Knowledge transfer and management in the construction industry: Trends and future challenges

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ABSTRACT

This study aims to determine the current issues associated with the transfer of knowledge in the construction industry published between 1987 and December 2021 to provide insights and ideas for future research. A total of 1240 publications were analysed to offer metadata analysis, and these papers were extracted from the Scopus database. The insights gained from analysing papers from Scopus databases are presented along with classifications of the literature based on content analyses, including conceptual understanding, barriers and facilitators, a collaborative effort with knowledge management and other optimisation models, and evaluation of knowledge management practices and performance. The study's findings show a declining trend in research on drivers or obstacles analysis of knowledge management. In contrast, there is a growing trend in applying mathematical optimisation models to enhance decision-making in pursuing knowledge management performance.

Furthermore, the study's findings reveal a steady increase in assessing knowledge management techniques and performance over time. Contributions by disciplines are identified, and the most significant authors, leading journals, leading nations, leading contributing institutions, and leading contributing institutions. The study's results and future research possibilities open up a new channel for further inquiry and contribution to this subject.

KEYWORDS: Knowledge management, Knowledge transfer, Knowledge share, Barriers, Construction industry.

INTRODUCTION

Horton introduced the concept of knowledge management (1979). When Rogers, Sveiby, and Edvinsson published their findings in the 1980s, they were recognised for their contributions to knowledge resources (Edvinsson, 1987; Rogers, 1987; Sveiby & Lloyd, 1987). According to the literature on knowledge management, knowledge management has been a field since 1991 (Ikujiro Nonaka, 1991). When knowledge management was systematically explored for the first time after an extended period, it began to draw widespread attention (Ikujirō Nonaka *et al.*, 1995). Since then, knowledge has been recognised as one of the most significant resources, competencies, or assets that organisations may have to preserve for their sustained competitive advantage over competitors (Bruton *et al.*, 2007). As a crucial and rising strategic instrument, knowledge management has experienced an explosion in the study conducted during the previous two decades. In research papers nowadays, knowledge management is significant (Yu

& Yang, 2018). Scholars have devoted a great deal of time and effort to this subject (Cárcel-Carrasco & Cárcel-Carrasco, 2021; Hu *et al.*, 2021; Wang *et al.*, 2022). Knowledge management is crucial to improving firm performance in the construction industry, which is characterised by considerable expertise (Kim, 2014).

The construction industry is one of many countries most important foundations of economic growth. In general, the industry is regarded as project-based, for which knowledge management is frequently a difficult task because project teams typically comprise members with diverse backgrounds and various specialities. They work together for a limited period, exchanging information (Zhao *et al.*, 2022). Furthermore, these individuals may have never worked together before. Because of the lack of proper knowledge management, knowledge generated during a project is more likely to be misplaced or lost. Construction industry expertise is essential for completing projects and for project participants in selecting appropriate projects and obtaining bids for projects they are interested in. The fragmented and project-based construction management structure causes information from one project to be divided and spread across several construction phases (Chen *et al.*, 2022). Different participants own the knowledge in each phase. Failure to collect and transmit knowledge in the context of transient virtual organisations would risk "reinventing the wheel" in the future. In this way, one of the most important components in ensuring the successful completion of construction projects is the efficient transfer of knowledge (Edwards, 2022).

Past research studies on knowledge management have been conducted (Del Giudice *et al.*, 2015; Jasimuddin *et al.*, 2014). In this collection, a few articles are concerned with the methodological portion of knowledge management (Adib Bin Othman, 2015; Demir *et al.*, 2021), while other papers are concerned with specific elements and practices (Blomkvist, 2012; Ghobadi & D'Ambra, 2012). Furthermore, only a few authors examine the intersection of knowledge transfer and knowledge sharing when reviewing knowledge management literature (Edwards, 2022; Yu & Yang, 2018), and only a few authors attempt to address broader aspects of knowledge management literature (Ashok *et al.*, 2021; Dahiyat, 2021). On the other hand, prior studies have shortlisted the articles for review and insights using a subjective process, potentially introducing bias. As a result, it is necessary to collect information objectively. With the exponential growth of knowledge transfer literature (as seen in Figure 2), it is becoming increasingly important to give fresh insights and research directions based on the most recent developments in the current body of knowledge in the construction sector. This study aims to determine the current issues associated with the transfer of knowledge in the construction industry to provide insights and ideas for future research. In order to accomplish this, the study covers the following research questions: who are the prominent authors? What is the current publishing fashion? What are the most important journals? In what nations, institutions, and subject areas do the most people contribute? What important topics can be extracted from existing knowledge transfer literature? What simplified framework captures the notion of knowledge transfer in the construction industry? What could give insights on knowledge transfer barriers and challenges in the construction industry that may be used to understand the current phenomena better and identify potential future research areas?

KNOWLEDGE MANAGEMENT IN THE CONSTRUCTION INDUSTRY

It is vital in the construction industry to transmit information and data from recently completed projects. On the other hand, the absence of systematic techniques for learning from earlier projects is still present in several ways (Huang & Yang, 2019). Individualised unique

approaches based on multiple perspectives and attitudes (Kamara *et al.*, 2002) continue to predominate in the sector, despite efforts to make it more systematic. Construction experts make their judgments primarily based on the time, cost, and quality involved in a particular project, depending on their good judgement. Using existing information from earlier initiatives is not done regularly (Yu & Yang, 2018). The industrial and service sectors have long used knowledge management to optimise their efforts to improve the effectiveness and efficiency of their projects, and this practice continues today. Through empirical and case studies, researchers have found that knowledge management helps shorten the duration of projects, decreases the expenses associated with their completion, and improves project quality and long-term viability. Understanding knowledge management may be described as the discovery, optimisation, and active management of intellectual assets to produce value, boost productivity, and obtain and maintain competitive advantage (Tan, 2015).

Knowledge management is a multifaceted concept with three main components (Sergeeva & Duryan, 2019). To begin, project stakeholders must determine the critical information that must be shared and utilised for the project's success. Second, the information gathered should be structured, evaluated, presented, and shared so that all stakeholders can readily comprehend and use the process's product knowledge. Third, stakeholders must keep, enhance, and validate project data in future undertakings (Castro Benavides *et al.*, 2012). This includes basic project information, dates, expected expenses, standards/ benchmarks, and the extensive experience of project employees and stakeholders in dealing with obstacles, issues, opportunities, and project completion. The primary hurdles to knowledge management and execution in construction projects are highlighted in this study (Anumba *et al.*, 2008; Kamara *et al.*, 2002). The study also presents a methodology for maximising knowledge management in building projects to reduce time and expense while improving quality and long-term sustainability (Dahiyat *et al.*, 2021). There are three phases to putting this strategy into action. To begin, construction companies and experts must raise stakeholder understanding of the value and significance of knowledge management. Second, because each project differs from competitors, it is necessary to identify critical information and knowledge components before the construction implementation phase. Third, construction companies must invest in technology that allows them to save, exchange, and validate project data.

Project Knowledge Transfer

Several researchers have found that the realisation of economic value in project-based companies is positively affected by knowledge transfer (Reich *et al.*, 2014). Managing project knowledge effectively may assist firms in achieving better levels of project management success (Owen, 2008). The knowledge and experience gained from various projects within the confines of time and resource restrictions are not usually adequately incorporated into an organisation's knowledge base (De Wit-de Vries *et al.*, 2019). In addition, the problem of knowledge loss from projects can result in the likelihood that positive lessons learned from earlier projects are not transferred to current or new projects and the chance that previous mistakes could be repeated (Gou *et al.*, 2019). Lessons learnt are used to describe both successful and unsuccessful lessons acquired from past projects. It is recommended that lessons learnt from previous projects be applied to current projects to enhance their management (Gemino *et al.*, 2021). According to Vaghefi *et al.* (2018), the practice of knowledge transfer can have a favourable impact on the management of projects when it is carried out effectively. Furthermore, they may be utilised to improve decision-making (Karamat *et al.*, 2018), measure the progress of project employees, and benchmark against other projects (Karamat *et al.*, 2018).

According to Mahura & Birollo (2021), it is difficult for organisations to collect and disseminate successful lessons and mistakes from earlier projects to apply them to current and future projects.

According to Kiessling *et al.* (2021), knowledge transfer is essential for success in project management. Most studies are concerned with the relationship between project performance and knowledge transfer when examining knowledge transfer in the project setting. For example, Gemino *et al.* (2021) investigated how knowledge management (KM) influenced project performance in ICT organisations. Their research revealed that if knowledge is managed efficiently, it has the potential to have a beneficial influence on organisational value. As Ceptureanu *et al.* (2018) pointed out in their paper, managing customer knowledge is critical in boosting sales projects. The utilisation of lessons learned that have already been discovered/produced in ICT project management was also explored by Randolph *et al.* (2022). Their study found a serious lack of models for assisting project team members in repurposing previously developed and stored project information, also known as "knowledge reuse." Anbari *et al.* (2008) investigated the roles of post-project reviews in the context of a research project (i.e., projects assessed after they have been completed). It concluded that this activity might improve project management's effectiveness. Despite the rising number of studies in the converging fields of project administration and knowledge management, little research has been done on how knowledge is created, stored, transmitted, and applied during each project management stage.

Aside from that, knowledge in project settings may be divided into three categories: Project-specific knowledge, project-specific knowledge within a project, and cross-project-specific knowledge (Fernandes, 2018). The term "organisational knowledge base" refers to collecting all of this data, which is used as a repository for knowledge in the context of knowledge management (Rodgers *et al.*, 2017). Project team members should draw on information from the repositories and then apply and develop new knowledge before depositing it back into the repositories for future projects to benefit from (Ramjeawon & Rowley, 2017). Projects are only meant to be transitory. Both old and new project personnel carry them out and are constrained by time and resource restrictions. Despite this, the knowledge and experience gained via various projects are not necessarily systematically incorporated into the organisation's knowledge base (i.e., the stocks of organisational knowledge resources) (Reich *et al.*, 2008). The problem of 'lost knowledge' might result in the likelihood that valuable lessons learnt from previous projects are not transferred and the chance that earlier mistakes are repeated. Lessons learnt describe successful and unsuccessful lessons from past projects (Andrew Stewart 2017). It is recommended that lessons learnt from previous projects be applied to current projects (Reich *et al.*, 2008) and that lessons acquired from previous projects be utilised to enhance the management of projects. Aside from that, they should be utilised to enhance decision-making (Cerchione *et al.*, 2016), evaluate the performance of project staff members, and compare their results to those of other projects. According to Duffield & Whitty (2015), it is difficult for organisations to collect and disseminate successful lessons and mistakes from earlier projects to apply them to current and future initiatives. Initial information (or lessons previously learned) is communicated from the organisation's knowledge base to people working on or managing the project at its beginning. The team members within the project use their collective knowledge when it is suitable. New lessons from the project are developed at every stage of the project management life cycle (Krylova *et al.*, 2016). When the project comes to a close, these new lessons are stored in the organisation's knowledge base to be applied to future projects.

METHOD

The data for this study was gathered systematically from reputable sources. The information was compiled from the Scopus databases and covers the period 1987 to December 2021. A total of 1240 publications have been analysed to offer metadata analysis, and these papers have been derived objectively from the Scopus database. A description of the knowledge management literature is provided in this information. It includes descriptive statistics on prominent authors, prominent journals, institutions, topic areas, influential papers, and a list of nations that have contributed articles to the field. The study provides several valuable findings that should serve as a springboard for further investigation. The contributions of this study are many and diverse. First, the study comprehensively describes knowledge management interwoven with other concepts. Second, the investigation uncovers certain conclusions that contrast previous studies' conclusions. Third, there are just a few categories in the classification of literature, which hinders readers' ability to comprehend and perceive the literature from various perspectives. The study presents a novel, straightforward, and simple yet comprehensive conceptual framework of knowledge management from the construction industry's perspective. Researchers and academicians will find this study interesting because of its insights and potential research direction for comprehending knowledge management in the construction industry and further examining the subject. Therefore, according to Saunders (2011), a literature review begins with the definition of good keywords that will be used to find and obtain the literature from databases and present the results of the literature analysis. According to Tranfield *et al.* (2003), this literature review aims to discover gaps in the literature and limitations in the current body of knowledge. In addition, a literature review analyses and categorises current studies based on important topics and makes recommendations for future research (Moshood *et al.*, 2020; Seuring *et al.*, 2005). Following these considerations, the current study adopts a systematic strategy to extract computationally, identify and categorise the literature based on content analysis and provide guidance for further study.

In summary, the study used a four-step procedure (see Figure 1) that followed a similar methodology, which included recognising the data, filtering initial data, evaluating eligibility, and including the data. It is necessary to collect this data to provide insight and future research directions. The data for the study was gathered from Scopus (for metadata analysis, categorisation and insights). Many researchers (Fahimnia *et al.*, 2015; Malviya & Kant, 2015) have cited the Scopus database as a reputable source of information. Furthermore, the Scopus database has long been recognised by academicians for high-quality indexing content.

Identification of the Data

The information was gathered from the Scopus database. The search is limited to articles published between 1987 and December 2021 to identify previous and current research on knowledge transfer. Several terms, including "Knowledge management" and "construction," are used at the beginning of the research. For the initial search, we restricted ourselves to the "TITLE-ABS-KEY" ("Constructions" AND "knowledge management") combination. Initially, 3971 papers were obtained from two keyword permutations. The results of the initial search of the Scopus database are presented in Table 1.

Table 1: Initial search results and the number of papers that appeared

Keywords	Results (No. of Articles)	Limit To	Document Type
Initial search result			
"Knowledge management" AND "constructions"	3971	Title, abstract and the keywords	Conference papers, books, book chapters and articles

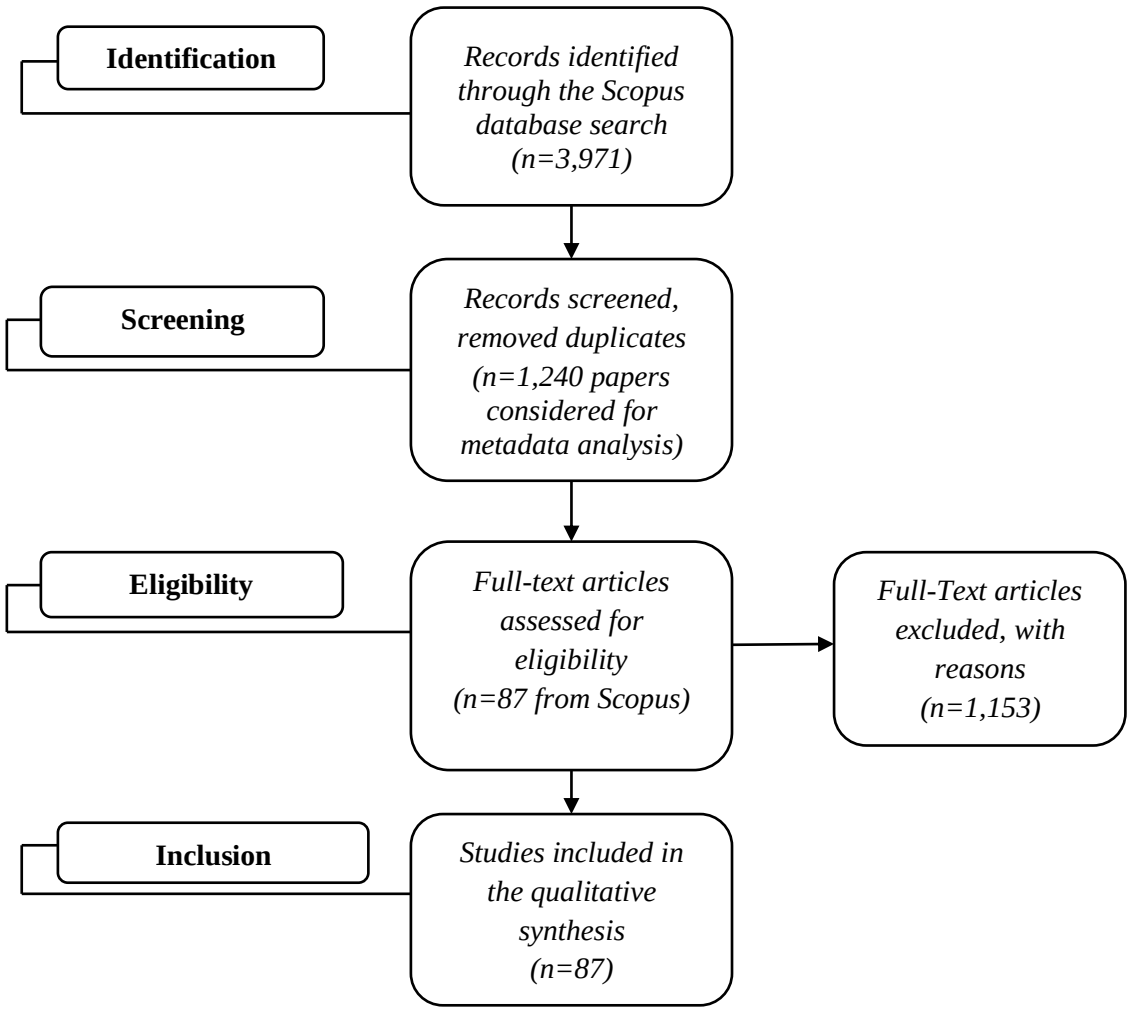

Figure 1: Overview of paper identification, selection, and inclusion process

Screening Initial Data

The first search result returns conference papers, book chapters, and articles. However, these items were eventually removed from the search results, except for the articles. As a result, the search was restricted to only 'article' Consequently, 1285 publications were retained as articles following the initial refining process, as shown in Table 2. After deleting duplicates, a total of 1240 publications were selected for metadata analysis.

Table 2: The result after refining the initial search

Keywords	Results (No. of Articles)	Limit To	Document Type
Limit-To Exact keyword Knowledge management and construction industry	1077	Title, abstract and the keywords	Articles
Knowledge Transfer	121		
Knowledge-sharing	87		
Total	**1285**		

Note: *TITLE-ABS-KEY ("Constructions" AND "knowledge management") AND (LIMIT-TO (EXACTKEYWORD, "Knowledge Management") OR LIMIT-TO (EXACTKEYWORD , "Construction Industry") OR LIMIT-TO (EXACTKEYWORD, "Knowledge Transfer") OR LIMIT-TO (EXACTKEYWORD, "Knowledge-sharing")) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "j")).*

Determining Eligibility

As a starting point for presenting the findings, the researchers objectively picked articles from Scopus based on a simple keyword search of the papers' titles, abstracts, and keywords to get insights into knowledge management and knowledge transfer in the construction industry. The keywords "Knowledge management" and "construction" were used in the search, and the results were limited to just articles. Once again, the investigation covered published publications between 1987 and December 2021. To emphasise the importance of the articles in this collection, it is worth noting that all 1240 publications from Scopus databases are included in the collection of papers offering insights.

The Inclusion of the Data

According to the research, one thousand two hundred forty articles from the Scopus database were used for metadata analysis, and 27 papers from the 1240 Scopus papers were used to give insights and prospects for the future. The study, therefore, verifies that the data has been obtained from reputable sources. These databases are also excellent for generalizability since they index journals from other important databases such as Elsevier, Emerald, Wiley, Taylor and Francis, Springer, and many others. In order to convey insights and future research directions, however, the data must originate from an even more credible source than before. Many previous researchers used subjective judgement to choose the data that would be used to show the insights (Fahimnia *et al.*, 2015; Malviya & Kant, 2015). On the other hand, the current study objectively chose 27 publications from prestigious journals for inclusion.

OBSERVATIONS AND RECOMMENDATIONS

The results of the metadata analysis and insights are presented in the next section. The meta-analysis of 1240 publications was completed, and the insights were offered based on the content analysis of 27 of those studies.

Metadata Analysis

Based on the metadata from 1240 papers, the descriptive statistics are presented in this section. The metadata analysis revealed the publishing of 1240 articles organised by year, journal, author, country, topic area, and institutional affiliation, among others. When doing metadata analysis, if a paper has several authors, the paper is counted more than once in the analysis. When a manuscript is coauthored by "Prof. Y and Dr Z," for example, both of them will receive one publication credit for their efforts. In a similar vein, both their nations and their respective institutes receive one publication credit. In certain circumstances, the numbers in this study are not presented as their whole but rather in a summary style to facilitate the data's readability.

Publications by year

As seen in Figure 2, the emergence of papers on knowledge management began in 1987, with a continuous increase in several articles occurring every year until 2005. It is obvious from the graph that there has been an exponential increase since 2006, which continues to the present day. On the other hand, the trend line suggests a rising pattern, which means that the knowledge management literature continues to develop. A total of 98 articles were published in the year 2021, which is a considerable increase in the number of papers published compared to the previous years. Finally, it can be stated that the construction industry is becoming increasingly concerned about and interested in the issue of knowledge management and information transfer.

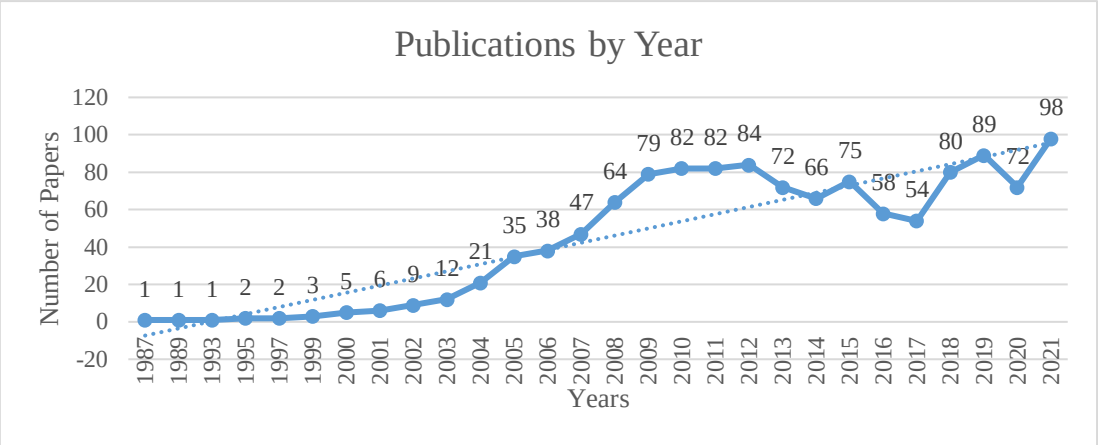

Figure 2: Publications on knowledge management and knowledge transfer by year

Publications by journals

Engineering construction and architectural management produced the largest number of publications, as seen in Figure 3 (51 papers). This journal also has a high impact factor (3.531). As a result of its influence and popularity, engineering construction and architectural management may be ranked among the top journals in the field. The construction engineering and management journal, which produced 49 of the total papers on knowledge management, is the second most popular journal. It also has a good impact factor (3.951) and a good reputation among the journals. However, even though the journal of knowledge management only published 24 papers out of the complete pool, it has the most significant impact factor (8.182), ranking it among the top ten journals in the field.

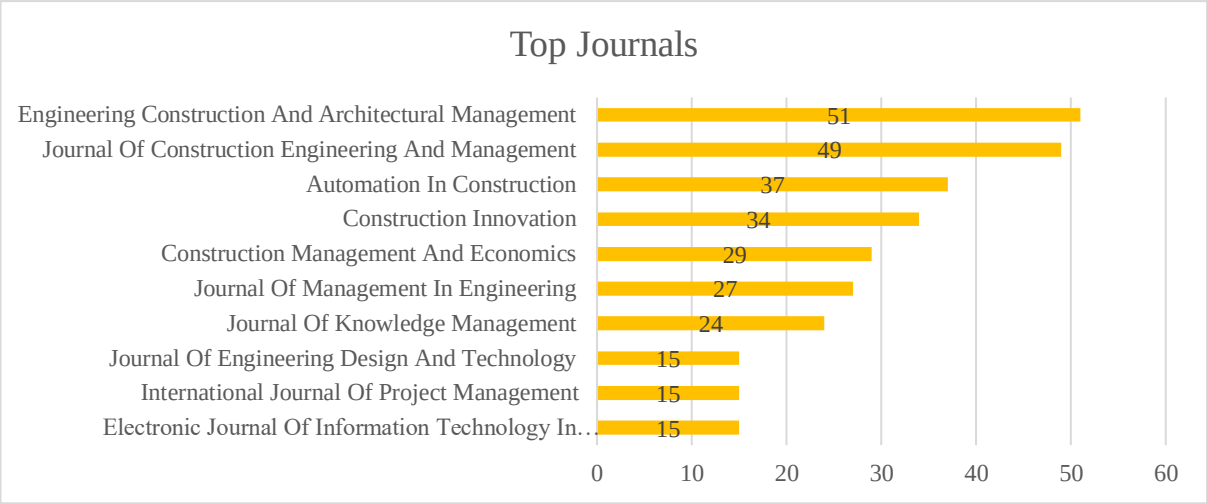

Figure 3: Publications by Journals on knowledge management related to the construction industry

Publications by authors

In a special relationship context, we attempted to determine who the most significant researchers are (and the most productive) in the subject and their effect on knowledge management research. Figure 4 shows the information on the top ten most productive scholars and the total number of publications by each of them. These ten scholars have been rated according to their number of publications. Figure 4 shows that Anumba C.J (18 out of 1240) is the author of the most research articles on knowledge management. Carrillo, P., Carrillo, P.M., Egbu, C., and El-Diraby, T.E. are the second, third, fourth, and fifth scholars with the most published papers (each with nine articles).

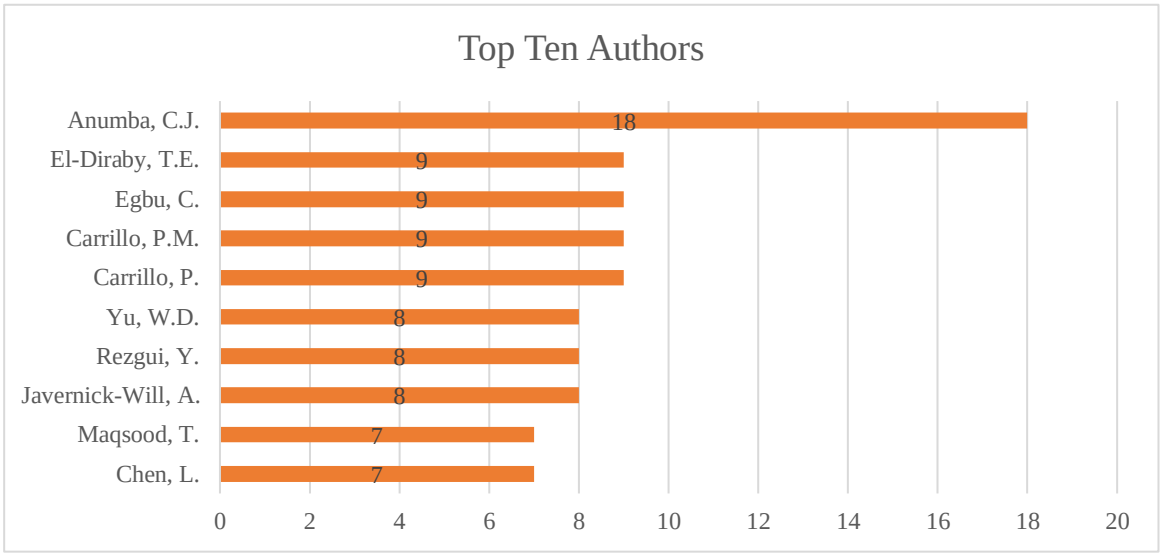

Figure 4: Top ten authors in knowledge management related to the construction industry

Publications by countries

China produced the greatest number of articles in knowledge management and knowledge transfer literature relating to the construction industry, according to Figure 5 with (224) papers, followed by the United Kingdom with (199) papers, according to the same figure. Following that, the United States has (172) published papers, and Australia has (89) papers published out of the total number of articles published worldwide. Brazil is ranked tenth in the world, with a proportion of (41) papers published out of the total number of articles published. It has become evident that Asia, America, and Europe are the dominant regions in the literature on knowledge management and knowledge transfer. Furthermore, it is noteworthy that both China and the United Kingdom published a cumulative average of 423 publications in total papers published. These developments might be attributed to more public awareness and improvement in building project methods in these nations, which are responsible for a large portion of the world's populations and have a pressing need to enhance the quality of life for their citizens.

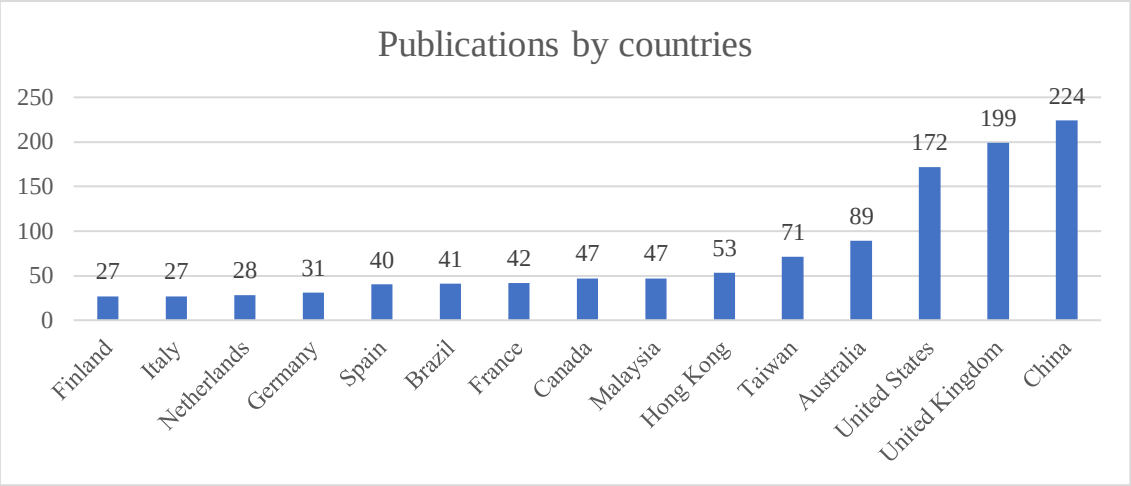

Figure 5: Top fifteen countries that contributed to knowledge management related to the construction industry

Most common words used in titles

When looking at the data in Table 3, it can be seen that the most often used phrases in the title are 'knowledge management,' which appears 1199 times. This is followed by the terms "construction industry," "project management," "knowledge transfer," "knowledge sharing," and so on. The most often used word in knowledge management concerning construction industry publications was discovered using wordart.com (a free, open-source online programme to conduct text search and word cloud). Figure 6 depicted the word cloud generated by the software, highlighting the most often used terms in larger and bolder fonts, while other, less frequently used words appeared in smaller and more subtly highlighted fonts. It is a simple way to detect the frequent terms in a complicated world (Birko *et al.*, 2015), and it may be used to determine the most prevalent topic and keywords used during publications, as described above.

Table 3: Most common words used in the title

Words	Numbers	Words	Numbers
Knowledge Management	1199	Knowledge Sharing	72
Construction Industry	359	Construction Projects	70
Project Management	187	Knowledge Engineering	47
Knowledge	86	Construction Companies	41
Knowledge Transfer	79	Knowledge Representation	29

Figure 6: Word cloud for most common words in knowledge management related to the construction industry

Publications by institutions

Figure 7 depicts knowledge management in relation to construction industry articles classified according to the authors' affiliations. The figure depicts Loughborough University as having produced the most articles in the knowledge management and knowledge transfer literature in recent years. This university alone produces 37 publications, accounting for around 2.9% of published papers. The University of Salford comes second with the most papers published, followed by RMIT University. When looking at Figs. 5 and 7, it is worth noting that Australia is ranked fourth among countries and third among institutions on the top fifteen list of countries, respectively. One of Australia's institutes is ranked third on the top fifteen list of institutions, which is interesting to note. The most obvious reason for this would be that a small number writes the majority of articles from Australia. Because the authors' work acknowledges the institutes, a specific institute's employees may be able to climb the ranks if they produce more articles. Similarly, the University of Florida receives recognition for the work of its faculty member Anumba, C.J., who is ranked first in the top ten researchers list. However, his institute is ranked ninth out of fifteen universities. Compared to Australia and China, the papers in the United States appear relatively spread.

Contribution by subject area

Various disciplines are covered in the knowledge management and transfer literature, demonstrating their relevance and acceptance in the academic community. It can be observed in Figure 8 that the fields of Engineering have provided the greatest number of publications, accounting for 33% of the total knowledge management and knowledge transfer literature. Computer Science and Business, Management, and Accounting are rated second and third, respectively, with 21% and 9% of the total publication. Social Sciences account for 9%. Although the engineering field dominates the knowledge management and transfer literature, several other disciplines, such as construction, are becoming more interested. There is extensive coverage of the construction industry's literature on knowledge management and transfer.

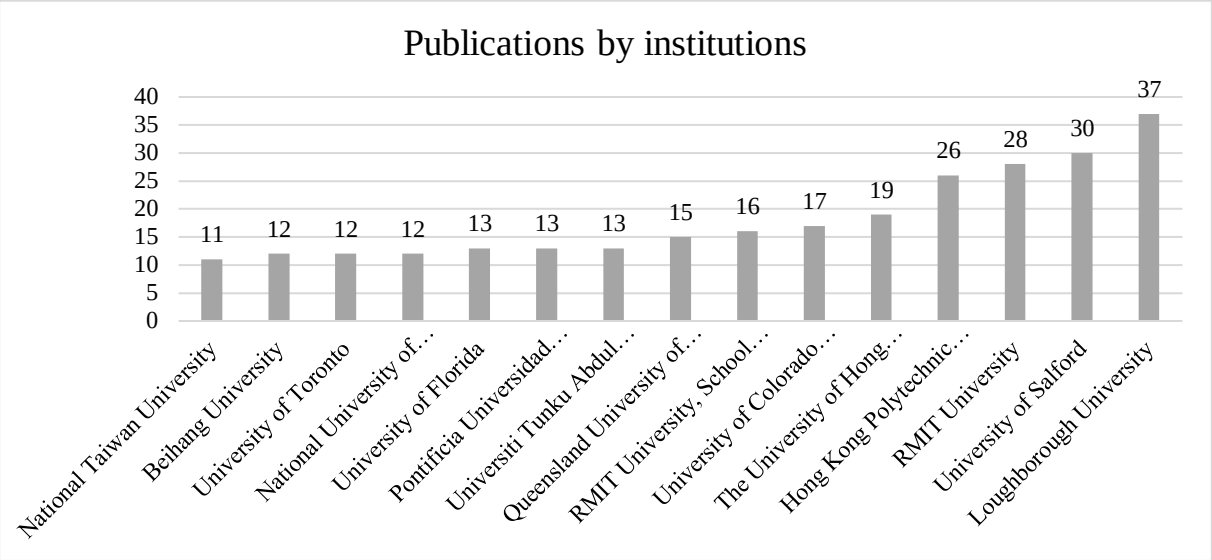

Figure 7: Top fifteen institutions by publications

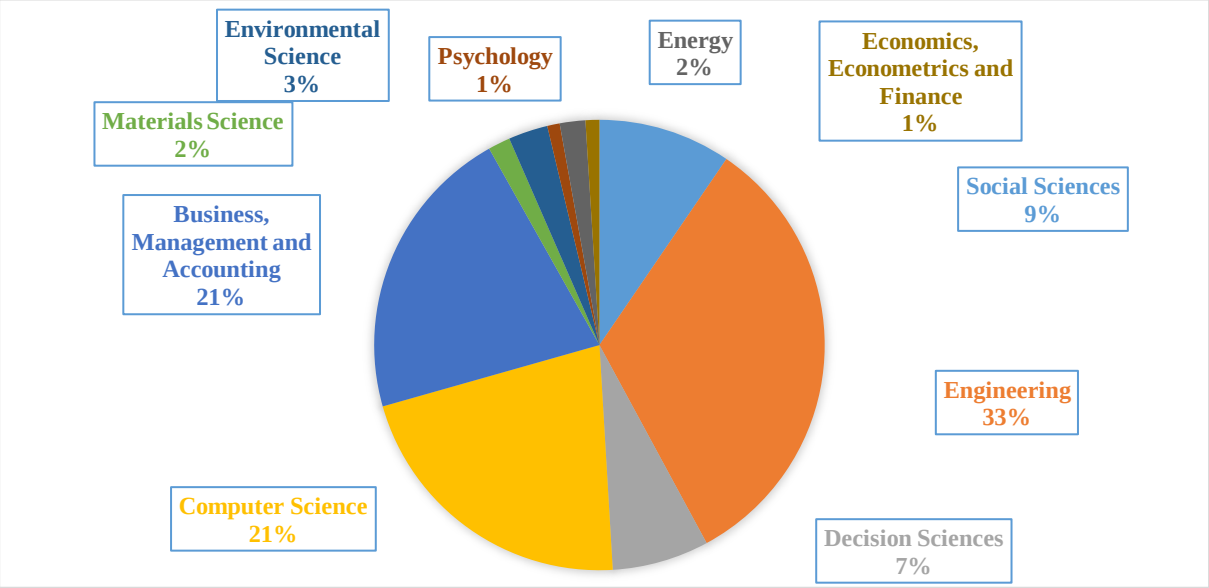

Fig. 8. Contributions by subject area

Insights of Knowledge Management and Knowledge Transfer

This part presents the findings based on 27 articles objectively chosen from Scopus. The articles are classified into three primary categories in the knowledge management and knowledge transfer literature in the subsequent section, which is accompanied by creating a system of thought based on an understanding of the current literature. The literature was divided into three categories: (i) overview of metadata analysis for knowledge management in the construction industry, (ii) barriers to knowledge management implementation in the construction industry, and (iii) attempting to establish possible solutions for knowledge transfer culture.

Summary of meta-review for knowledge management and knowledge transfer

In light of the rising importance of knowledge management within organisations, the promotion of knowledge transfer among employees (generally oriented to sharing experiences, skills, and understanding) has been debated among scholars. Because of the unstructured nature of tacit knowledge and the multiple roadblocks in the way of successful knowledge transfer, the capacity to communicate and transmit information is a challenging task. Following up on previous studies, several characteristics substantially influence individuals' tacit knowledge-sharing behaviour. These categories include enablers, facilitators, motivating factors, inhibitors, barriers, and deterrents (Joia & Lemos, 2010). Consequently, the trends, issues, and roadblocks that inhibit knowledge transfer and sharing in companies are investigated. This setting thoroughly examines several elements that promote and impede knowledge transmission and sharing and their interactions. A summary of the 27 pieces of literature on knowledge management and knowledge transfer is provided in Table 4.

Table 4: Overview of a meta-review for knowledge transfer and knowledge management

Authors/ Year	Issues	Trends	Methodology	Country
Zhao et al. (2022)	External constraints connected with a wide range of institutional contexts, as well as a lack of internal competitive skills	Knowledge-seeking strategy, knowledge transfer, and innovation are important components of any successful business.	Observation Document Review	United Kingdom
Chen *et al.*, (2022)	A special issue on knowledge concealment in organisations.	Increase the effectiveness of your dynamic skills to detect and reduce information concealment among executives or individuals in the workplace.	Multiple-Case Study	China
Hu *et al.*, (2021)	Diverse knowledge transfer between universities and business	Product innovation is correlated with a curvilinear connection through a variety of mechanisms.	Quantitative Survey with Description Analysis	China
Kavalić *et al.*, (2021)	Various factors influence the efficacy and efficiency of knowledge management software.	In addition to profitability, asset growth, market share, competitive position in a certain sector, productivity and wages are important metrics.	Quantitative Survey with Description Analysis	Serbia
Oliva & Kotabe, (2019)	Startups with a greater degree of maturity in terms of innovation	Organisational agility, dynamic skills, and knowledge management are all important.	Qualitative Survey	Brazil and USA
De Wit-de Vries *et al.*, (2019)	According to the latest theoretical developments, knowledge transmission is relevant in academic engagement.	Trust, communication, the use of intermediaries, and personal experience have all been recognised as knowledge transfer	Observation/Document Review	Netherlands

		facilitators that aid in the resolution of the stated hurdles.		
Vaghefi *et al.* (2018)	Firms are obliged to handle their knowledge resources efficiently.	Individual, team/exchange, and organisational development are all important.	Observation/Document Review	USA, New Zealand and Canada
Karamat *et al.* (2018)	The lack of support from senior management, poor strategic planning, and a lack of support from the organisational structure impedes knowledge management implementation.	Individuals, communities, and organisations gain a competitive advantage through their knowledge, which may be sustained over time.	Fuzzy Delphi Method	Pakistan
Rodgers *et al.* (2017)	Observations of differences between expert auditors and novices bolstered evidence for the importance of knowledge and expertise in enhancing scepticism in engagement planning.	During the planning stages of an audit engagement, expert expertise, position, and judgement were all important variables to consider.	Quantitative Survey with Description Analysis	USA
Ramjeawon & Rowley, (2017)	Knowledge management enablers and challenges in a developing nation with a growing higher education sector are discussed.	Qualified and experienced academic staff at public higher education institutions, information technology (IT) infrastructure, a library/digital library, and certain knowledge production and transmission incentives are essential.	Semi-Structured Interviews	UK
Cerchione *et al.* (2016)	Obstacles to the use of knowledge management in SMEs	Economic and financial performance, market performance, technical performance, and human performance are all measured in terms of performance.	Content Analysis	Italy
Krylova *et al.* (2016)	In knowledge-intensive organisations (KIOs), how can knowledge workers' improvisation processes help enhance knowledge transfer and knowledge protection in their companies?	When it comes to information transfer inside an organisation and knowledge protection outside of it, an experimental culture, minimum structures, the practice of storytelling, and common mental models all play a role.	Semi-Structured Interviews	USA, Canada
Del Giudice *et al.* (2015)	The use and distribution of knowledge-sharing technology are increasing in the private transportation industry.	The spread of knowledge technology on customer relationship management is being investigated. Several factors influence the spread of knowledge-sharing technologies in communities of practice.	Quantitative Survey with Description Analysis	Naples, Italy
Ranucci & Souder, (2015)	In mergers and acquisitions, tacit knowledge transfer occurs.	Considering both the amount and the quality of communication.	Description Analysis	USA
Rathi *et al.* (2014)	Organisational collaboration and knowledge-sharing across different organisations	Partnerships of a different nature. Partnership types differ in terms of their structural qualities. Overlapping of processes for exchanging information across and within organisations. The role performed by the board of directors in the development of organisational structures and the exchange of information among non-profits.	Qualitative Analysis of Exploratory Interviews	Canada & Australia
Yoo, (2014)	Knowledge sharing and perceived knowledge quality are related. Substructures of perceived knowledge quality, and innovativeness	The quality of knowledge in the PKQ Repository is dynamic. Factors that influence the PKQ substructures.	Quantitative Survey with Description Analysis	USA

Fullwood *et al.*, (2013)	Attitudes and intentions for sharing knowledge, as well as other variables.	In order to leverage the existing culture at universities, intelligence and other useful-related ways are being developed.	Questionnaire-Based Survey	UK
Kang & Kim, (2013)	Embedded social capital resources and knowledge transmission	The network survey's external linkages. Multiple survey waves were studied over time in longitudinal research.	Quantitative Survey with Description Analysis	South Korea
Ghobadi & D'Ambra, (2012)	In cross-functional teams, there is both competition and collaboration.	The conditions and antecedents lead to cross-functional cooperative and competitive behaviours.	Quantitative Survey with Description Analysis	Australia
Kim *et al.*, (2012)	Institutional pressure applied from outside the organisation, as well as knowledge sharing	Affiliation with an accreditation agency	Quantitative Survey with Description Analysis	Midwest United States
Seba *et al.*, (2012)	Middle East companies confront several challenges when it comes to information exchange.	Arab culture and the culture of the police force are two different things.	Semi-Structured Interviews	Dubai (Middle East)
Teng & Song, (2011)	Knowledge Exchange that is both voluntary and solicited	Knowledge sharing has traditionally been treated as a distinct notion, with voluntary knowledge sharing (VKS) being considered a proactive type of KS. Managers should be aware of the importance of both voluntary and solicited KS. Knowledge management practitioners should foster a culture that fosters trust among workers and recognises them for taking on knowledge-related activities.	Quantitative Survey with Description Analysis	USA
Lilleoere & Hansen, (2011)	Knowledge-sharing Obstacles and Opportunities	Managers should be conscious of the differences amongst experts regarding information exchange and hurdles to success. Managers should underline the importance of synergy among knowledge-sharing enablers. Because of the socially entrenched tacit information that R&D professionals possess, the location of R&D staff should be considered.	Semi-Structured Interviews	Denmark
Zhou *et al.* (2010)	Content and knowledge transmission through social ties	The discussion of how senior members use social media networks to convey knowledge and how this differs from younger staff. A strategy for estimating the pooled estimates.	Quantitative Survey with Description Analysis	China
Li, (2010)	Cross-cultural information sharing is now possible online.	Knowledge exchange between businesses with diverse cultural backgrounds is taking place online.	Semi-Structured Interviews	America & China
Holste & Fields, (2010)	The influence of emotional and cognitive-based trust in coworkers on professionals' readiness to share and use tacit information was investigated.	Leaders should make investments to establish different levels of trust inside their organisations. Knowledge management initiatives should include a more in-depth look at employees' social networking and how it affects knowledge transfer and management procedures, among other things.	Quantitative Survey with Description Analysis	USA

Niu, (2010)	The relationship between a firm's membership in an industrial cluster, trust, and the acquisition of knowledge	To achieve the necessary level of industrial cluster participation, companies must concentrate their knowledge-acquisition efforts and trust connections among clustering enterprises in the relevant areas. In order to properly evaluate cluster involvement, it is necessary to take into account the specific form of trust established and the source of knowledge obtained.	Quantitative Survey with Description Analysis	USA, China, Taiwan, Sweden

After thoroughly reviewing the chosen research papers, numerous determinants and obstacles to knowledge transfer and sharing were discovered. There are a variety of obstacles that prevent information from being implemented in building projects. The inability of construction experts to work together effectively throughout a project is the primary reason behind the industry's poor adoption of knowledge management practices. In many circumstances, on-site workers cannot communicate effectively with off-site workers, resulting in delays, increased expenses, and worse quality. Applying best practices in projects takes longer when construction workers, stakeholders, and suppliers don't meet frequently enough. In construction projects, as the number of workers increases, there are fewer opportunities for employees to interact face to face, which affects the ability of all parties involved to effectively coordinate their efforts. Decentralising a project's duties through outsourcing and subcontracting makes it more difficult for the many stakeholders to organise meetings, share information, and use their individual and collective talents.

Communication networks are the second obstacle to effective knowledge management in the construction industry. According to an industry expert, many construction projects have yet to adopt new technology that allows workers to communicate in real-time with one other. Many small and medium-sized businesses also fail to properly convey the extensive documentation of previous studies, resulting in additional time, effort and costs to an already finished research study. It is impossible for the project team to effectively build a knowledge base that can be shared over time because of the communication breakdown (Asrar-ul-Haq & Anwar, 2016). Construction companies' lack of effort and readiness to produce useful information that can be transmitted to future projects is another significant hurdle in implementing knowledge management in the sector. Since each building project is so individual, custom processes and procedures must be developed that cannot be generalised into a useful body of knowledge. This has led to a shift in the stakeholders, experts, and professionals' mindsets. "Projects are all one-of-a-kind. As a result, there is no use in building a library of information." Even though each project has distinct characteristics, there are unique features in every production, manufacturing, and service routine, which has not prevented them from appearing. The lack of knowledge management education, awareness, training, and implementation among construction professionals has been discovered via empirical research and extensive case studies. Construction workers, site engineers, project managers, clients, and the administrative machinery may benefit greatly from knowledge management, yet many people aren't even aware of its existence. In addition, they are ignorant of the financial and time benefits of employing knowledge management techniques and processes.

Lastly, cultural factors disallow the construction sector from effectively implementing knowledge management. The building sector rises exponentially in developing countries such

as Turkey, Brazil, India, Nigeria, and the Middle East. Comparing the economies of the United Kingdom, New Zealand, the United States, Germany, and Japan, the industries in such nations lack technical sophistication, men's skillsets, and market maturity. Even in such markets, many professionals who work in them are still dubious about the efficacy and advantages of knowledge management. They prefer that each individual develops their method to use information based on experience, merit, and good judgment.

Furthermore, when an organisation pays individuals for sharing information, individuals are driven to share knowledge, and, as a result, they learn from one another, resulting in organisational learning. Research has emphasised the necessity of incentives and motivation for knowledge transfer to date while identifying a lack of motivation and job satisfaction as barriers to knowledge transfer. Intrinsic and external motivation are predictors and antecedents of information-sharing behaviours (Asrar-ul-Haq & Anwar, 2016). As a result, companies should design an adequate compensation structure and encouragement to stimulate knowledge transfer. The transmission of tacit knowledge within an organisation is influenced by organisational structure (El-Diraby & Kashif, 2005). If a professional's connection network is intended to help individuals find those who know what, knowledge transfer in the company becomes simple (Krylova *et al.*, 2016). Even if the organisation's structure is hierarchical, employees may reach each other when they need specific information. Hence the hierarchical organisational structure does not prevent knowledge transfer.

The relevance of organisational structure in successful knowledge transfer may be demonstrated by the fact that recent research on knowledge transfer has highlighted organisational structure as an essential aspect that supports or impedes knowledge transfer in the organisation. Individuals in an organisation are motivated to act in ways that benefit one another via social interactions. According to Qureshi & Evans (2015), when people in an organisation form pleasant relationships, there are increased opportunities for knowledge transfer. Face-to-face interaction and social connections are frequently used in organisations to facilitate knowledge exchange. Since 2010, the function of social ties in information exchange has been a hot issue of discussion. There is a favourable association between information sharing and social interactions or networks of employees in the company, according to key study findings published in 2010. However, Zhou *et al.*'s (2010) study revealed that direct interaction and network linkages are linked. Extending this idea, it may be assumed that individuals should form network linkages to enhance information exchange and transfer, which can be done when interpersonal trust exists. However, social ties with information exchange have been investigated in various ways in succeeding years. In their study, Ghobadi & D'Ambra (2012) discovered that cooperative interpersonal interactions considerably impacted knowledge-sharing behaviours. Later studies by Fullwood *et al.* (2013) found that social engagement and positive social interactions among coworkers facilitate knowledge transfer.

Changes in technology, a lack of discussion boards, a scarcity of resources, and other factors all contribute to the difficulty of knowledge sharing (Gururajan & Fink, 2010). According to the findings, the distinctiveness of knowledge has indeed been investigated as a characteristic highly associated with partial knowledge sharing (Ramjeawon & Rowley, 2017). Knowledge sharing has been hampered by a lack of a suitable system and a lack of coordination, both recognised as obstacles (Cerchione *et al.*, 2016). Knowledge-sharing hurdles such as a lack of attention and appreciation and a fear of appearing ignorant have been recognised as significant (Lilleoere & Hansen, 2011). Ambiguity in the substance and context of information and uncertainty operates as roadblocks to transferring knowledge (Ceptureanu *et al.*, 2018). It has

been noted as a significant obstacle to information exchange using social media technologies because of the degree of tacitness (Panahi *et al.*, 2013). Furthermore, a lack of socialising among coworkers prevent exchanging information (Qureshi & Evans, 2015).

Organisational, technology and individual knowledge transfer hurdles were identified as the three most significant obstacles to knowledge transmission. The literature has identified several organisational, technology and individual obstacles, including insufficient organisational structures, sectarian division, hostile organisational cultures, a lack of motivation, and a lack of training. The hurdles identified in this study were classified into three major categories, as indicated in Table 5 on organisational, technology and individual.

Table 5: Summary of Knowledge transfer Barriers

Categories	Barriers
Individual	Communication and interpersonal skills are lacking.
	Differences in age
	Gender disparities
	The absence of a social network
	Differences in educational levels
	Lack of faith
	Differences in culture
	Insufficient time to share
Technological	Integration of IT systems is lacking.
	Lack of technical assistance
	Unrealistic expectations
	Compatibility issues between IT systems
	Misalignment of user and IT requirements
	Lack of IT knowledge and expertise
	Lack of communication and demonstration
Organisational	Uncertainty about the integration approach
	There is a lack of leadership,
	Lack of well-supported infrastructure.
	Limited resources
	Structure of the organisation
	Dimensions of the business unit
	Competitiveness on the outside
	Culture in the workplace

These barriers are intended to serve as a starting point for scholars seeking to study the impact of these barriers on various organisations. As a result, this list sets the foundation for further study into the organisational, technology and individual barriers preventing knowledge transfer in the construction sector. Carrillo *et al.* (2004) indicated that the construction industry's primary motivations for knowledge management include encouraging continuous improvement, sharing important tacit knowledge and best practices, responding to consumers swiftly, reducing rework, and developing new goods or services. As a result, the construction industry relies heavily on an efficient transfer procedure to avoid knowledge loss throughout

building projects. It's important to choose the correct tools, methodologies and practices when developing a knowledge management plan for a company's unique needs. The enabling elements might guide a good knowledge transfer plan. Table 6 summarises the facilitator factors that have been documented in the research. Since the most effective way to manage knowledge is to convert individual and group knowledge into organisational knowledge, even though this study considers individual, technology and organisational factors, it will present the importance of the individual factors so that the construction industry can adopt them in their entirety, following their organisational culture.

Table 6: Facilitator's framework

Facilitators Framework	Culture	We should remember that culture has been regarded as one of the most important variables contributing to the success of any knowledge management project. Organisational culture offers norms/rules for behaviour in companies, which are critical in sharing information when they are well-implemented in the corporate culture.
	Reciprocity	People's resources such as time, energy, and intellectual ability are limited. They are more willing to lend a helping hand to a colleague if they believe they will obtain valuable knowledge in exchange, either now or in the future. This requires a sense of mutual recognition.
	Observance of the corporate culture	In order to provide an efficient flow of information in global business operations such as knowledge management, a supportive and harmonised culture shared by all organisational components is a necessary but not sufficient condition for success. Establishing a culture in which information transfer is the norm is important to the success and stability of knowledge management projects inside a company.
	Peer recognition	Individuals want to be perceived as experts because it benefits them. It is a source of power when someone has a well-deserved reputation for knowledge. They need to know that their coworkers will credit the source of this information rather than take credit for it.
	Monetary and social motives	Knowledge transfer obstacles must be addressed, and knowledge management techniques must be effectively supported by a reward and incentive system to implement knowledge management strategies in construction companies successfully. Building an incentive and reward framework is critical because "goodwill knowledge philanthropy" is difficult to attain.
	Imitating the actions of leaders	When construction industry top executives are willing to play a much more substantial part in the performance of these activities by setting an example, knowledge management activities may be executed more effectively and efficiently.
	Honouring Knowledge transfer commitments	People are concerned about appearing consistent with others and have expressed their intent to share their knowledge. As a result, they will want to live up to their plans and honour their commitments.
	Perceived value and uniqueness of knowledge	Some issues spark people's interest, and they might be excited to talk about them, not just for self-gratification but also to share information. People see information as more valuable as it gets more difficult to come by and acquire.

It is stressed by Serna *et al.* (2017) that throughout the knowledge transfer process, in this specific sector, various difficulties arise primarily due to the requirement for knowledge transfer not being appropriately identified and recollected, among other reasons. Aside from that, the parties involved in the situation are reluctant to share their understanding. Most of the information gained is lost, and the lessons learned are distributed after projects if they are not adequately preserved and shared. Table 7 lists the primary inhibitory factors identified in the literature, which can be used to explain the significant challenges in the construction sector when it comes to implementing an information-sharing strategy.

Table 7: Inhibitor's framework

Inhibitors Framework	Culture	In the literature on knowledge management, culture has emerged as a recurring subject since it can either help or hinder an organisation's knowledge management approach. Several research have identified organisational culture as a source of cross-cultural sharing difficulties.
	High turnover	One of the most significant hurdles to the knowledge transfer process has been identified as the departure of employees from the organisation. High worker turnover is the most significant barrier to successfully adopting knowledge management.
	Resources – Mainly time	Due to projects being completed within specified time frames, time constraints are a significant hurdle in the construction industry. Employees commonly complain about a shortage of time available for knowledge sharing.
	Mainly a male sector	Following previous research, Lin (2006) discovered that females are more likely than males to engage in high-quality instrumental exchanges about individualised information and personalised knowledge, recommending that females are much more delicate than males to the impact of instrumental ties on knowledge transfer.
	Training and intellectual capacity are at a low level.	According to Covey (2004), one of the many reasons sharing information efforts fail in the industry is the loss of intellectual capital due to a lack of access to knowledge-creating resources (such as computers). The absence of standardised work practices, which Carrillo *et al.* (2004) identify as an obstacle to knowledge transfer, is partially explained by employees' low degree of training.

Because the literature considers high turnover to be the biggest impediment in implementing knowledge management, more specifically a knowledge transfer approach, it plays an essential role in knowledge transfer in the construction sector. Given how the construction business operates, with clearly defined project deadlines, each participant must adhere to a timeline plan for locating, gathering and sharing knowledge. This cycle will only be achievable if the construction firm in charge of these projects implements an effective knowledge transfer plan to ensure that the information discovered and acquired leaves its field and becomes part of the organisational field once shared (Korkmaz & Bahidrah, 2017). Although we can see the impact of the inhibiting factors identified in the literature on construction industry knowledge transfer process. It seems unavoidable, especially in light of the technological era in which we live. An inhibiting factor that has yet to be fully explored in literature is the lack of willingness to share knowledge due to the unappealing way in which this process has been defined in the construction industry. One of the main causes of reluctance to use knowledge-sharing information technology solutions is ignoring the informal, non-canonical character of knowledge transfer, including people's motivation, capacity, and opportunity to share

knowledge. However, there are already several construction knowledge transfer platforms, such as the Knowledge Platform for Contractors (KPfC), which a group of Turkish researchers developed to promote knowledge transfer more interactively and dynamically. More recently, HASIFR, works as a knowledge-based tool to support management in the selection of building materials and technological solutions in the construction industry. As mentioned by Vlajčić *et al.* (2019), there is still the need for more platforms for construction industry transformation and adaptation to the current market. This is made possible through the development of innovative knowledge transfer techniques and the subsequent adherence of intervenient players in the knowledge transfer process, which considers technological advancements in the construction industry. After considering Tables 6 and 7 and the response to the second research question, it is possible to infer that the construction industry contains both facilitators and barriers to the process of information transfer. Although individual views play a role in improved performance, most of these factors are tied to organisational issues.

Establishing a knowledge transfer culture - Potential solutions

The interconnectivity and integration of these three knowledge categories into information layers, which frequently influence one another, results from the complexity of most construction projects, from conceptualisation and design through to operational assessment (Ashok *et al.*, 2021). This is especially true because of the availability and use of the Internet and other communication channels in recent years (Korkmaz & Bahidrah, 2017). Although knowledge involves data manipulation from the standpoint of experience, it is also true that what is meant by knowledge must include the even more abstract idea of tacit knowledge for it to be considered (Oliva & Kotabe, 2019). There has been an increasing interest in the tacit component of knowledge in the last two decades, which is perhaps the most difficult to control of the three dimensions. Individual skill is also required to successfully integrate knowledge management principles into the day-to-day operations of the construction industry's processes. The capacity to self-start, seek out chances, and create one's job should be considered when hiring employees who will work under little supervision (Karamat *et al.*, 2018). At the same time, training and greater involvement in educational opportunities, conferences, and other information-sharing events can help raise their understanding of knowledge management in the workplace. As a result, employees can reflect on their jobs, exchange stories and ideas with coworkers, and stay up to date on professional concepts and applications (Leal *et al.*, 2017).

In order to gather and share project knowledge to reduce the time spent spinning the wheel, site visits, audits, talks, and informal meetings, followed by documentation, are examples of project knowledge solutions that may be used (Korkmaz & Bahidrah, 2017). In order to manage organisational knowledge in construction businesses, three things must be considered: product, which represents technical knowledge; process, which represents procedural and regulatory information; and people, which identifies and links individual talents with experiences. Detailed components of such solutions include workshops for information distribution, seminars for knowledge exchange, departmental meetings, summary reports, and a project award plan (Leal *et al.*, 2017).

As a technique of social communication, the process-centred approach tackles knowledge management from the standpoint of the person who developed the knowledge, in which knowledge is intimately tied to the person who created it and is shared mainly through face-to-face interaction (Korkmaz & Bahidrah, 2017). On the other hand, product-centred methods strongly emphasise recorded knowledge and storing and reusing corporate memories that are

kept on computers. A "content-driven" strategy is another term for this approach (Ceptureanu *et al.*, 2018). In the construction sector, the Accident Root Cause Tracing Method (ARCT) is a supplemental approach whose design and execution are closely related to using knowledge management ideas in a unique social-technical environment. This strategy is based on the knowledge requirements for both operations and projects. Beyond the obvious training issues, its concept is founded on management practices that should be designed in order to proactively detect and eradicate detrimental situations (Leal *et al.*, 2017). Knowledge representation and knowledge exchange are the two most important parts of knowledge management, and they are interconnected. The process representation and process exploration are incorporated within these document sections. During the construction communication process, the two most significant components are depicting the process and exploring the results (Rodgers *et al.*, 2017). Using the knowledge management model, the major layers to consider while designing knowledge management tools for construction projects will be storage, access control, information protection, interface communication, compatibility, service, and the project's current state.

CONCLUSION

This systematic review aims to determine the current issues associated with the transfer of knowledge in the construction industry to provide insights and ideas for future research. The study discusses knowledge management and transfer and then assesses the existing research. This research systematically assesses knowledge management and transfer literature, including descriptive analysis based on metadata and content analysis findings. The information was gathered from reputable databases. Influential authors, prominent journals, publications by year, top contributing nations, institutions, and fields are revealed through metadata analysis. Based on the number of publications, Chimay Anumba is the most prominent author in knowledge management and knowledge transfer.

Furthermore, Engineering construction and architectural management was the most influential journal by impact and number of articles published in this field. Also, the knowledge management journal was discovered among the top 10 journals in the field. The survey also finds that China and the United Kingdom dominate this field regarding influence and quantity of publications. Furthermore, the analysis discovers that the fields of Engineering account for a significant portion of the literature on knowledge transfer and management. The study findings were based on Scopus shortlisted publications using content analysis. The shortlisted articles were grouped into three categories for the content analysis. The categories consist of an overview of metadata analysis for knowledge management and knowledge transfer, barriers to knowledge management implementation, and a possible solution for knowledge transfer culture.

According to the content analysis, articles connected to the conceptual model are still on the rise, indicating that authors are continuing to improve knowledge management and that additional sub-disciplines, or branches, are forming. On the other hand, articles connected to drivers and barriers demonstrate that the number of papers is rising compared to other categories, indicating that the study of drivers and obstacles in knowledge management has achieved a standard of performance. Contemporary scholars have emphasised the need for cooperation within the construction sector to increase knowledge management performance, as revealed by this study. According to studies, collaboration with suppliers, clients, and third-party logistics providers is essential for sharing information, reducing risk factors, and

achieving mutually beneficial organisational goals. A further finding of the study is that there has been an increase in the number of articles published in recent years on various mathematical optimisation methods to improve decision-making in knowledge management. Due to the emergence of new sub-disciplines and fields, organisations are confronted with new obstacles. Implementing mathematical models will most likely focus on addressing new difficulties as they arise. Additionally, continuous effort to measure knowledge transfer and knowledge management performance was noted during the study period.

In addition, scholars and practitioners from a wide range of sectors have expressed an interest in knowledge management and transfer techniques and methods. The study found that there was a significant gap in the literature on knowledge-transfer techniques in the construction industry. It is primarily concerned with knowledge management practices associated with various work-related outcomes. There is a lack in the literature regarding the formulation, process mechanisms, and implementation of knowledge management practices. Considering the findings of the review, it is apparent that knowledge management and transfer are the most significant areas for further investigation. These include the structure and technique of execution to handle potential concerns. Although, those processes will range from one organisation to the next in terms of their effectiveness. Because of this, thorough and substantial studies are required in this area. Organisations will gain a considerable competitive advantage due to knowledge management and transfer methods, particularly in the construction sector. Employee learning processes are subsequently facilitated due to the process of creating informal connections, which has a positive influence on organisational performance and creativity. In order to effectively create and implement knowledge-based activities, businesses must devote significant resources to this endeavour.

As a result, the study makes several contributions. First and foremost, it takes an impartial and fair approach to data collection. As a result, there is a statistically significant difference between the current study results and those of previous investigations. As determined by the metadata analysis, the current study's top ten authors and top ten institutions are considerably different from the results reported by Shah & Kant (2018). Previous studies may have used different methodological approaches because of different definitions or methods.

Furthermore, a handful of categories in the classification of the literature are distinct from previous research, providing readers with fresh perspectives on the literature to consider and investigate. Also, the research gives an integrated description of project knowledge transfer, followed by the presentation of nine knowledge domains covered in the different project stages. In order to round things off, the study provides a thorough description of a meta-review conducted for knowledge management and knowledge transfer from previous literature.

FUTURE DIRECTIONS

Knowing how to manage knowledge is relatively new, particularly in the construction sector. There is still a lot to learn about knowledge management and the procedures that go along with it. An organisation's ability to manage and share knowledge is critical to thriving in today's internationally competitive economy; according to the findings of this study, knowledge management and transfer encounter several obstacles and concerns that prevent the successful sharing and transfer of information between individuals. However, other elements enable sharing and transferring information within organisations, across borders, and worldwide. Despite the significant contributions of writers to knowledge management and transmission,

there is still much more to be discovered and studied. However, even if most knowledge management and transfer research have been undertaken in developed countries, investigations in the same field may be carried out in underdeveloped countries.

There is minimal evidence of research into knowledge sharing and transfer in the construction industry; as a result, there is a great deal of opportunity for this area to be further investigated. In conjunction with knowledge sharing and transfer, the cultural factors outlined by Hofstede *et al.* (2005) have been extensively examined in the Chinese context; however, these cultural dimensions may be investigated in various cultural contexts. Studies are being performed to understand better how emotional and cognitive trust affect the future process of sharing and transferring knowledge. With the advent of new technologies, social media and web 2.0 technological tools have grown increasingly popular. Currently, research is being conducted to determine the function of social media and web 2.0 technological tools in promoting knowledge sharing and transmission. The study of online knowledge sharing and transfer in various cultural and organisational contexts is a viable option.

It is possible to investigate knowledge sharing and transfer within organisational levels. It is possible to uncover the influence of organisational politics on knowledge management and transmission in this context. It is possible to investigate information sharers' and receivers' attitudes and actions, particularly in a political atmosphere. It is possible to investigate in depth the challenges that an organisation is likely to experience if the information is not shared or transferred inside the firm and its subsidiaries, which may be located worldwide. Regarding knowledge sharing and transmission, the influence of national culture may be examined in greater depth. Sharing and transferring information are also influenced by differences in human qualities between knowledge sharers and information recipients. This is a notion that may be explored in further depth. In knowledge exchange and transfer, communication is supposed to be the facilitator (Nakano *et al.*, 2013). But it is possible to investigate the level of communication quantity and quality required to promote knowledge exchange and transfer. Furthermore, numerous formally and informally communication strategies might be researched and implemented at the organisational level.

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