a TLS of 350 with three published documents and 104 citations for each university. This high number of citations compared to the number of papers they published shows that research output generated from these institutions is not only extensive but also well-received in the academic community. Their emphasis on management of the economy and business, as well as technology and operations, reflects interdisciplinary research in value management.

University College London (UCL) also has a TLS of 350 with a number of publications of 3 and citations of 104. Significantly, UCL's School of Management adds to thought leadership on value management, demonstrating the depth of the university's expertise in its field of management studies and its relevance to construction and project management. In contrast, the University of Moratuwa in Sri Lanka shows a TLS of 35 with four documents and 6 citations. While the volume of publications is commendable, the relatively low citation count indicates that the impact of its research may not be as pronounced as that of other institutions on this list. The Department of Building Economics plays a crucial role in exploring value management within the regional context.

Finally, Shahed University of Iran, with a TLS of 24, has three documents and 31 citations. This demonstrates a growing research interest in value management, mainly from the Department of Industrial Engineering. Its contribution is acknowledged by the citation count, although it is not comparable to top-level research institutions.

As a summary, Table 4 shows the strong research performance and expanded collaboration of institutions such as the Federal University of Technology, Akure, and the City University of Hong Kong. In contrast, Ghent University, Vlerick Business School, and University College London demonstrate high citation in profiles. This is proof that their research is both high in quality and has practical significance. This diversity is evident in both sources and terms for academic contribution to value management, which indicates the difficulties faced by scholars who rely on structural methods.

3.4. Leading Journals Published Research in Value Management in the Construction Field

Table 5 lists the top 10 journals that publish research and studies related to value management applications in construction projects. This summary includes such key metrics as the number of publications and total citations for each journal, pointing out how much they contributed to the field.
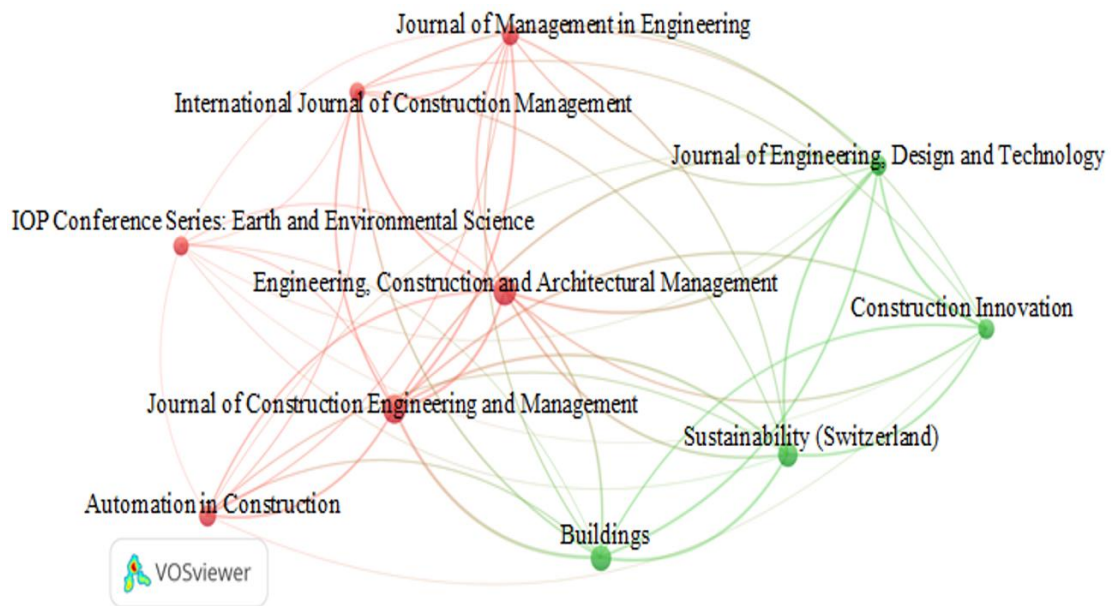
Table 5.
The top 10 journals related to value management in construction research.

Journal	TLS	No. of Documents	No. of Citations
Journal of Construction Engineering and Management	1149	16	381
Buildings	1012	12	173
Engineering, Construction, and Architectural Management	926	16	307
Sustainability (Switzerland)	899	11	275
Journal of Engineering, Design and Technology	855	8	150
Construction Innovation	658	8	137
International Journal of Construction Management	598	7	98
Journal of Management in Engineering	580	9	280
Automation in Construction	423	9	239
IOP Conference Series: Earth and Environmental Science	132	7	8

According to Table 5, the analysis of the most influential journals in published papers in the field of value management application in the construction sector indicates that research efforts were quite impressive and had a great impact.

Specifically, the Journal of Construction Engineering and Management is the most distinguished journal, achieving a TLS of 1,149 with 16 published documents and a high number of citations of 381. This high number of citations implies that the research in this journal has been well accepted by academia, emphasizing the journal's critical influence in disseminating knowledge on value management in construction projects. The following "Buildings" journal, with a TLS of 1,012, 12 documents published, and 173 citations, emphasizes the interdisciplinary aspects of construction design and management, making it of particular interest to researchers in the field of value management, with special considerations to sustainability and efficiency in construction. Engineering, Construction and Architectural Management also contributes to the research field of value management, with a TLS of 926, 16 papers, and 307 total citations. The focus of this journal on merging engineering with construction management results in it being an important forum for improving value management techniques. The "Sustainability (Switzerland)" journal has a listing TLS of 899 records, with 11 documents and 275 citations. Their strong focus on sustainability in construction aligns with the philosophy of value management, drawing researchers to investigate innovative ideas that contribute to environmental and economic betterment. The Design & Technology contributes to knowledge with a TLS of 855, 8 papers, and 150 citations. This journal focuses on engineering innovations and design methodologies essential for advancing value management in construction. "Construction Innovation" has a TLS of 658, with 8 documents and 137 citations. This journal's focus on novel approaches to construction processes and technologies highlights the importance of innovation in implementing effective value management practices. The "International Journal of Construction Management" has a TLS of 598, with 7 articles and 98 citations. Although the average number of citations to this journal is less than that of the top journals, it remains an important platform for discussing current issues and topics in construction management and value engineering. The "Journal of Management in Engineering" has published 9 articles, which have been cited 280 times, with a TLS of 580. The focus of this journal is on managing engineering projects, relevant to good value management practices. "Automation in Construction" has a TLS of 423, with 9 publications and 239 citations. This journal emphasizes automation technology in construction and is increasingly important for value management through efficiency and innovation.

Finally, 'IOP Conference Series: Earth and Environmental Science' has a TLS of 132, with 7 publications and 8 citations. Although it contributes to the broader discussion on environmental matters, its relative impact is low compared to other journals in this analysis. As can be seen in Figure 5, 10 of the sources met these requirements.

Figure 5.
Networking visualization of journals published in 2010-2025 that have more than 7 documents related to value management in construction research.

Overall, the "Journal of Construction Engineering and Management" has the highest citation impact, indicating its pivotal role in the field of value management in construction. Journals such as "Buildings," "Engineering, Construction and Architectural Management," and "Sustainability" are also essential, demonstrating that the research is ongoing and developed, encouraging the implementation of value management within the construction industry. These journals have a significant responsibility toward the formulation of best practices for sustainable construction management.

3.5. Most Influential Publications Related to Value Management in Construction Projects

Citation analysis is considered a significant method for gaining insight into the intellectual perspectives of an academic field, which become crucial. It shows one publication in relation to others. These analytical methods facilitate the identification of benchmark works in a research field and enable citation trends and patterns to be traced [58]. Considering the study, a citation analysis of the academic papers on value management in the construction context was conducted.

Table 6 shows the top 22 most cited papers in this field that provide the greatest impact and advancement to the field. The table lists these influential works in descending order of citations and offers important indications of the approaches applied and the main findings that have significantly informed ongoing debates on value management in construction research. Through considering these high-impact works, we will have a good insight into the literature and its current and future directions in the research area of value management, thus highlighting the significance of citation analysis in the evolution of knowledge within management.

Table 6.
The top 22 most-cited documents related to value management in construction research.

Year	Document Title	Journal	Citations	Ref.
2015	Construction and evaluation framework for a real-life project database	*International Journal of Project Management*	110	Batselier and Vanhoucke [57]
2010	Facilitating client value creation in the conceptual design phase of construction projects: A workshop approach	*Architectural Engineering and Design Management*	97	Thyssen et al. [59]
2021	Exploring the Value Management Critical Success Factors for Sustainable Residential Building. A Structural Equation Modelling Approach	*Journal of Cleaner Production*	95	Kineber et al. [53]
2021	Design for Manufacture and Assembly (DfMA) in construction: the old and the new	*Architectural Engineering and Design Management*	91	Lu et al. [60]
2021	Impact of Value Management on Building Project Success: Structural Equation Modeling Approach	*Journal of Construction Engineering and Management*	82	Kineber et al. [61]
2015	Value Management in Singaporean Building Projects: Implementation Status, Critical Success Factors, and Risk Factors	*Journal of Management in Engineering*	76	Hwang et al. [62]

2019	Value creation in projects: Towards a narrative perspective	*International Journal of Project Management*	76	Green and Sergeeva [63]
2012	Measuring the efficiency of project control using fictitious and empirical project data	*International Journal of Project Management*	74	Vanhoucke [52]
2018	Barriers to the Adoption of Value Management in Developing Countries	*Engineering, Construction and Architectural Management*	74	Aghimien et al. [64]
2020	Barriers to value management implementation for building projects in the Egyptian construction industry	*Ain Shams Engineering Journal*	74	Othman et al. [50]
2019	Using real project schedule data to compare earned schedule and earned duration management project time forecasting capabilities	*Automation in Construction*	66	de Andrade et al. [65]
2017	BIM-Based 4D Simulation to Improve Module Manufacturing Productivity for Sustainable Building Projects	*Sustainability*	66	Lee and Kim [66]
2016	Barriers to applying value management in the Vietnamese construction industry	*Journal of Construction in Developing Countries*	61	Kim et al. [13]
2020	Identifying and assessing sustainable value management implementation activities in developing countries: The case of Egypt	*Sustainability*	61	Kineber et al. [67]
2019	Integrated project delivery with BIM: An automated EVM-based approach	*Automation in Construction*	61	Elghaish et al. [68]
2015	Empirical Evaluation of Earned Value Management Forecasting Accuracy for Time and Cost	*Journal of Construction Engineering and Management*	59	Batselier and Vanhoucke [56]
2019	Examining the role of value management in controlling cost overrun [application on residential construction projects in Egypt]	*Ain Shams Engineering Journal*	58	Khodeir and El Ghandour [69]
2011	Identification of key performance indicators for measuring the performance of value management studies in construction	*Journal of Construction Engineering and Management*	58	Lin et al. [70]
2010	The integration of sustainability within value management practices: A study of experienced value managers in the GCC countries	*Project Management Journal*	57	Al-Saleh and Taleb [71]
2018	An implementation framework of value management in the Nigerian construction industry.	*Built Environment Project and Asset Management*	55	Tanko et al. [72]
2015	Critical success factors for value management workshops in Malaysia	*Journal of Management in Engineering*	50	Ramly et al. [73]
2022	Barriers to Digital Technology Deployment in Value Management Practice	*Buildings*	50	Aghimien et al. [74]

3.6. Primary Research Areas of Value Management in Construction

According to Biberci [75], co-occurrence analysis is important for detecting research topics and evaluating the dynamic trends of research fronts within a discipline. In this study, VOSviewer was applied to analyze Scopus data to obtain a minimum of 8 keywords. Therefore, 22 keyword strings were extracted from 1024 author keywords.

Table 7 shows a list of keywords that met or exceeded the pre-determined threshold set for this study. In this list, the authors' keywords are emphasized instead of the indexed keywords. The top 22 keywords are ordered by descending TLS as shown in Table 7. A thorough scientific analysis was utilized to calculate the ranking of these keywords, accounting for variables such as cumulative link strength, the number of links pointing to each keyword, and the frequency of their occurrence.

Table 7.
Top 22 keywords from the research published on value management in construction.

Keywords	Cluster	TLS	Occurrence
Value Management	2	138	135
Project Management	1	64	43
Earned Value Management	1	60	70
Value Engineering	4	42	26
Construction	3	41	27
Construction Industry	4	41	31
Construction Projects	1	34	24
Sustainability	2	31	20
Construction Management	3	28	16
Building Projects	2	23	12
Risk Management	5	23	18
Critical Success Factors	2	18	11
Project Control	1	15	10
Value	4	15	15
Earned Value	3	13	9
Innovation	2	13	8
Cost Control	3	11	8
Performance Measurement	1	11	8
EVM	5	10	11
Lean Construction	4	10	9
Earned Duration Management	1	8	10
Earned Value Management (EVM)	1	7	15

Table 7 presents the top 22 keywords identified from research related to value management in construction. Based on the findings of the keyword overlap analysis, "Value Management," "Project Management," and "Earned Value Management" are the most frequently used terms in the context of applying value management in construction research. These findings support the essential significance of value management in the field of construction studies. The terms "value engineering," "construction," "construction industry," and "construction projects" were also among the top ten keywords associated with value management in construction research. According to the TLS values, "value management" obtained the highest score (138), followed by "value engineering" with 42, "project management" with 64, and "earned value management" with 60. These findings demonstrate the relative significance of these fundamental keywords in the field of research.

In this context, Figure 6 displays a network diagram that illustrates the co-occurrence of keywords identified in research articles focused on the value management in construction.
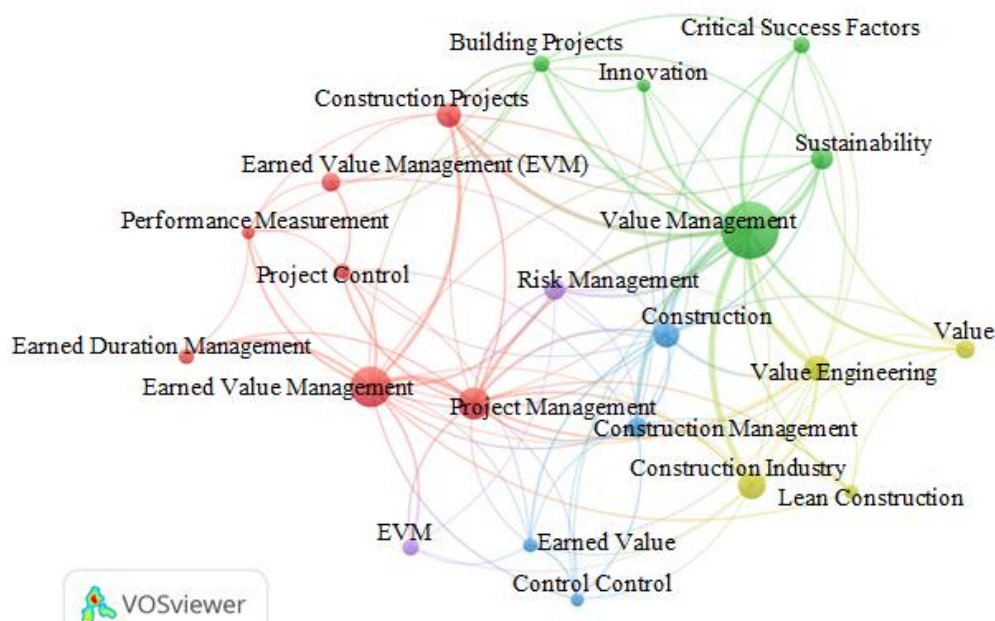
Figure 6.
Co-occurrence author keywords related to value management in construction.

Figure 6 shows nodes of different keywords, with the shape and placement of the nodes indicating the frequency of co-occurrence of these keywords. By the detailed analysis of the keyword co-occurrence, five clusters represented by different color areas can be classified as different topics contained in the field of research with respect to value management in the construction domain.

The nodes represent the detected groups where each group is focused on a specific topic related to the application of value management in construction. The size of the nodes indicates the frequency of their occurrence, and the width of connections between the nodes reflects the strength of their interrelations.

Cluster 1, highlighted in red, comprises 7 keywords. This cluster focuses on construction project control and performance assessment based on techniques such as EVM, Performance Measurement, and Earned Duration Management. These key terms underscore the need for systematically controlling and managing the progression of the project to accomplish objectives. In general, the cluster could be given the name "Performance Assessment and Control Mechanisms within Projects."

Cluster 2, highlighted in green, features 5 keywords. This cluster emphasizes the development of value management along with sustainability and risk management in construction. It highlights the method in which value management principles can be effective in working in agreement with risk management and sustainability-related actions to achieve value for project cost, as well as value for the broader environment, and achieve project best value by managing these project uncertainties. The cluster can simply be named as "Integration of Value Management into Risk and Sustainability in Construction".

Cluster 3, highlighted in blue, includes 4 keywords. This cluster is highly focused on the organization and management of construction projects, emphasizing topics such as earned value control, construction management, and the construction industry. It generally represents an emphasis on efficient project delivery, summarized under the heading "Efficient Project and Construction Management Practices."

Cluster 4, highlighted in yellow, consists of 4 keywords. This cluster highlights the relationship between the four keywords: value, value engineering, lean construction, and construction industry, emphasizing how these concepts collectively drive the quest for optimal project outcomes. Within the construction industry, value engineering serves as a structured approach to enhance value by systematically analyzing project functions to reduce costs without compromising quality, while lean construction focuses on eliminating waste and improving processes to maximize efficiency. Together, these methodologies mainly aim to deliver higher value by ensuring resources are used effectively, projects meet performance expectations, and client satisfaction is achieved, ultimately fostering more sustainable and competitive construction practices.

Cluster 5, highlighted in purple, focuses on 2 keywords. This cluster emphasizes the solid relationship between Earned Duration Management (EDM) and risk management. It shows how they work together to ensure efficient management of project time schedules. While EDM provides a more sophisticated method to monitor and evaluate schedule performance by comparing earned progress against projected durations, risk management concentrates on detecting, evaluating, and reducing risks that could cause delays. Combined, these approaches enable proactive handling of potential disruptions and provide early detection of schedule deviations, ensuring projects stay on track and are delivered reliably within their planned timeframes.

4. Future Work

Future studies on VM in the construction industry should go in several crucial directions. directions in order to advance the research area and improve its practical effect.

First, there is a positive chance to create frameworks and guidelines suitable for specific regions, particularly for developing countries in Asia, Africa, and the Middle East, where obstacles such as a lack of knowledge, technical experience, and regulatory support continue to prevent the widespread adoption of VM applications. Research that considers regional cultural, economic, and regulatory contexts can ensure that VM concepts are more successfully incorporated into various construction sectors. In addition, several countries in Latin America, Central Asia, and the Middle East have no notable presence in publication output or citation strength. This geographic imbalance suggests that regional-specific research frameworks and policy-influenced studies are either lacking or unpublished in indexed sources. The lack of contributions from these regions presents a crucial opportunity for future studies to investigate VM applicability in diverse regulatory, economic, and cultural contexts.

Secondly, there are several opportunities for investigating the intersection between VM practices and digital transformation. VM application through the project activities could be completely transformed by including Artificial Intelligence, Data Analytics, Building Information Modelling (BIM), and the Internet of Things (IoT) into VM procedures. Future research could create and evaluate intelligent VM systems that use real-time data to facilitate risk reduction, performance improvement, and dynamic decision-making.

Moreover, future work should explore the integration of VM with sustainability objectives, going beyond cost and functionality to encompass environmental and social dimensions. Research could develop multi-criteria value frameworks that explicitly align VM with green certifications, circular economy principles, and social value creation, reflecting the broader responsibilities of the construction sector.

5. Conclusion

This study performed a bibliometric analysis of research on the application of value management in construction projects. A total of 449 articles derived from the Scopus database were reviewed and subjected to bibliometric analysis

using the VOSviewer 1.6.20 software, which reveals significant trends and developments in this research area. The results indicate a growing scholarly interest in VM, especially in countries such as Malaysia, Nigeria, and the UK. However, significant regional gaps remain, with limited contributions from Latin America, Eastern Europe, and parts of the Middle East. Additionally, nearly 50% of the research on value management applications in construction projects has been published within the last five years. The analysis shows that interest in applying VM in construction projects has increased over the past five years, reaching a peak in 2024 and 2025 with 40 and 45 published articles, respectively. The results identify the Journal of Construction Engineering and Management, Buildings, and Construction and Architectural Management as the three highest-ranked journals discussing VM in construction projects. Malaysia, with 52 papers published, is the leading country in VM publications. In terms of publication volume, the Federal University of Technology Akure ranks first. The most frequently used keywords representing the primary focus of studies in this area and receiving increased attention recently are value management and project management.

Overall, while this study provides valuable insights for policymakers and academics, future studies should focus on exploring VM implementation in underrepresented regions through context-sensitive frameworks; investigating the integration of digital technologies such as BIM, AI, and IoT with VM; establishing standardized performance indicators to evaluate VM effectiveness; and bridging the academic-practitioner divide by aligning research with real-world construction challenges.

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