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RESEARCH ARTICLE

An Integrated Paradigm for Managing Efficient Knowledge Transfer: Towards a More Comprehensive Philosophy of Transferring Knowledge in the Construction Industry

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Abstract

The efficient knowledge transfer among project group members can help those individuals do their jobs more successfully. However, there are challenges with effective and efficient knowledge transfer within the construction industry. Past research has assumed that all information can be articulated and codified, thus focusing on the transfer that generates the supply of knowledge. There seems not to be a comprehensive strategy for dealing with reverse, intra-firm information transfer that considers several elements and the interconnections between them. The current study developed a conceptual framework that comprehensively overviews knowledge transmission variables. A total of 128 papers from Scopus and Web of Science and publisher databases like Taylor & Francis, Elsevier, Emerald Insight, and Google Scholar were evaluated between 1990 and 2021. The data were evaluated using ATLAS.ti 9 software tool. The study contributed significantly to the impression of knowledge transfer by the construction industry. It also suggests that organisations should inspire and increase the involvement and evaluation of knowledge dissemination. In addition, a set of factors for efficient information transfer was identified and described in detail. Effective communication strategies should include establishing regular and efficient communication, creating a community of practice with common

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goals, creating a sense of urgency and connection to the challenge, and continuously transferring information amongst organisation members.

Keywords

Knowledge Transfer; Barriers; Knowledge Sharing; Knowledge Management; Construction Industry

Introduction

In the last few decades, scholars (Shin, Holden and Schmidt, 2001; Liyanage, et al., 2009; De Luca and Rubio, 2018) have indicated that knowledge is an essential resource for organisations' ability to compete. Knowledge aids the creation of value-adding goods and services and improves the efficiency of operational activities (Shin, Holden and Schmidt, 2001). For example, while having a good understanding of an organisation's clients helps in addressing present and future clients' demands, in the same manner having a good understanding of a company's rival helps a company to properly position itself for any form of competition. Similarly, Bacon, Williams and Davies, (2019) believe that knowing how to do things better and more efficiently increases production and improves the final output. An organisation's performance will be strongly influenced by its employees' capacity for knowledge development and efficient application (Tafkov, Towry and Zhou, 2022). Using knowledge successfully will provide organisations with long-term competitive benefits, primarily if replicating or transferring information is not challenging (Liyanage, et al., 2009; North and Kumta, 2018b). Therefore, knowledge is an essential resource due to its inherent benefits.

Goh (2002) states that knowledge management is critical for organisational success and competitive advantage. However, organisations have substantial obstacles to effective knowledge management. Goh (2002) asserts that knowledge transfer and the ability of organisations to share information are crucial in knowledge management. Most organisations have well-defined procedures for knowledge transfer (Zhou, et al., 2020). However, merely implementing a knowledge transfer method will not be sufficient to ensure success in knowledge transfer (Ferrer-Serrano, Fuentelsaz and Latorre-Martinez, 2021). Instead, organisations must be proactive in implementing such formal procedures (López-Sáez, et al., 2021).

Numerous scholars acknowledge that organisational culture is one of the most significant obstacles to knowledge transfer in projects (Ajmal and Koskinen, 2008; Wiewiora, et al., 2013). According to Ajmal and Koskinen (2008), organisational culture impacts project team members' decisions with regard to sharing and exchanging project-related knowledge. However, there is still a lack of a specific and comprehensive understanding of how such influence occurs. Furthermore, organisational culture frequently hinders the transfer of learning lessons and the replication of innovative strategies (Eskerod and Skriver, 2007).

The primary objective of the current study is to emphasize the importance of effective knowledge transfer within construction organizations. In construction, projects are delivered by temporary project organizations, formed by integrating different subgroups such as design and construction teams to deliver the project. Pathirage, Amaratunga, and Haigh (2007) suggest that this is the intrinsic characteristic of construction and the industry, distinguishing it from other sectors with its much greater concentration of smaller firms. Therefore knowledge in the construction industry is more likely to be dependent, situational, and otherwise confined to individual and local practices (Styhre and Gluch, 2010). As a result of this distinctiveness and short-term focus, temporary project organizations have challenges in knowledge management, which might impede the development of procedures and organizational learning.

Lombardi (2019) states that even if knowledge is preserved within an organisation, it must be transferred to create value. Effective knowledge transfer contributes to successful knowledge transfer (Zimpel-Leal and Lettice, 2021), which in turn enhances innovation (Cohen and Levinthal, 1990), improves operational process effectiveness (North and Kumta, 2018b), and reduces the danger of "reinventing the wheel" (Pandey, 2016). Therefore, ensuring effective and efficient transfer of knowledge within construction organisations

is the main concern of this study (Brown, Sharpe and Andrews, 2020). Knowledge transfer research in the construction sector has focused on organisational culture (Ajmal and Koskinen, 2008; Wiewiora, et al., 2013) and its contextual impact on organisations. Other articles have focused on the influence of knowledge transfer on a company's success (Kamara, et al., 2002; Van Egmond and Erkelens, 2007; Castro, et al., 2012) and on construction business (Costa, et al., 2006; Maurer, Bartsch and Ebers, 2011). Therefore, this study addresses two objectives. Firstly, the study seeks to establish the obstacles to successful knowledge transfer in the construction sector. Secondly, it seeks to establish how motivation and willingness influence knowledge transfer and sharing in the construction sector. It is hoped that the study recommendations would bridge knowledge gaps surrounding knowledge transfer within the construction industry. Previous works on knowledge transfer within organisations are reviewed in the following section.

Knowledge and Information

Knowledge is a broad notion that may be interpreted in various ways. Pathirage, et al., (2007) opine that knowledge ranges from practical to conceptual and philosophical approaches; the scope ranges from narrow to broad. Knowledge justifies genuine belief (Nonaka, 1994; Artemov, 2018). Although it justifies true belief, it does not inevitably lead to new knowledge when truth's constructive nature is considered (Artemov, 2018). Thus, a statement must be true for it to be believed, so believing in the truth of a statement is justified.

Milton (2007) suggests that several descriptions of knowledge include a highly organized type of information, what it takes to think like an expert, distinguishing factors of professionals from non-professionals, and what is required to carry out complicated activities. On the other hand, North and Kumta (2018a) describe information and knowledge as using symbols, which are the essential building elements of communication. Rules are required to make meaning of the symbols, and they refer to these rules as syntactic rules, which combine with symbols to form data. Thereafter, information is gleaned by giving the raw data some context. 'Information is organized data that adds significance to communication' (North and Kumta, 2018a). Various people regard this information differently depending on their background, previous experience, and expectations. Historical context, expertise, and expectations contribute to the understanding obtained from the material. In this investigation, North and Kumta's (2018b) concept of knowledge will be adopted: Knowledge refers to a person's understanding of connections between objects, whether implicit or explicit. Routines for carrying out tasks, organisational structures, procedures, and ingrained ideas and behaviours contribute to it. To have the knowledge, one must be able to link inputs and outputs, recognize trends in information, codify, explain, and finally make predictions.

DIMENSIONS OF KNOWLEDGE TRANSFER

Information processing comprises reordering, quantifying, qualifying, grouping, and learning (Ashok, et al., 2021): these processes enable humans to generate deeper relationships between information and actions depending on reactions to information (Li, et al., 2021). Knowledge is kept in an organization's documents and storage systems and through everyday work procedures, implementation, and specifications (Kavalić, et al., 2021). The two types of knowledge are tacit and explicit. In literature, knowledge is tacit and explicit (Magnier-Watanabe and Benton, 2017; Zebal, Ferdous and Chambers, 2019; Shao and Ariss, 2020). Explicit knowledge is described by North and Kumta (2018a) as formal and organized, and it may be conveyed by codification or transferred through the use of formal systematic language.

Furthermore, explicit information may be preserved in various media other than the brain (Zhao, et al., 2020). On the other hand, tacit knowledge is defined as the accumulation of experience earned through the execution of tasks or projects and the insights gained via problem resolution (North and Kumta, 2018a).

Tacit knowledge is highly individual, context-specific, and sometimes unconscious, making it difficult to formalize and convey.

Tacit knowledge is based on an individual's education, ideals, beliefs, and emotional state of mind as it is firmly embedded in the acts and experiences of an individual (North and Kumta, 2018a). Within construction project-based environments, the tacit dimension of knowledge is the hardest to manage because it is embedded within individuals, thus making it impossible to be formally communicated (Pathirage, et al., 2007). Subjective and substantive information not expressible in words or phrases is referred to as tacit knowledge (Vlajčić, et al., 2019). On the other hand, explicit knowledge is objective and metaphysical information that can be described in words and numbers. It is personal, difficult to codify, and deeply rooted in individual acts and experiences, personal ideas, beliefs, and inner sentiments. It may be communicated and disseminated easily utilizing specialized resources, scientific formulas, established methods, and general concepts (Ashok, et al., 2021). However, valuable human and knowledge resources could be wasted unless organisations make an effort to properly manage tacit knowledge in the construction industry (Pathirage, et al., 2007). Both tacit and explicit knowledge is acquired through a continuous flow of information, such as drawing on personal experiences of family and friends, observing and trying to imitate the states of others, knowledge being passed from teachers to students in schools, knowledge being passed from senior employees to junior employees at a company, and companies having meetings to announce modifications to the existing rules. These are all processes of knowledge transfer.

Knowledge acquisition, organization, structural reconstructions, storing, memory, and final assembly for deployments and distribution. Szulanski (2000) describes knowledge transfer as the flow of information among organizational members or the normal interchange of information between knowledge suppliers and receivers to operate individuals' abilities and social institutions. According to Davenport, De Long and Beers, (1998), this process involves transmission and absorption, where transmissions refer to knowledge being transferred to potential receivers and absorption refers to people receiving approved knowledge. Knowledge transfer fails if receivers do not absorb the information; this highlights the significance of contact between knowledge producers and receivers since knowledge can only be transmitted if both parties are eager to give and receive information (Oliva and Kotabe, 2019). Organizations must provide fundamental construction skills that facilitate knowledge transfer and generate incentives for individuals, teams, divisions, and lines of business to collaborate toward common goals.

Due to the unique and temporary nature of construction projects, as well as the involved multidisciplinary teams, much of the gained knowledge and learned lessons are dispersed at the end of projects (Kivrak, et al., 2008), especially when not well documented or shared properly (Fong and Wong, 2005; Kazi and Koivuniemi, 2006; Patel, et al., 2016). Generally, since most know-how, know-what, and experiences are in people's minds capturing tacit knowledge of construction practitioners and reusing these on future projects may be difficult for organisations (Woo, et al., 2004; Lin, et al., 2005; Ajmal and Koskinen, 2008). Lee and Al-Hawamdeh (2002) and Shao and Ariss (2020) demonstrated that because people know more than they can convey, this situation makes it difficult for tacit knowledge to be formalized. This suggests that explicit information has an advantage over tacit knowledge since it is easier to transfer between persons and contexts than tacit knowledge (Bacon et al., 2019).

Overview of Knowledge Transfer in the Construction Industry

An organisation's ability to transfer and manage knowledge provides a competitive advantage (Halila, et al., 2017). However, knowledge management in construction is relatively difficult (Riggio, Alhariri and Hansen, 2020). Studies have analysed an organisation's knowledge transfer and management process when purchasing new technology or creating new business operations (Sergeeva and Duryan, 2019). However,

little is known regarding construction organisations' knowledge transfer efficiency. Managing various other variables has made the fragmented nature of the construction sector obvious. Consequently, a higher level of coordination is required for these temporary organisations, which may be working on many projects simultaneously (Castro, et al., 2012; Huang and Yang 2019).

It is well known that construction projects consume a lot of time (Uusitalo and Lavikka, 2021) because of the many critical decisions to take. Therefore, knowledge management remains critical to the success of activities on site (Halila, et al., 2017). Castro, et al., (2012) argue that a unified strategy for knowledge management is lacking in the construction sector. Knowledge management is only seen as an ideal, not a reality. Nevertheless, construction organisations can still benefit from the proactive transfer of knowledge across their various projects, create synergies within their organisations, and learn from the past experiences and successes of others for increased performance and productivity (Williams, Fugar and Adinyira, 2021). These are only possible if construction organizations can devise means for collecting, storing, transmitting, and repurposing knowledge as a priority (Berg, et al., 2012).

Furthermore, the construction sector offers enormous, expensive, custom-built structures to complete a building project. It is a powerful, knowledge-based industry that primarily relies on the knowledge contribution of various project team members (Sun, Ren and Anumba, 2019). Some components of knowledge management have been present for a long time, such as the attempt in the 1980s to capture tacit knowledge in Expert Systems and Knowledge-Based Systems. However, these have limited effectiveness in specific areas, such as determining the origin of moisture in structures (Carrillo, et al., 2004). This method of capturing personal experiences in information technology (IT) systems failed miserably. Technology has progressed to the point that it is now widely recognised that IT is a facilitator, not a knowledge management system (Wei and Miraglia, 2017). There are several steps to completing a building job. It necessitates the development of a virtual, temporary, interdisciplinary organisation comprised of customer and supply chain representatives. Architects, consulting engineers, general contractors, specialised subcontractors, material suppliers, and other experts in the supply chain may all be employed by separate firms (Wang, et al., 2021). After completing a project, these virtual teams typically disperse without performing post-project reviews or spreading the lessons learned. This implies that positive and negative team and individual learning experiences are not shared (Owusu-Manu, et al., 2018). As a result, knowledge and information sharing are required between comparable initiatives done by an organisation and between the many enterprises that make up the supply chain (Wang, et al., 2021).

The spectrum of tacit to explicit knowledge should be addressed properly in the management of building project knowledge. Throughout the project life cycle, from design to usage, the construction industry depends largely on its expertise in specialised fields (Owusu-Manu, et al., 2018). Infrastructure is needed to provide access to this tacit expertise through networks, discussion forums, mentorship, or other methods. Similarly, IT promotes the global exchange of explicit information via intranets, knowledge portals, and other means (Ren, Deng and Liang, 2018). With its focus on collaborative working, information sharing, and building new networks to boost competitiveness and profitability, knowledge transfer is especially important to the construction sector (Moodley, 2017). Carrillo, et al. (2004), citing poor levels of firm profitability, compelled several construction companies to rethink how they run their businesses and the role of learning and knowledge in meeting performance goals. Due to the long-term nature of the relationships between the members of the workforce and the repetitive nature of some of the projects, relatively new forms of procurement, such as partnering and public-private partnerships (which fund schools, hospitals, prisons, and roads), can benefit from better knowledge asset management. Knowledge transfer can immediately enhance a number of the performance parameters now utilised by the construction industry (cost, time, safety, flaws, and predictability). These gain from knowledge captured and disseminated from previous project stages as well as from other projects.

Methodology

SEARCH STRING

The data for this study was gathered systematically from reputable sources. According to Saunders (2011), a systematic review starts with introducing acceptable keywords that can be used to find literature from databases. A systematic review aims to discover gaps and limitations in the current body of knowledge (Tranfield, Denyer and Smart, 2003). Through the review, the study intends to make recommendations for future research (Seuring, et al., 2005). The current study adopts a systematic approach to investigate knowledge transfer, knowledge sharing, and impediments to knowledge transfer related to the construction industry. Aggregator databases, such as Scopus and Web of Science, and publisher databases, such as Taylor & Francis, Elsevier, Emerald Insight, and Google Scholar, were used to find and extract articles relevant to the research with the use of the Google Chrome browser operator. Table 1 shows keywords used during the search.

Table 1. Search engines, scholarly databases, phrases used and keywords

Search Engines and Database	Key Words
Search Engines Google Scholar	Knowledge Transfer and Construction; Knowledge Sharing and Construction; Knowledge Transfer Barriers and Construction; Effective Knowledge Transfer and Construction; Willingness to Share Knowledge and Construction.
Academic Research Databases Scopus Web of Science	TITLE-ABS-KEY ("knowledge AND transfer" AND "construction" AND "knowledge AND sharing" AND "construction") AND (LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 1990)). "Effective AND knowledge" AND "transfer AND construction" AND "willingness to share" AND "knowledge AND construction" AND "motivation to transfer AND knowledge."
Taylor & Francis, Elsevier, Emerald Insight	Knowledge Transfer and Construction; Knowledge Sharing and Construction; Knowledge Transfer Barriers and Construction; Successful Knowledge Transfer and Construction; Effective Knowledge Transfer and Construction; Willingness to Share Knowledge and Construction.

Since there was a link between the two levels of the domain, the aggregate searches used in collecting all relevant information from the literature were validated by utilising this level of granularity (aggregator and publisher level) (Bastas and Liyanage, 2018). The first search result returns conference papers, book chapters, and articles. As a result, the search was restricted to only 'article' results to eliminate books, conference papers, and magazines from the collection. Only 128 articles were included in the study, and academic areas were scrutinized alongside the most trustworthy materials and publications with management impact (Thornhill, Saunders and Lewis, 2009). Only articles written in English were included in the search. The search period for this analysis was between 1990 and 2021, based on the most significant breakthroughs

in knowledge transfer, information sharing, knowledge transfer hurdles, and collecting state-of-the-art publications.

ANALYSIS PROCESS

This study adopted several steps involved in preparing and investigating knowledge transfer. Each stage of the evaluation phase was grouped around the procedures, results, and discussion sections, allowing the reader to better understand how the data were reviewed to follow the implications of the process and the resultant data for each stage of the phase. After the specified systematic literature review procedure (as seen in Figures 1 and 2), an iterative selection technique was adopted to screen, filter, and verify the articles to ensure that they matched the criteria for inclusion in the study.

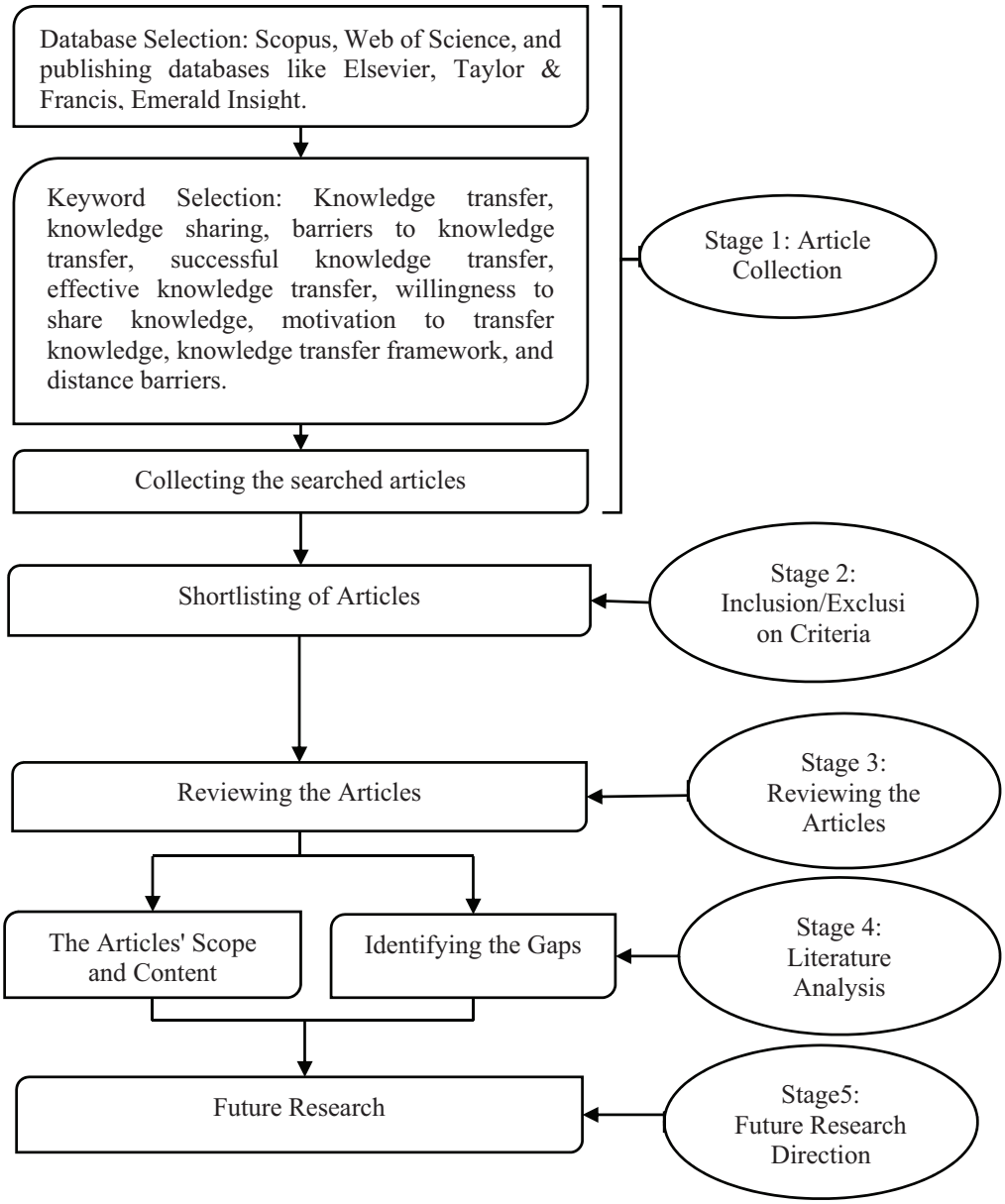

Figure 1. Literature review methodology

The process of analysis included the following: the elimination of duplicates, the verification of eligibility from abstracts, and the review of the complete content of an outstanding paper in the context of the study to make a final decision on the knowledge transfer, areas under investigation, and other factors (Moher, et al., 2015). 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, Taylor and Francis, 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.

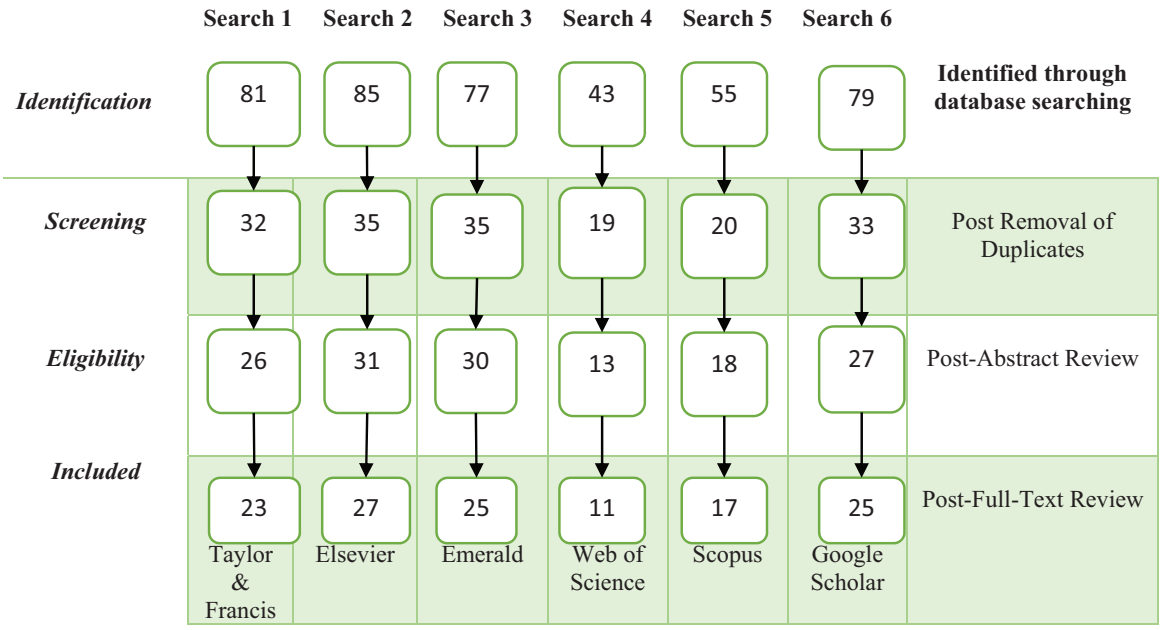

Figure 2. Overview of paper identification, selection, and inclusion process

The original papers identified from databases include 420 articles. These articles were screened (Identified through database searching, 420 papers) and re-screened (After eliminating duplicates, 174 papers remain). Further screening for eligibility (After abstract review, 145 papers remain) and validation for inclusion in the research were done (Post-full-text review, 128). Afterward, the 128 systematically reviewed articles were evaluated for validity.

This study adopted a methodological approach established by scholarly works published in previous studies. For instance, descriptive analysis was adopted to describe the characteristics of the relevant parameters. These are potential modifications to knowledge transfer intended to improve service efficiency in the construction sector, raise effectiveness, detect prospective advances, eliminate impediments to knowledge transfer, and promote the desire to transfer, as shown in this paper.

Analysis of the Findings

Knowledge transfer articles in the construction sector are examined in this research to determine the relationships and correlations of keywords. Several classifications were developed based on the 128 reviewed publications. As a result of multiple rounds of recoding and code merging in ATLAS.ti 9, the final indicators revealed seven primary patterns and relationships.

ATLAS.TI 9 SOFTWARE IN SYSTEMATIC REVIEWS

The ATLAS.ti 9 software package was considered adequate for storing, categorizing, and evaluating evidence in this study (Moshood, et al., 2021). It is regarded as a powerful workbench for qualitative analysis where large bodies of textual, graphical, audio, and video data are involved (https://atlasti.com/product/what-is-atlas-ti/). An advantage of ATLAS.ti 9 is that it enables easy access to keywords, subjects, relationship maps, and other analytical features by using quotes as search terms. Its use in this study is described alongside explaining the systematic review process.

The current review follows four out of six taxonomies presented by Cooper (1988). These four are purpose, concentration, point of view, and layout. The purpose of the review is to give insight into the existing growth and ultimate potential of knowledge transfer in the construction sector. The research concentrates on the features of knowledge transfer in the construction industry. Thirdly, the point of view of the analysis is taken from a neutral stance. Finally, the layout follows the logical linking of keywords after the articles are sorted. This approach comprehensively addressed the literature (Chang and Hsieh, 2020).

Figure 3. Word cloud information on knowledge transfer and knowledge sharing

Figure 3 is a word cloud utilized as a starting point to give a snapshot of terms connected to knowledge transfer and knowledge sharing. Because word clouds are limited in application, ATLAS.ti 9 capabilities were used to manually mix and show the words of several papers in a lengthy word cloud. Therefore, the articles had a clearer structure that allowed for apparent variances and similarities in word usage. Nonaka (1994) created a cyclic socialization, externalization, combination, and internalization (SECI) model, which has served as a reference to represent a preliminary study into how knowledge management ideas are used in an organization (Kahrens and Früauff, 2018). Tactic and explicit knowledge are presented as a conversation in Nonaka's knowledge generation spiral, showing the four ways in which knowledge is created (Crupi, et al., 2020). Thus, four knowledge transformations are presented in the models expressed in Figures 4 and 5.

Figures 4 and 5 display a network view, illustrating how the eight primary concerns (Socialisation "Tacit to Tacit," Internalisation "Explicit to Tacit," Externalisation "Tacit to Explicit," and Combination "Explicit to Explicit") that emerged from the review of knowledge transfer among construction workers are related to data codes. In order to recognize and mark as quotes, all components of the knowledge organisation in which ATLAS.ti 9 software was applied; the usage of ATLAS.ti 9 software, and the auto-code breakthrough for the main analysis phase were recognized and marked as quotations (Moshood, Nawanir

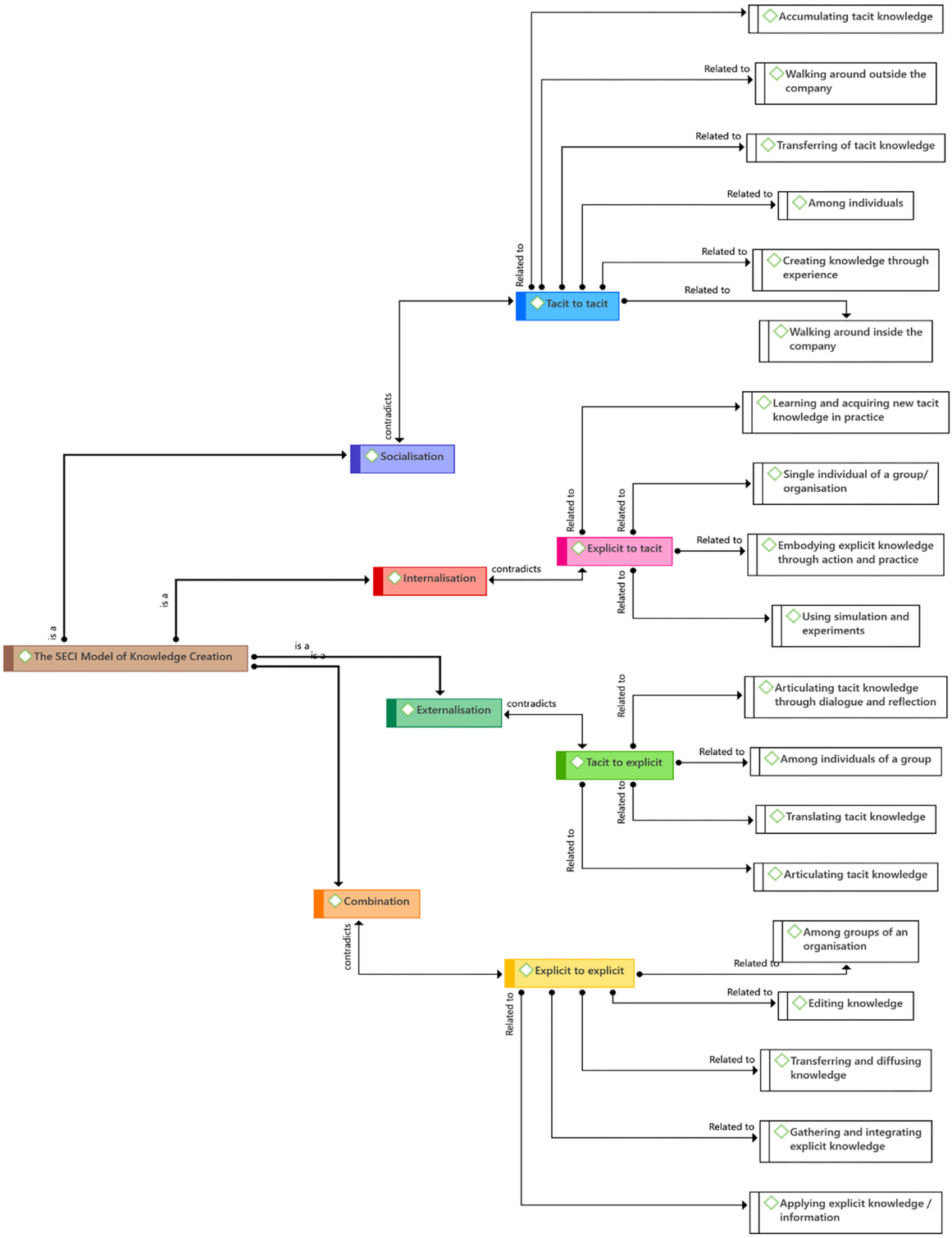

Figure 4. Atlas.ti network view on the (SECI) model of knowledge transfer

and Mahmud, 2022). They were thereafter grouped into distinct assessment records, and the quotations were then studied as part of the study's process. The research subject necessitated a thorough reading and explanation of all papers to identify recurring patterns and concepts (Paulus and Bennett, 2017).

Three different sorts of reports were intended to be produced using the materials acquired. 1) Comprehensive report: Their investigations first defined the publications that were suggested to describe the basic purpose of the literary evaluation. 2) Detailed description: This paper concerns general knowledge transfer among construction employees. The received papers were divided into eight categories. In order to provide detailed information on the things acquired, their relationship to the study's aims and procedures, as well as their productivity and value in terms of technology, were addressed. 3) In conclusion, interaction analysis is a statement regarding the transmission of information among construction workers to complement the previous statement. Also, additional options such as knowledge transfer, knowledge sharing, roadblocks in the process of knowledge transfer, successful knowledge transfers, efficient knowledge transfers, willingness to share knowledge, and incentives for knowledge transfer (amongst others) were discussed.

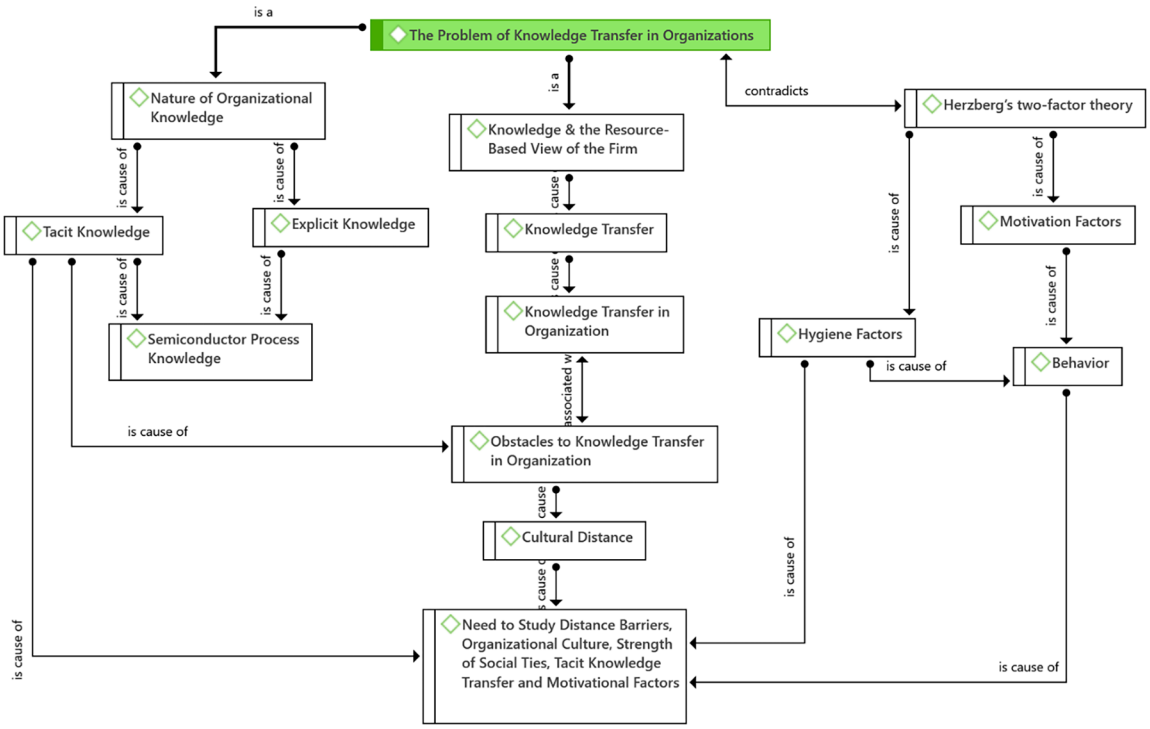

Figure 5. Literature review map

DISTINGUISHING BETWEEN KNOWLEDGE SHARING AND KNOWLEDGE TRANSFER

As previously stated, the process of establishing and separating the many domains under knowledge management is time-consuming, and knowledge transfer has always been against this principle. For example, Paulin and Suneson, (2015) discuss how the two phrases, knowledge sharing, and knowledge transfer, are sometimes used synonymously. However, their definitions and meanings slightly differ depending on how various writers approach and interpret the concepts. In addition, Liyanage, et al., (2009) point out that the two phrases are frequently discussed together by numerous writers and academics, as they consider. While knowledge sharing, according to Liyanage, et al., (2009), is a two-way process between individuals exchanging information. Knowledge transfer extends beyond simply utilizing existing knowledge to include how it should be acquired and stored to increase efficiency, effectiveness, and productivity. Furthermore, they continue their reasoning by referring to Argote and Ingram, (2000), who asserted that knowledge transfer extends beyond the scope of information sharing to cover the transfer of knowledge

across groups, departments, and divisions, among other things (Latilla, et al., 2018). The transmission of information among the construction industry workers is the primary focus of this investigation.

Knowledge Sharing

Knowledge can only be used better when individuals share what they know and build on what they have learned from others (Ipe, 2003). Sharing knowledge is making information available to others in the organisation. To add to this definition, Ipe (2003) says that knowledge sharing is "the process via which a person's information is translated into a form that other people can understand, absorb and apply." According to Bartol and Srivastava (2002), knowledge sharing is about individuals sharing organisationally relevant information, suggestions, ideas, and expertise with one another (Senaratne, Jin and Denham, 2021).

The recipient must develop knowledge before it can be sent to another person. Nonaka and Takeuchi, (1996) SECI model describes the transmission and generation of knowledge. Nonaka and Takeuchi's model explains how explicit and implicit information might be conveyed as modes (Kahrens and Früauff, 2018). Socialization, combination, externalization, and internalization are the four operating modes discussed below. If regarded as a spiral of organisational knowledge development, the model may be used in various ways, generating knowledge by interacting between the many modes (Nonaka, 1994). Tactic and explicit knowledge are considered independently, with the idea that they may be changed in four distinct ways. Figure 6 shows the differences between tacit and explicit knowledge, while Figure 7 shows the knowledge creation modes.

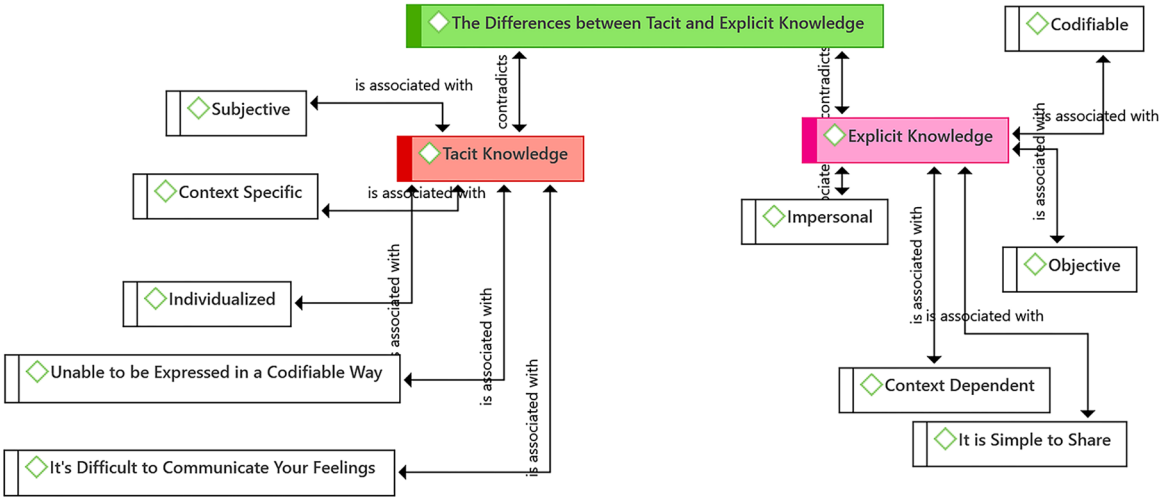

Figure 6. The Differences between Tacit and Explicit Knowledge

Nonaka (1994) describes socialization as the process of transferring tacit knowledge between people. It involves interactions such as observation, imitation, and practice, all of which are conversion methods. The converting procedure does not need the usage of any language. The creation of tacit knowledge by the receiver is the primary purpose of gaining shared experience. The author defines combination as the act of bringing together separate people's explicit knowledge to produce new explicit knowledge (Nonaka, 1994). New explicit knowledge may be created by categorizing, augmenting, and re-contextualizing previously communicated knowledge. Individuals can exchange explicit information via holding meetings or talking on the phone. As outlined by Nonaka, the conversions between tacit and explicit knowledge are referred to as externalization and internalization. When tacit information becomes explicit, it is referred to as externalization. When tacit knowledge becomes explicit, it is referred to as internalization (Nonaka, 1994).

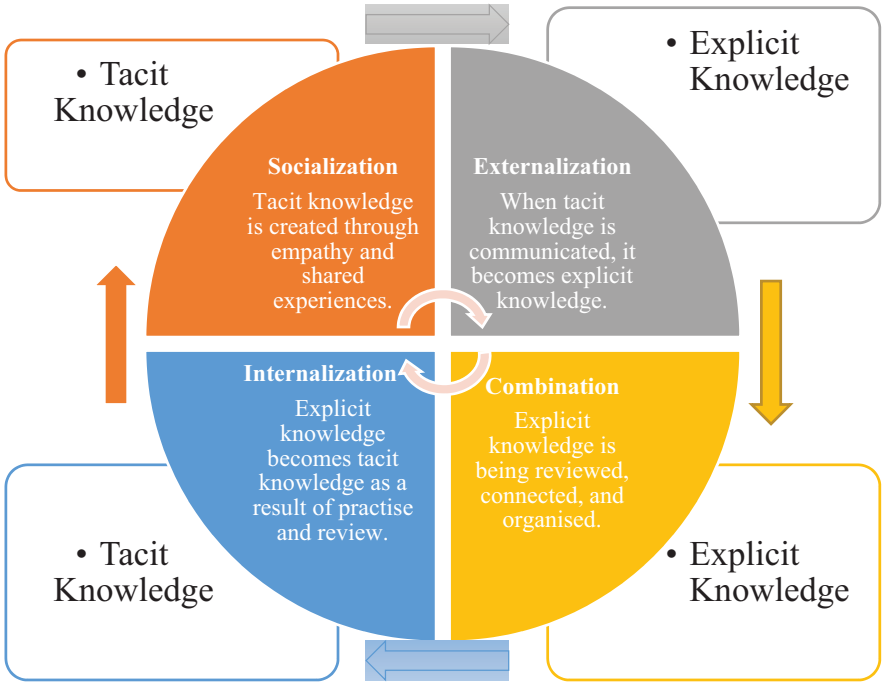

Figure 7. Modes of the knowledge creation

In the process of passing on information, externalization is initially accomplished by the knowledge source, followed by the knowledge recipient's internalization (Tan, 2015). Consequently, the recipient will develop new information and distribute it to the participants.

Knowledge Transfer

Varying stages of knowledge transfer have been described in great detail in the literature. These different levels are classified by Duan, Nie, and Coakes (2010) into four broad categories: knowledge transfer at the global scale, knowledge transfer between organisations, knowledge transfer inside organisations, and information transfer at the individual scale (Thomas, 2019; Renukappa, Suresh and Alosaimi, 2021). The major concern of this work is intra-organisational knowledge transfer, which can be described as the accessibility to a resource that a company already has, such as internal knowledge (Perrin and Rolland, 2007). Perrin and Rolland (2007) offer a similar definition, claiming that knowledge transfer in organisations is "the procedure by which one unit (e.g. group, division, or department) is impacted by the experience of another," which can be either overtly or implicitly (Secundo, et al., 2018). It is also possible to observe the intra-organisational knowledge transfer process from an individual level that Argote and Ingram (2000) described as having the influence that expertise in one activity has on the execution of another.

A KNOWLEDGE TRANSFER FRAMEWORK

Researchers have made efforts in this study area to continually produce new models and explanations that would better describe the process from different viewpoints on knowledge transfer (Wei and Miraglia, 2017). It has been suggested by Bacon, Williams, and Davies (2019) that the knowledge transfer method is composed of four separate elements: the player's engagement (both the source and the receiver), the context in which interaction occurs, and the transfer of knowledge among individuals, and the transfer method. According to previous studies, the exchange of information and knowledge absorption are independent activities in the knowledge transfer process (Davenport and Prusak, 1998; Perrin and Rolland, 2007). As a result, Perrin and Rolland (2007) and Davenport and Prusak (1998) argued that information that had not

been digested had not been conveyed. According to Cummings and Teng (2003), knowledge transfer is only successful if the recipient retains the knowledge shared. In this research, the concept of effective transferring of knowledge includes the absorption and utilization of new knowledge, which is an important point to accept. Several existing frameworks have been reviewed to find a suitable model for use in this study.

Several requirements must be met while choosing a theoretical framework. High validity and consistency are required for a framework. It should reflect intra-organisationally transferred knowledge, adherence to the terms defined above, and the study's application to perform a thorough analysis. Cummings and Teng's (2003) theory of transferring knowledge met all requirements, making it the ideal foundation for our investigation. Two goals of presenting this model are understanding the notion of knowledge transfer and gaining insight into the components, actions, and mechanisms that comprise the knowledge transfer procedure. Figure 8 depicts Cummings and Teng's (2003) redesigned and simplified view of the knowledge transfer procedure.

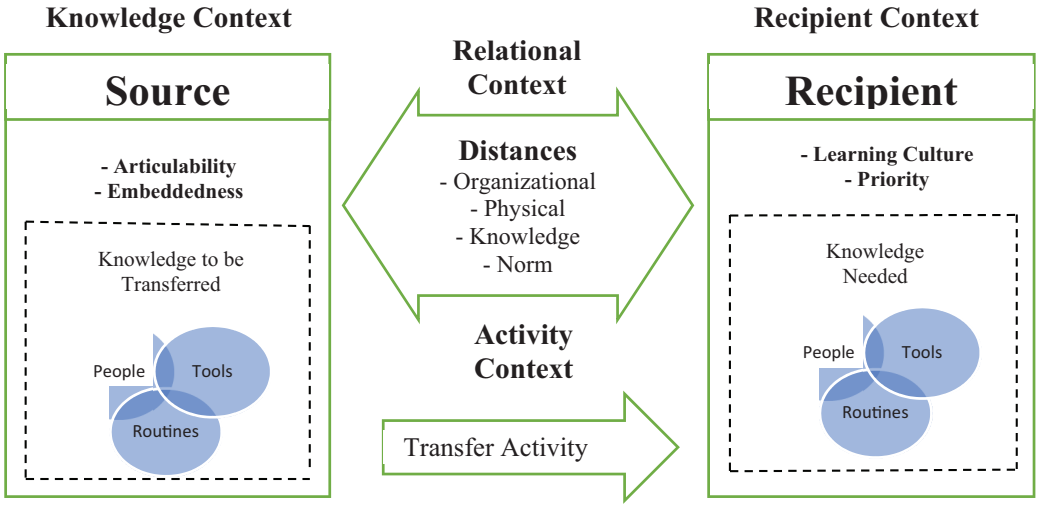

Figure 8. The model of transfer success with nine key factors affecting knowledge by Cummings and Teng (2003)

Here is a simplified version of Cummings and Teng's (2003) depiction of knowledge transfer, which is based on several different streams of research (Davenport and Prusak, 1998; Cummings and Teng, 2003). There are four areas in which Cummings and Teng have defined the process: knowledge context, activity context, relational context, and receiver context. Various elements influence the success of knowledge transfer in each of these categories. As a result of the model, knowledge transfer is viewed as a collection of interrelated domains and elements that have a cumulative impact on the process's performance. Szulanski (2000) argues that addressing knowledge transfer as a process instead of an event is critical if the model accounts for the associated issues.

To put it in another way, seeing the transfer as a whole process makes it possible to see how problems develop along with the procedure. Additionally, it encourages the creation of organizational strategies that would aid in transferring knowledge (Tornjanski, Petrovic and Nesic, 2020). The framework depicted in the figure considers several critical context-specific aspects. As a tool for understanding how knowledge gets transferred in the specific setting of this study, the broader concept is briefly outlined below.

Knowledge context

For successful knowledge transfer, Cummings and Teng (2003) recommend that source and receiver have a common understanding of how and where the necessary knowledge may be made available to each other. The authors then go on to describe how the embeddedness and artic lability of the transmitted information is included in this first area (Hwang, 2022). Prior studies suggest that knowledge is primarily entrenched in people, tools, and routines, as well as the accompanying subnetworks concerning the former (Argote and Ingram, 2000; Cummings and Teng, 2003). Furthermore, the ability to express information significantly influences the success of knowledge transmission.

Relational context

The model combines four relational domain aspects that might significantly influence successful knowledge transfer (Hamdoun, Jabbour and Othman, 2018). The first thing to consider is the distance between units in relation to organisational integration. Second, 'the difficulty, time demand, and complexity of communicating and coming together face-to-face' is represented as the physical distance between the transmitter and recipient participating in the process. The 'degree whereby the source and recipient hold identical information' is the third element impacting the success of knowledge transmission (Cummings and Teng, 2003). Finally, the ultimate norm distance is defined as the degree to which the values and organisational culture of the source and recipient are aligned.

Recipient context

Project priorities and learning culture both play a role in this situation. According to Cummings and Teng (2003), these characteristics may impact knowledge transfer success in the way initiatives are prioritised, resources are given, and how much learning is prioritised by both the source and receiver. Success is partly determined by how well the organisation facilitates and encourages learning if enough activities and procedures facilitate organisational learning (Cummings and Teng, 2003).

Activity context

Cummings and Teng's final domain captures the importance of knowledge transfer activities necessary to achieve effectiveness in knowledge transfer: the total number of activities in place and the frequency with which they are used. According to Cummings and Teng (2003), organizational learning and knowledge transfer are intertwined, and organisations with a strong learning culture must adhere to higher criteria in their knowledge transfer efforts. As a result, Cummings and Teng's (2003) perspective on knowledge transfer integrates findings from several study areas to provide a holistic picture of how information is transmitted from a source to a recipient or from one entity to the other. This section's model makes it easier to grasp what goes on in a knowledge transfer process and sets the stage for the rest of the chapter.

KNOWLEDGE TRANSFER STRATEGIES AND MECHANISMS

Knowledge transfer is described by Albino, Garavelli and Schiuma (1998) as a communication process involving information processing activities, where the engaged players can transmit knowledge via an appropriate channel (Jasimuddin, 2007). According to Jasimuddin (2007), personalization and codification are the two most important methods when it comes to information transfer. According to Jasimuddin (2007), implementing an effective knowledge transfer plan would help ensure the process works smoothly. According to Hansen, Nohria, and Tierney (2013), personalization or codification should be utilized as the primary technique while the other strategy should back it up.

According to Hansen, Nohria, and Tierney (2013), a company's codification strategy focuses on centralizing information in databases to be readily available to all employees. The authors call this strategy

a "people-to-documents" method since it allows users to reuse information without contacting the original creators of the publications. Additionally, they discuss how easily codifiable knowledge can frequently be. Rather than formalizing and transmitting, tacit knowledge is, as defined earlier, personal and difficult to formalize and convey (Hansen, Nohria, and Tierney, 2013). As a result, organisations that rely on tacit knowledge should adopt a personalization strategy emphasising exchanging information via direct personal contact. That is, a "person-to-person" approach relates to personalization. Codified knowledge only helps to educate people before they directly have contact with the original source of the knowledge. Documentation, technologies, and face-to-face contact are the three most often employed strategies for transferring information, according to Perrin and Rolland (2007). Ipe (2003) distinguishes both formal and informal options for knowledge transfer and exchange inside organisations from a broader viewpoint. According to Ipe (2003), formal procedures are best for transmitting explicit information. Such structured methods give the means for transferring data and the tools to do it. Other methods of sharing tacit information, such as informal networks and personal connections, are more suited for face-to-face communication since they entail informal channels for transferring knowledge (Yoo, 2020).

Furthermore, knowledge transfer procedures are classified in the literature as either organized knowledge transfer or unstructured knowledge transfer. It is calculative design and control, referred to as structured knowledge transfer (Shen, Li and Yang, 2015). Calculative design and control are defined as "regularizing the transfer operations inside an organisation so that they are consistent with the expectations established in policies, plans, and objectives." It is a systematic and planned process that results in codification that is guided by rules, processes, and formal structures. Direct knowledge transfer is a component of structured knowledge transfer (Lombardi, 2019). Bacon, Williams, and Davies (2019) describe control as bureaucratic and normative, with people's conduct and performance monitoring to prevent opportunistic behaviour. Structured knowledge transfer, on the other hand, may operate as a deterrent to spontaneous and active learning. An unstructured knowledge transmission process is an informal, unorganized process comprising identifying opportunities for knowledge transfer, providing alternatives for information sharing, and maintaining the availability of knowledge transfer channels (Boatca, Draghici and Carutasu, 2018).

It is obvious that different knowledge transfer techniques must be employed flexibly and simultaneously since the knowledge transferred might have various complementing types and/or features (Shen, Li and Yang, 2015). Because some organisational structures are more suited to specific knowledge qualities than others, organisations should have a wide range of transfer methodologies and corporate settings that are accessible (Argote and Ingram, 2000). When providing a more equitable distribution of information, credibility of knowledge transfer, and support for socialization, evidence suggests that organized and unstructured knowledge transfer are essential drivers (Shen, Li and Yang, 2015). Developing organisational knowledge transfer efficacy has become dependent on the transfer procedures, centred on the structural arrangement, normalization, control, and processes centred on social knowledge transfer. Table 2 presents a comparison between structured and unstructured knowledge transfer.

Structured knowledge transfer ensures that information is shared between those who can effectively use it. Structured processes like document transfers, problem-solving sessions, shared technical training, and periodic cultural training may help organisations transfer knowledge (Shen, Li and Yang, 2015). As a result, the fundamental principle of structured knowledge transfer can be rephrased as follows: regulating human behaviour by rational planning is the complete technique of conveying information (Froese, et al., 2021). Knowledge sharing and transfer are more likely when people have more influence and authority over how events play out. Organized knowledge transmission is characterized by formalization, specialization, standardization, and a preference for a structured, predictable sequence. These strategies necessitate logical behaviour from the start and so necessitate well-managed organisations, such as professional leadership and rationalization of the administrative structure (Cristofaro, et al., 2021). A "relatively small window of opportunity to fix unanticipated difficulties" may be created using structured knowledge transfer to build

Table 2. Knowledge transfer processes

Items	Structured Knowledge Transfer	Unstructured Knowledge Transfer
Strength	Reduced information costs: capacity to create massive systems through intricate articulation and carefully regulated complexity.	Rapid infusion and dissemination of significantly new viewpoints via individuals in social groups; enabling individuals to perform independently; may present unanticipated chances to improve workers' desire to transmit information; more likely to keep more flexibility in conveying, relating, and understanding information.
Weakness	Competence traps are created by a growth route that is excessively constricted. The development path is skewed towards institutional structures, resulting in strategic vulnerability.	Because of the limitations on the socialization process, it takes a long time to learn new information; it is difficult to transmit knowledge on a wide scale because of the dependence on smaller societies, human fatigue, and lack of general management by the organisation.
Specific contents	policies and procedures of management; leadership; structure of the organisation; design of the organisation; assistance with information technology.	Social connections; corporate socialization; community of practice; centre of excellence.
Management processes	There is no place for anarchy; thus, top management serves as a monitor and allocator. Leaders are commanders who rely on information processing to make decisions.	A catalyst, an architect, and a guardian are all roles played by the top management; leaders operate as catalysts and sponsors, and a focus is placed on combinations and temporary constellations.
Transferred knowledge	Knowledge may be found in various formats, such as written documentation, structured information saved in online databases, formalized human knowledge saved in knowledge-based systems, documented organisational rules and processes, and tacit knowledge gained by individuals and networks. Information can be explicitly documented in a digital or another way.	Culture of the organisation; changes (production processes and work procedures) Tacit knowledge comes in many shapes and sizes.

more reliable, standardized, and organized information dissemination protocols. Structured knowledge-sharing reduces the costs of the intra-organisational transaction by preventing future problems or occurrences from causing intra-transactional transaction costs (Rotsios, Sklavounos and Hajidimitriou, 2021).

A social or cultural connection system is used for unstructured knowledge transfer. Staff can have access to various interpretations, some of which are at odds with one another (Katila and Ahuja, 2002), while still adhering to the values and goals of their organisation, allowing them to act in concert with each other (De Luca and Rubio, 2018). Unstructured knowledge transfer is less formal and more informal than structured knowledge transfer, yet it can limit widespread diffusion. Knowledge dissemination through social processes necessitates the use of unstructured knowledge sharing. For unstructured knowledge transfer to occur, employees must be willing to share and transmit their expertise, necessitating developing social connections, values, and socialization processes that facilitate knowledge transfer (Giuri, et al., 2019). It is also possible for unstructured knowledge transfer to encourage informal discussions and interactions within businesses, which can be crucial for enhancing knowledge flow (Gupta and Govindarajan, 2000). Individuals from various organisational sub-units and individuals with remote, informal, unstructured interactions may enable information dispersion and sharing so as to boost knowledge transfer efficacy (Cristofaro, et al., 2021).

BARRIERS TO KNOWLEDGE TRANSFER

Knowledge transfer barriers can be categorised as elements that raise the complexity and difficulty of transferring knowledge within an organisation. In the field of evaluating knowledge transfer, there are both challenges and possibilities to be explored. This section addresses the different barriers to knowledge transfer. Innovations that have the potential to provide alternative measures are also presented.

Distance Barriers

According to Cummings and Teng (2003), possible constraints associated with distances have been identified through a mix of multiple study streams. Organisational, knowledge, physical, and norm distance are the four types of distance.

Organisational Distance

In intra-organisational relationships, organisational distance refers to how the involved people are integrated into the larger organisation. According to Cummings and Teng (2003), the power of social links, the easy flow of information, the consistency of administrative regulations, and the amount of confidence between the source and the receiver all play a significant role in overcoming this barrier to the exchange. In the study of Wall and Lippel (2020), their findings suggest that the efficacy of information transmission rises when the link between the source and the receiver is closer to the recipient. An improved organisational distance between the source and the receiver arises due to a lower level of integration. As a result, successful knowledge transfer is less likely to take place.

Physical Distance

Athanassiou and Nigh (2000) have proven that face-to-face interactions outperform alternative transfer modes and media, such as efficacy, depth, and tactfulness of knowledge. When a greater distance separates participants, communication becomes more complex, time-consuming, and expensive, making it harder to facilitate face-to-face discussion (Cummings and Teng, 2003). As a result, Cummings and Teng argue that when strong interaction is required, units involved in the transfer process must be located adjacent to one another. Then distance can act as a barrier to the exchange of information.

Knowledge Distance

The knowledge gap is a third possible obstacle. According to Cummings and Teng's (2003) findings, information transmission is more accessible when the source and receiver have comparable backgrounds. According to their findings, knowledge distance has an inverse connection with transfer success, indicating that as knowledge distance increases, so does the degree of success in transferring information. The learning capacity is also hindered when the disparity in knowledge is too high between source and receiver

(Thörnberg and Dusén, 2021). 'The recipient's absorption capacity, which refers to the ability to apply new knowledge, is dependent on the recipient's present stock of knowledge and abilities,' giving origin to the phrase 'absorptive capacity' (Szulanski, 2000).

Norm Distance

The last barrier is known as the norm distance, which measures how well the source and receiver organisations share the same culture and values and how well they comprehend the knowledge transfer process as a whole (Cummings and Teng, 2003). According to Dhanaraj, et al. (2004), who originated the term "relational embeddedness," a link between actors may be defined in terms of the depth of their social interactions, their level of trust, and the degree to which they share similar processes and values. As a result, high levels of relational embeddedness promote information interchange, appropriate knowledge transmission, and the development of accepted norms (Dhanaraj, et al., 2004).

Organisational culture

McDermott and O'dell (2001) emphasize that organisational culture significantly impacts how a business successfully transmits information. This is particularly true when it comes to the transfer of new technologies. Goh (2002), for example, emphasizes the need to foster a learning-centred organisational culture to enhance the flow of knowledge. If Cummings and Teng (2003) are correct, then not having an educationally oriented work environment might result in a loss of information that cannot be adequately cultivated or transferred. For this reason, they support the theory that recipients in a culture of continuous improvement with the ability and routines to support the whole knowledge-transfer process are more likely to succeed. To ensure efficient knowledge transfer, Goh (2002) says that a collaborative working culture with a high degree of trust is required, where people perceive it as natural, rather than a duty, to exchange information to achieve mutual success.

Language Barrier

When collaborating across borders, disparities in a shared language have been cited as a possible obstacle in literature (Montelius, 2018). Translation can be problematic when conveying information between people who speak different languages. Welch and Welch (2008) have reported using a common organisational language (typically English) to promote efficient modalities of information transmission. Although this might improve information transmission, it could also bring new forms of obstacles, given that employees have varying degrees of English proficiency and that they may be influenced by their native language when speaking English, resulting in their utilizing the same language in communication (Duan, Nie and Coakes, 2010). There is no need to move to a common language because the Swedish and Danish are mutually understandable (Gooskens, et al., 2010). According to Montelius (2018), Danes are better at understanding Swedes than Swedes are at understanding Swedes. Despite this, the languages are similar enough for communication to take place in the native tongues of the various personnel.

Leadership and management

Another possible roadblock is leadership, which may significantly impact organisational culture and the relative importance of different projects and tasks to different personnel. According to Warrick (2017), 'organisational cultures essentially mirror their leaders.' According to Davenport, De Long, and Beers (1998), senior management support contributes to knowledge project success. They explain that senior managers significantly impact an organisation's degree of knowledge orientation. Davenport, De Long, and Beers (1998) identified three key facilitators of effective knowledge management projects based on their thorough analysis of knowledge management projects. They transmit data that knowledge leadership and operational learning are vital to firm performance and effective knowledge management projects.

They also provide infrastructure money and other resources, outlining the most valuable knowledge to the business (Fernández-Esquinas, et al., 2021). According to these findings, management is critical to attaining successful knowledge management because it provides employees with clear direction and the necessary resources to move in that direction while also incorporating the value of knowledge management into the organisation's culture (Anand et al., 2021).

Transfer activities

According to Al-Salti and Hackney (2011), knowledge transfer needs various activities that enable knowledge exchange. Increasing the quantity and types of transfer activities increases the recipient's possibility of internalizing the information, which adds to knowledge transfer success. According to Cummings and Teng (2003), knowledge transfer activities are divided into three categories: those based on evaluating the structure and embeddedness of the knowledge; those aimed at creating and controlling an administration system through which differences and difficulties between the parties may be accommodated and decreased; and those centred on transferring knowledge (Wall and Lippel, 2020). Evaluating the form of knowledge refers to identifying the tastiness of the knowledge and developing and maintaining an administrative structure related to establishing the information's tastiness. Focusing on all three knowledge transfer activities is critical since they are interdependent (Cummings and Teng, 2003). Ignoring one or more activity areas might make it more difficult to transfer knowledge, thus producing a barrier in the process.

Employee turnover

Al-Salti and Hackney (2011) emphasize the repercussions of staff turnover, mainly when there is insufficient handover. They feel that limiting the risks connected with this element is essential for firms wishing to transfer successful knowledge. If workers leave the organisation without passing on their expertise to a new employee or existing colleagues, a knowledge gap is immediately generated, resulting in the disappearance of both explicit and tacit information from the company. According to Droege and Hoobler (2003), when people leave a company, the company does not run the danger of losing codified knowledge. This, however, is only acceptable if the information in question has been adequately documented, which is not always the case. It should be noted that even if such information is conveyed in papers, as described by one of the academics, the ease of access and usage becomes critical. It can be troublesome if the organisation lacks the appropriate infrastructure (Wall and Lippel, 2020).

In this scenario, the danger of losing tacit knowledge when staff leave is potentially more severe because the effectiveness of the information transfer depends on the individual's expertise. So, it is expected that a thorough handover that emphasizes socialization would considerably increase the retention and use of tacit knowledge – which will be extremely beneficial to the knowledge transfer process. Furthermore, because it takes time to connect with new workers and learn about their abilities and set of skills, staff turnover contributes to a decline in knowing who understands what within departments. This, as claimed, would further impede efficient knowledge transfer across departments dependent on one another and where the transmission of information should ideally involve the employees with the necessary knowledge base.

MOTIVATIONAL FACTORS

The elements that influence motivation may be split into two categories: external forces and internal ones. Ipe (2003) characterizes them as follows: 'External elements include the relationship with the receiver and benefits for sharing' while 'Internal aspects include the felt power tied to the information and the reciprocity that arises from sharing.' Liu and Fang (2010) define an external motivation as something a person undertakes to obtain something desired or avoid something uncomfortable. For example, money, promotion, or a prize are all examples of external motivators. Internal motivators generally derive from personal

interests, job pleasure, and the job's difficulty in question (Al-Salti and Hackney, 2011). Examples of internal motivators include the desire to solve an issue no one else has solved before and the recognition of one's own efforts. According to Hau et al., (2013), external motivators' effects vary, with some data indicating they are beneficial. Although some research has demonstrated that external influences might inspire knowledge sharing, others have found that external motivators can negatively impact information-sharing behaviour. According to Bacon, Williams and Davies (2019), internal variables have consistently demonstrated a favourable influence on sharing information.

Hendriks (1999) posits that Hertzberg's two-factor approach is useful in identifying the motivating elements that drive information sharing. Hertzberg's two-factor theory distinguishes between two variables: hygiene factors and motivation factors. When hygiene factors are present, they do not affect behaviour (Alshmemri, Shahwan-Akl and Maude, 2017). However, when hygiene aspects are lacking, they will still induce dissatisfaction and lower motivation (Al-Salti and Hackney, 2011). Examples of such factors are salary, status, and corporate policies. Among the things that Hertzberg considers to be motivators are the following five: a sense of accomplishment, a sense of responsibility, acknowledgment for a job well done, promotional prospects, and the task's difficulty. According to Hendriks (1999), the need for operational autonomy is a sixth motivational element that has been shown to be important in previous research. A rise in motivation is a result of the presence of the motivators in a situation. Because of this, the previously observed boost in motivation is not sustained or further developed, and the situation returns to the prior state. However, when the motivators are gone, there is no increase in unhappiness. The link between the hygienic components, the motivating elements, and behaviour is depicted in Figure 9.

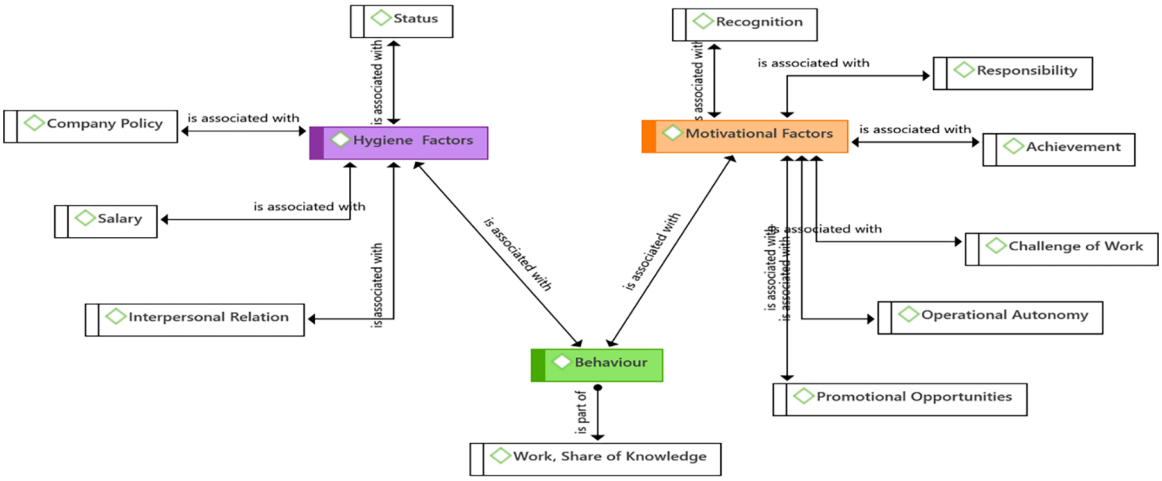

Figure 9. Herzberg's two-factor theory modified by Hendriks (1999).

Hendriks (1999) believes that when considering why employees share information, one should look at motivating factors rather than hygienic criteria. For example, bonuses are unlikely to increase knowledge sharing itself, and partly because, for example, knowledge holding indicates status where knowledge sharing is less likely to occur. Furthermore, Hendriks goes on to say that the motivators appear to be the ones that cause information sharing. Finally, he argues that distinct motivational variables influence the willingness of knowledge suppliers and knowledge users to participate in information sharing (Abbate, Cesaroni and Presenza, 2021). Knowledge sources may be expected to be recognized and given advertising chances, or they may feel obligated to offer their expertise first-hand. Furthermore, they may share because they anticipate or aspire for reciprocity, whereas knowledge recipients may seek operational autonomy, a challenging job, or advancement prospects (He, et al., 2022).

Another study by Liu and Fang (2010) examined the relationship between several environmental, internal, and hygienic aspects and the desire and behaviour to share information. Their descriptions of internal and external motivating elements were comparable to those in this study, citing Herzberg's behaviour-based hygiene factors (Alshmemri, et al., 2017). The study's findings revealed a substantial and positive correlation among knowledge-sharing willingness and behaviour and motivation and altruistic features of internal motivation and reputation and mutual benefits. But only sharing behaviour was linked significantly with hygienic elements of external incentive, not ready to share (Sanjeev and Surya, 2016). These findings made the authors of this research (Sanjeev and Surya, 2016) conclude that fostering an altruistic mentality among employees and increasing the desire and behaviour to share information will increase productivity. These features will also help people who participate in knowledge sharing build a favourable reputation by demonstrating a desire and behaviour to gain from sharing information (Alrawahi, et al., 2020). Furthermore, hygienic elements such as prizes will focus people's attention on and encourage information-sharing behaviour, but they will have little effect on people's desire to share their knowledge.

Willingness to share

According to Ajzen (1991), anticipating people's behaviour is challenging. However, according to Wehn and Montalvo (2018), people's intents, objectives, and plans are one factor that affects their behaviour. Individuals who have formed a goal are more likely to behave in a way that helps them achieve it. Since most human behaviour is goal-directed, it is possible to forecast a person's behaviour by looking at their intents, objectives, and plans in a particular setting (Wehn and Montalvo, 2018). Figure 10 illustrates how

Figure 10. A model of applied knowledge transfer

the model is applied in a knowledge transfer environment, as Wehn and Montalvo (2018) demonstrated in their modified version of Ajzen's (1991) Theory of planned behaviour model. For example, the model shows that knowledge transfer behaviour can be characterized by three components: attitudes towards knowledge transfer, social norms, and control over that process. These aspects add up to a compounded desire to transmit information. As observed, unlike the other elements, controlling the information transfer process can directly result in the transmission of knowledge itself. The actual nature of the relationships in Ajzen's Theory of planned behaviour model is still unknown, even though Ajzen (1991) stated that empirical data strongly supports his theory. So, this ambiguity and practical data should apply to Wehn and Montalvo's model, too. Wehn and Montalvo (2018) further claim that the model may be used in both inter and intra-organisational situations.

According to Wehn and Montalvo (2018), attitude is defined as "the degree to which people have a favourable judgment or appraisal of a certain behaviour." As a result, the degree to which an employee participates in knowledge transfer activities serves as a barometer for their perceptions of the benefits and drawbacks of their participation. Accumulated knowledge transfer beliefs are composed of salient beliefs and relevant facts about whatever topic is being transferred. According to Wehn and Montalvo (2018), employees' normative attitudes about how they should or shouldn't behave are formed by their accumulation of perceived social norms, the second aspect of engaging in information transfer. In the context of knowledge transmission, this refers to whether or not they should participate in the knowledge transfer activity.

Finally, control of the information transfer process is determined by the perceived ease or difficulty of acting in accordance with a particular habit (Wehn and Montalvo, 2018). The assumption about how simple or difficult it is to obtain the desired result through knowledge transfer is based on prior experience or second-hand information, for example. Perceived behavioural control over the knowledge transfer process by an employee is a good indicator of whether or not the resources and opportunities necessary to carry out the transfer of information are there or unavailable (Pietruszka-Ortyl, 2018). The model also includes various categories of general incentives (social outcome as well as economic and strategic outcome), pressures (financial, institutional and organisational), and capabilities (organisational, technological, and institutional) that have an impact on the sources and recipients of the resources (Wehn and Montalvo, 2018). The factors that impact each category differ based on the source and recipient's context. They might go beyond the recommended incentives, pressures, and capacities contained in the model to influence each category differently.

Discussion

The purpose of this study was to establish the obstacles to successful knowledge transfer and how motivation and willingness impact knowledge transfer and sharing in the construction sector. The study starts by discussing knowledge management and knowledge transfer in the construction industry and then assesses the existing research. The information was gathered from reputable databases. The study adds fresh pieces to the puzzle of effective knowledge transfer by providing new insights and illuminating information for future research. This literature study, as a result, provides a synopsis of current research, a critical argument, and a scientific strategy for transferring knowledge in the construction business. The use of organisational knowledge transfer as a theoretical lens for our discussion contributes to contemporary knowledge management research. As was previously alluded to in the opening paragraphs, knowledge transfer is crucial in construction organisations because of the fragmented nature of the industry and the temporal nature of its services and products. Knowledge transfer serves as a critical connection within and outside of an organization, which, if effective, could be transformed into economic and market value for organisations, as stated by Hendriks (1999). Construction organisations hold enormous knowledge assets

that must be harnessed because separating information into silos will be inefficient (Lee and Al-Hawamdeh, 2002). This undertaken review has shown that information must be shared among the organization's members to function well. Information exists in both tacit and explicit forms, with the explicit being more easily transmitted to others and the tacit being more challenging to express. Socialization, externalization, combination, and internalization are all concepts that are presented in the (SECI) model developed by Nonaka and Takeuchi (1995) to explain how conversion between two forms of knowledge might occur.

Construction organisations must consistently focus on both tacit and explicit knowledge preservation to minimize the risks associated with employee turnover. For instance, employees must be encouraged to transfer the information they have amassed to other colleagues before departing. Tactic information should be discussed and passed on to others through socialization rather than being kept secret. As a result, knowledge transmission should be carried out using a codification technique backed up by personalization. E-storage technologies could facilitate the storage and embedding of knowledge. Operations and technical standards that are essential for new workers to learn from should be updated regularly to prevent their loss. Therefore, increased attention to knowledge preservation could improve the successful transfer of knowledge.

Knowledge may be conveyed through meetings and networks, mentorship, and on-the-job training. Employees can also be moved around (working together). Information is complicated, and as a result, there are obstacles and impediments to the transmission and exchange of knowledge. According to the reviewed literature for this study, the most significant challenges are those related to the organization's knowledge transfer strategy (financial barriers are also associated with this factor), organizational and national cultures, their differences, and language barriers and cultural differences. The organization must have a knowledge transfer plan that is consistent with its overall strategy. Knowledge transfer across borders can be made more difficult by variations in organizational culture across nations and disparities in organizational culture within a country.

The organisational culture should recognise the potential variations in cultural and tacit knowledge that may exist within organizations. For instance, obstacles may arise regarding differing objectives amongst partner organisations on a construction project, which should not be disregarded. This study's findings have highlighted some management aspects that could facilitate efficient knowledge transfer within the construction sector. Some of these facilitators include the following: organizational cultures that are open and transparent (knowledge transfer is highly motivated internally); ensuring a good match between resources and objectives for knowledge transfer; and ensuring effective (by keeping physical distance to a minimum) regular communication. Furthermore, the study has found that all construction parties must share objectives that permit connection to common problems. Knowledge transfer thrives where organisations pull and push towards similar goals in the same direction. Because of the greater sense of dependency and responsibility that comes with a stronger sense of community, it is reasonable to predict that employees will feel more pressure to participate actively in knowledge transfer activities.

Furthermore, considering that knowledge is strategically vital for a competitive organisational edge (Shao and Ariss, 2020), organizations should make an effort to recruit highly valued skills so they can benefit from their expertise. Individual knowledge capital should be evaluated to determine their trustworthiness and harness this for effective knowledge transfers. In accordance with the concept presented by Vance and McNulty, (2014), it is vital to develop appropriate strategies for obtaining brilliant individuals and set up and continue to maintain an efficient local support structure. Organizations need to give serious consideration to acquiring the talent and management personnel needed for overseas postings from existing employees of the company as well as from potential local hires whose services have become available as a result of the expatriation decisions they have made in the past. These approaches are significant within the construction sector context considering the persistence of skill shortages. From artisans to supervisory

and to managerial roles, turnover issues pervade the construction industry; hence it is not uncommon to experience regular knowledge losses.

Additionally, to ensure the efficacy of worker knowledge transfer, workers must be placed in positions where their expertise may be used to the greatest advantage of organisations. Organizations should consistently channel employees' talent with the construction industry's needs (Doherty and Dickmann, 2013). Furthermore, firms should foster an organisational culture that encourages people to learn and implement their newfound knowledge. The assignment of individuals responsible for recognizing new information imparted by employees and then encouraging other employees to use it is one feasible solution. For businesses to effectively utilize workers' knowledge, they must first have a significant capacity to absorb information and adopt a set of procedures and processes to properly exploit and integrate new knowledge.

Conclusion

Based on the findings of this study, the authors have identified criteria for successful knowledge transfer among construction industry personnel. In order to facilitate effective knowledge transfer and achieve successful knowledge transfer, it is critical to have an organisational culture that promotes knowledge transfer, a common goal, interconnectivity, commitment, and responsibility, as well as regular, efficient communication among teams. Knowledge must be proactively managed throughout organizations. Resources must be sufficiently matched with demands as well as established knowledge transfer objectives. Knowledge transfer processes need to be clearly provided to all involved parties. All knowledge transfer activities must take cognizance of the intrinsic characteristics of the construction industry. The industry is highly fragmented and fraught with adversarial relationships; therefore, approaches to acquiring and retaining its knowledge capital must be pursued conscientiously.

Finally, the study concludes that obstacles to effective knowledge transfer can be overcome through certain management aspects (facilitators) previously explained. Construction organisations must be willing and motivated to transfer knowledge because of its inherent benefits. This study has emphasized the correlations between knowledge transfer and competitive advantages. As a result of this study, various gaps in the literature were identified, which might be further investigated by academics. A study directed at enterprises in the construction industry, for example, might shed insight on the success of existing technologies and practices applied in businesses in order to acquire, exchange, transmit, and store knowledge. Investigating the quality of the information that has been exploited may also be an intriguing topic. Investigating the observable advantages of knowledge transfer in the building project is a more ambitious strategy that should be considered. A future study might examine the opportunity costs of the ineffective addressing of knowledge management in the workplace by comparing studies with other productive industries. Examples should include process improvement benchmarking studies in manufacturing from a quality standpoint or the measurement of long-term cost reductions in the construction industry due to the transfer of solutions that have already been implemented in the workplace. The preservation of knowledge across organisations might be further studied by doing comparable research that includes various case studies across diverse sectors. For example, corporate or human resource policies or the establishment of new standards and procedures to be applied after people leave the organisation could be examined as possible avenues for additional exploration.

References

Abbate, T., Cesaroni, F. and Presenza, A., 2021. Knowledge transfer from universities to low-and medium-technology industries: Evidence from Italian winemakers. *The Journal of Technology Transfer*, [e-journal] 46(4), pp.989-1016. https://doi.org/10.1007/s10961-020-09800-x

Ajmal, M.M. and Koskinen, K.U., 2008. Knowledge Transfer in project-based organizations: An organizational culture perspective. *Project Management Journal*, [e-journal] 39(1), pp.7-15. https://doi.org/10.1002/pmj.20031

Ajzen, I., 1991. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes,* [e-journal] 50(2), pp.179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Al-Salti, Z. and Hackney, R., 2011. Factors impacting knowledge transfer success in information systems outsourcing. *Journal of Enterprise Information Management*, [e-journal] 24(5), pp.455-68. https://doi.org/10.1108/17410391111166521

Albino, V., Garavelli, A.C. and Schiuma, G., 1998. Knowledge transfer and inter-firm relationships in industrial districts: The role of the leader firm. *Technovation,* [e-journal] 19(1), pp.53–63. https://doi.org/10.1016/S0166-4972(98)00078-9

Alrawahi, S., Sellgren, S.F., Altouby, S., Alwahaibi, N. and Brommels, M., 2020. The application of Herzberg's Two-Factor Theory of Motivation to job satisfaction in clinical laboratories in Omani hospitals. *Heliyon,* [e-journal] 6(9), p.e04829. https://doi.org/10.1016/j.heliyon.2020.e04829

Alshmemri, M., Shahwan-Akl, L. and Maude, P., 2017. Herzberg's Two-Factor Theory. *Life Science Journal,* [e-journal] 14(5), pp.12–16. https://doi.org/10.7537/marslsj140517.03

Anand, A., Muskat, B., Creed, A., Zutshi, A. and Csepregi, A., 2021. Knowledge sharing, knowledge transfer and SMEs: Evolution, Antecedents, outcomes and directions. *Personnel Review*, [e-journal] 50(9), pp.1873-93. https://doi.org/10.1108/PR-05-2020-0372

Argote, L., Ingram, P., Levine, J.M. and Moreland, R.L., 2000. Knowledge transfer in organizations: Learning from the experience of others. *Organizational Behavior and Human Decision Processes*, [e-journal] 82(1), pp.1-8. https://doi.org/10.1006/obhd.2000.2893

Artemov, S., 2018. Constructive knowledge and the justified true belief paradigm. *Indagationes Mathematicae*, [e-journal] 29(1), pp.125-34. https://doi.org/10.1016/j.indag.2017.09.012

Ashok, M., Al Badi Al Daheri, M.S.M., Madan, R. and Dzandu, M.D., 2021. How to counter organisational inertia to enable knowledge management practices adoption in public sector organisations. *Journal of Knowledge Management*, [e-journal] 25(9), pp. 2245-73. https://doi.org/10.1108/JKM-09-2020-0700

Athanassiou, N. and Nigh, D., 2000. Internationalization, tacit knowledge and the top management teams of MNCs. *Journal of International Business Studies*, [e-journal] 31(3), pp.471-87. https://doi.org/10.1057/palgrave.jibs.8490917

Bacon, E., Williams, M.D. and Davies, G.H., 2019. Recipes for success: conditions for knowledge transfer across open innovation ecosystems. *International Journal of Information Management*, [e-journal] 49, pp.377-87. https://doi.org/10.1016/j.ijinfomgt.2019.07.012

Bartol, K.M. and Srivastava, A., 2002. Encouraging knowledge sharing: The role of organizational reward systems. *Journal of Leadership & Organizational Studies*, [e-journal] 9(1), pp.64-76. https://doi.org/10.1177/107179190200900105

Bastas, A. and Liyanage, K., 2018. Sustainable supply chain quality management: A systematic review. *Journal of Cleaner Production*, [e-journal] 181, pp.726-44. https://doi.org/10.1016/j.jclepro.2018.01.110

Berg, S., Legnerot, C., Lindström, A., Nilsson, M., Bosch-Sijtsema, P.M. and Gluch, P., 2012. Knowledge transfer within and across organizational boundaries: A case study in the construction industry. In *ARCOM 28th Annual Conference, Edinburgh, 3-5 September 2012*.

Boatca, M.E., Draghici, A. and Carutasu, N., 2018. A knowledge management approach for ergonomics implementation within organizations. *Procedia-Social and Behavioral Sciences*, [e-journal] 238, pp.199-206. https://doi.org/10.1016/j.sbspro.2018.03.024

Brown, A., Sharpe, S. and Andrews, D., 2020. Supporting 'successful knowledge transfer'for early childhood professionals–An emerging conceptual framework in an Australian context. *Early Years*, [e-journal] pp.1-16. https://doi.org/10.1080/09575146.2020.1856045

Carrillo, P., Robinson, H., Al-Ghassani, A. and Anumba, C., 2004. Knowledge management in UK construction: Strategies, resources and barriers. *Project Management Journal*, [e-journal] 35(1), pp.46-56. https://doi.org/10.1177/875697280403500105

Castro, A.L., Yepes, V., Pellicer, E. and Cuéllar, A.J., 2012. Knowledge management in the construction industry: state of the art and trends in research. *Revista de la Construcción*, 11(3), pp.62-73. https://doi.org/10.4067/S0718-915X2012000300006

Chang, Y.T. and Hsieh, S.H., 2020. A review of Building Information Modeling research for green building design through building performance analysis. *Journal of Information Technology in Construction (ITCon)*, [e-journal] 25, pp.1-40. https://doi.org/10.36680/j.itcon.2020.001

Cohen, W.M. and Levinthal, D.A., 1990. Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, [e-journal], pp.128-52. https://doi.org/10.2307/2393553

Cooper, H.M., 1988. Organizing knowledge syntheses: A taxonomy of literature reviews. *Knowledge in Society*, [e-journal] 1(1), pp.104-26. https://doi.org/10.1007/BF03177550

Costa, D.B., Formoso, C.T., Kagioglou, M., Alarcón, L.F. and Caldas, C.H., 2006. Benchmarking initiatives in the construction industry: Lessons learned and improvement opportunities. *Journal of Management in Engineering*, [e-journal] 22(4), pp.58-167. https://doi.org/10.1061/(ASCE)0742-597X(2006)22:4(158)

Cristofaro, C.L., Melina, A.M., Vesperi, W. and Reina, R., 2021. Knowledge Management and Mentoring in Public Organizations: A Narrative Case Study. In: *ECKM 2021, 22nd European Conference on Knowledge Management* (p. 225). Academic Conferences Limited.

Crupi, A., Del Sarto, N., Di Minin, A., Phaal, R. and Piccaluga, A., 2020. Open innovation environments as knowledge sharing enablers: The case of strategic technology and innovative management consortium. *Journal of Knowledge Management*, [e-journal] 25(5), pp.1263-86. https://doi.org/10.1108/JKM-06-2020-0419

Cummings, J.L. and Teng, B.S., 2003. Transferring R&D knowledge: The key factors affecting knowledge transfer success. *Journal of Engineering and Technology Management*, [e-journal] 20(1-2), pp.39-68. https://doi.org/10.1016/S0923-4748(03)00004-3

Davenport, T.H., De Long, D.W. and Beers, M.C., 1998. Successful knowledge management projects. *MIT Sloan Management Review*, 39(2), p.43.

Davenport, T.H. and Prusak, L., 1998. *Working knowledge: How organizations manage what they know*. Boston, Massachusetts: Harvard Business School Press.

De Luca, P. and Rubio, M.C., 2018. The curve of knowledge transfer: A theoretical model. *Business Process Management Journal*, [e-journal] 25(1), pp.10-26. https://doi.org/10.1108/BPMJ-06-2017-0161

Dhanaraj, C., Lyles, M.A., Steensma, H.K. and Tihanyi, L., 2004. Managing tacit and explicit knowledge transfer in IJVs: The role of relational embeddedness and the impact on performance. *Journal of International Business Studies*, [e-journal] 35(5), pp.428-42. https://doi.org/10.1057/palgrave.jibs.8400098

Doherty, N. and Dickmann, M., 2013. Self-initiated and assigned expatriates: talent management and career considerations. In: *Talent Management of Self-Initiated Expatriates* (pp.234-55). London: Palgrave Macmillan. https://doi.org/10.1057/9780230392809_11

Droege, S.B. and Hoobler, J.M., 2003. Employee turnover and tacit knowledge diffusion: A network perspective. *Journal of Managerial Issues*, pp.50-64.

Duan, Y., Nie, W. and Coakes, E., 2010. Identifying key factors affecting transnational knowledge transfer. *Information & Management*, [e-journal] 47(7-8), pp.356-63. https://doi.org/10.1016/j.im.2010.08.003

Eskerod, P. and Skriver, H.J., 2007. Organizational culture restraining in-house knowledge transfer between project managers a case study. *Project Management Journal*, [e-journal] 38(1), pp.110-22. https://doi.org/10.1177/875697280703800111

Fernández-Esquinas, M., Sánchez-Rodríguez, M.I., Pedraza-Rodríguez, J.A. and Muñoz-Benito, R., 2021. The use of QCA in science, technology and innovation studies: A review of the literature and an empirical application to knowledge transfer. *Scientometrics*, [e-journal] 126(8), pp.6349-82. https://doi.org/10.1007/s11192-021-04012-y

Ferrer-Serrano, M., Fuentelsaz, L. and Latorre-Martinez, M.P., 2021. Examining knowledge transfer and networks: An overview of the last twenty years. *Journal of Knowledge Management*. [e-journal] https://doi.org/10.1108/JKM-04-2021-0265

Fong, P.S. and Wong, K.C., 2005. Capturing and reusing building maintenance knowledge: A socio-technical perspective. In: *Knowledge management in the construction industry: A socio-technical perspective* (pp.67-89). IGI Global. https://doi.org/10.4018/978-1-59140-360-9.ch005

Froese, F.J., Stoermer, S., Reiche, B.S. and Klar, S., 2021. Best of both worlds: How embeddedness fit in the host unit and the headquarters improve repatriate knowledge transfer. *Journal of International Business Studies*, [e-journal] 52(7), pp.1331-49. https://doi.org/10.1057/s41267-020-00356-4

Giuri, P., Munari, F., Scandura, A. and Toschi, L., 2019. The strategic orientation of universities in knowledge transfer activities. *Technological Forecasting and Social Change*, [e-journal] 138, pp.261-78. https://doi.org/10.1016/j.techfore.2018.09.030

Goh, S.C., 2002. Managing effective knowledge transfer: An integrative framework and some practice implications. *Journal of Knowledge Management*, [e-journal] 6(1), pp.23-30. https://doi.org/10.1108/13673270210417664

Gooskens, C., Van Heuven, V.J., Van Bezooijen, R. and Pacilly, J.J., 2010. Is spoken Danish less intelligible than Swedish? *Speech Communication*, [e-journal] 52(11-12), pp.1022-37. https://doi.org/10.1016/j.specom.2010.06.005

Gupta, A.K. and Govindarajan, V., 2000. Knowledge management's social dimension: Lessons from Nucor Steel. *MIT Sloan Management Review*, 42(1), p.71.

Halila, F., Tell, J., Hoveskog, M. and Lu, Q., 2017. The diffusion of green innovation technology in the construction industry: European passive house knowledge transfer to China. *Progress in Industrial Ecology, An International Journal*, 11(2), pp.164-81. https://doi.org/10.1504/PIE.2017.088867

Hansen, M.T., Nohria, N. and Tierney, T., 2013. What's your strategy for managing knowledge? In: *The Knowledge Management Yearbook 2000-2001* (pp.55-69). Routledge. https://doi.org/10.4324/9780080941042

Hau, Y.S., Kim, B., Lee, H. and Kim, Y.G., 2013. The effects of individual motivations and social capital on employees' tacit and explicit knowledge sharing intentions. *International Journal of Information Management*, [e-journal] 33(2), pp.356-66. https://doi.org/10.1016/j.ijinfomgt.2012.10.009

He, X., Kothari, S.P., Xiao, T. and Zuo, L., 2022. Industry-specific knowledge transfer in audit firms: Evidence from audit firm mergers in China. *The Accounting Review*, [e-journal] 97(3), pp.249-77. https://doi.org/10.2308/TAR-2018-0651

Hendriks, P., 1999. Why share knowledge? The influence of ICT on the motivation for knowledge sharing." *Knowledge and Process Management*, [e-journal] 6(2), pp.91-100. https://doi.org/10.1002/(SICI)1099-1441(199906)6:2<91::AID-KPM54>3.0.CO;2-M

Huang, Y.H. and Yang, T.R., 2019. Exploring on-site safety knowledge transfer in the construction industry. *Sustainability*, [e-journal] 11(22), p.6426. https://doi.org/10.3390/su11226426

Hwang, S., 2022. Sharing tacit knowledge in small-medium regional construction companies in the US: the current status and the impact of organizational ecology. *International Journal of Construction Management*, [e-journal] 22(9), pp.1746-55. https://doi.org/10.1080/15623599.2020.1742628

Ipe, M., 2003. Knowledge sharing in organizations: A conceptual framework. *Human Resource Development Review*, [e-journal] 2(4), pp.337-59. https://doi.org/10.1177/1534484303257985

Jasimuddin, S.M., 2007. Exploring knowledge transfer mechanisms: The case of a UK-based group within a high-tech global corporation. *International Journal of Information Management*, [e-journal] 27(4), pp.294-300. https://doi.org/10.1016/j.ijinfomgt.2007.03.003

Kahrens, M. and Früauff, D.H., 2018. Critical evaluation of Nonaka's SECI model. In: *The Palgrave Handbook of Knowledge Management* (pp.53-83). Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-71434-9_3

Kamara, J.M., Augenbroe, G., Anumba, C.J. and Carrillo, P.M., 2002. Knowledge management in the architecture, engineering and construction industry. *Construction Innovation,* [e-journal] 2(1), pp.53-67. https://doi.org/10.1108/14714170210814685

Katila, R. and Ahuja, G., 2002. Something old, something new: A longitudinal study of search behavior and new product introduction. *Academy of Management Journal*, [e-journal] 45(6), pp.1183-94. https://doi.org/10.5465/3069433

Kavalić, M., Nikolić, M., Radosav, D., Stanisavljev, S. and Pečujlija, M., 2021. Influencing factors on knowledge management for organizational sustainability. *Sustainability*, [e-journal] 13(3), p.1497. https://doi.org/10.3390/su13031497

Kazi, A.S. and Koivuniemi, A., 2006. Sharing through social interaction: The case of YIT Construction Ltd. In: A.S. Kazi and P. Wolf, eds. *Real-life knowledge management: Lessons from the field*. KnowledgeBoard in collaboration with VTT - Technical Research Centre of Finland, pp.65-78.

Kivrak, S., Arslan, G., Dikmen, I. and Birgonul, M.T., 2008. Capturing knowledge in construction projects: Knowledge platform for contractors. *Journal of Management in Engineering*, [e-journal] 24(2), pp.87-95. https://doi.org/10.1061/(ASCE)0742-597X(2008)24:2(87)

Latilla, V.M., Frattini, F., Petruzzelli, A.M. and Berner, M., 2018. Knowledge management, knowledge transfer and organizational performance in the arts and crafts industry: A literature review. *Journal of Knowledge Management,* [e-journal] 22(6), pp.1310-31. https://doi.org/10.1108/JKM-08-2017-0367

Lee, C.K. and Al-Hawamdeh, S., 2002. Factors impacting knowledge sharing. *Journal of Information & Knowledge Management*, [e-journal] 1(01), pp.49-56. https://doi.org/10.1142/S0219649202000169

Li, J., Saide, S., Ismail, M.N. and Indrajit, R.E., 2021. Exploring IT/IS proactive and knowledge transfer on enterprise digital business transformation (EDBT): A technology-knowledge perspective. *Journal of Enterprise Information Management*, [e-journal] 35(2), pp.597-616. https://doi.org/10.1108/JEIM-08-2020-0344

Lin, Y.C., Wang, L.C., Tserng, H.P. and Jan, S.H., 2005. Enhancing knowledge and experience exchange through construction map-based knowledge management system. In: *Construction Research Congress 2005: Broadening Perspectives* (pp. 1-10). https://doi.org/10.1061/40754(183)84

Liu, W.C. and Fang, C.L., 2010. The effect of different motivation factors on knowledge-sharing willingness and behavior. *Social Behavior and Personality: An International Journal*, [e-journal] 38(6), pp.753-58. https://doi.org/10.2224/sbp.2010.38.6.753

Liyanage, C., Elhag, T., Ballal, T. and Li, Q., 2009. Knowledge communication and translation–a knowledge transfer model. *Journal of Knowledge Management,* [e-journal] 13(3), pp.118-31. https://doi.org/10.1108/13673270910962914

Lombardi, R., 2019. Knowledge transfer and organizational performance and business process: past, present and future researches. *Business Process Management Journal,* [e-journal] 25(1), pp.2-9. https://doi.org/10.1108/BPMJ-02-2019-368

López-Sáez, P., Cruz-González, J., Navas-López, J.E. and del Mar Perona-Alfageme, M., 2021. Organizational integration mechanisms and knowledge transfer effectiveness in MNCs: The moderating role of cross-national distance. *Journal of International Management*, [e-journal] 27(4), p.100872. https://doi.org/10.1016/j.intman.2021.100872

Magnier-Watanabe, R. and Benton, C., 2017. Management innovation and firm performance: The mediating effects of tacit and explicit knowledge. *Knowledge Management Research & Practice*, [e-journal] 15(3), pp.325-35. https://doi.org/10.1057/s41275-017-0058-6

Maurer, I., Bartsch, V. and Ebers, M., 2011. The value of intra-organizational social capital: How it fosters knowledge transfer, innovation performance, and growth. *Organization Studies*, [e-journal] 32(2), pp.157-85. https://doi.org/10.1177/0170840610394301

McDermott, R. and O'dell, C., 2001. Overcoming cultural barriers to sharing knowledge. *Journal of knowledge management*. 5(1), pp.76-85. https://doi.org/10.1108/13673270110384428

Milton, N.R., 2007. *Knowledge acquisition in practice: a step-by-step guide*. London, UK: Springer-Verlag.

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P. and Stewart, L.A., 2015. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic reviews*, [e-journal] 4(1), pp.1-9. https://doi.org/10.1186/2046-4053-4-1

Montelius, S., 2018. *Knowledge Transfer within an International Consultancy Company A case study in a Scandinavian context.* Master›s. Chalmers University of Technology.

Moodley, S., 2017. *The effect of contextual business attributes on the transfer of tacit knowledge in family firms.* PhD. University of Pretoria.

Moshood, T.D., Nawanir, G., Mahmud, F., Sorooshian, S. and Adeleke, A.Q., 2021. Green and low carbon matters: A systematic review of the past, today, and future on sustainability supply chain management practices among manufacturing industry. *Cleaner Engineering and Technology*, [e-journal] 4, p.100144. https://doi.org/10.1016/j.clet.2021.100144

Moshood, T.D., Nawanir, G. and Mahmud, F., 2022. Sustainability of biodegradable plastics: a review on social, economic, and environmental factors. *Critical Reviews in Biotechnology*, [e-journal] 42(6), pp.892-912. https://doi.org/10.1080/07388551.2021.1973954

Nonaka, I. and Takeuchi, H., 1996. The knowledge-creating company: How Japanese companies create the dynamics of innovation. *Long Range planning*, 4(29), p.592. https://doi.org/10.1016/0024-6301(96)81509-3

Nonaka, I., 1994. A dynamic theory of organizational knowledge creation. *Organization science*, 5(1), pp.14-37. https://doi.org/10.1287/orsc.5.1.14

North, K. and Kumta, G., 2018a. Knowledge in organisations. In: *Knowledge Management* (pp. 33-66). Springer, Cham. https://doi.org/10.1007/978-3-319-59978-6_2

North, K and Kumta, G., 2018b. *Knowledge Management: Value Creation through Organizational Learning*. Springer. https://doi.org/10.1007/978-3-319-59978-6

Oliva, F.L. and Kotabe, M., 2019. Barriers, practices, methods and knowledge management tools in startups. *Journal of Knowledge Management,* [e-journal] 23(9), pp.1838-56. https://doi.org/10.1108/JKM-06-2018-0361

Owusu-Manu, D.G., Edwards, D.J., Pärn, E.A., Antwi-Afari, M.F. and Aigbavboa, C., 2018. The knowledge enablers of knowledge transfer: A study in the construction industries in Ghana. *Journal of Engineering, Design and Technology,* [e-journal] 16(2), pp.194-210. https://doi.org/10.1108/JEDT-02-2017-0015

Pandey, K.N., 2016. *Paradigms of Knowledge Management: With Systems Modelling Case Studies-Volume 60*. Springer. https://doi.org/10.1007/978-81-322-2785-4

Patel, B., Guo, M., Izadpanah, A., Shah, N. and Hellgardt, K., 2016. A review on hydrothermal pre-treatment technologies and environmental profiles of algal biomass processing. *Bioresource Technology*, [e-journal] 199, pp.288-99. https://doi.org/10.1016/j.biortech.2015.09.064

Pathirage, C.P., Amaratunga, D.G. and Haigh, R.P., 2007. Tacit knowledge and organisational performance: construction industry perspective. *Journal of Knowledge Management,* [e-journal] 11(1), pp.115-26. https://doi.org/10.1108/13673270710728277

Paulin, D. and Suneson, K., 2015. Knowledge transfer, knowledge sharing and knowledge barriers–three blurry terms in KM. *Leading Issues in Knowledge Management*, 2(2), pp.73-94.

Paulus, T.M. and Bennett, A.M., 2017. I have a love–hate relationship with ATLAS. ti'™: Integrating qualitative data analysis software into a graduate research methods course. *International Journal of Research & Method in Education*, [e-journal] 40(1), pp.19-35. https://doi.org/10.1080/1743727X.2015.1056137

Perrin, A. and Rolland, N., 2007. Mechanisms of intra-organisational knowledge transfer: The case of a global technology firm. *M@n@gement*, 10(2), pp.25-47. https://doi.org/10.3917/mana.102.0025

Pietruszka-Ortyl, A., 2018. The challenges of knowledge transfer in organizations in Poland–discussion on empirical study. In: Verica Babic, ed.2018. *Contemporary Issues in Economics, Business and Management.* Serbia: Faculty of Economics, University of Kragujevac. Ch.39.

Ren, X., Deng, X. and Liang, L., 2018. Knowledge transfer between projects within project-based organizations: the project nature perspective. *Journal of Knowledge Management*, [e-journal] 22(5), pp.1082-1103. https://doi.org/10.1108/JKM-05-2017-0184

Renukappa, S., Suresh, S. and Alosaimi, H., 2021. Knowledge management-related training strategies in Kingdom of Saudi Arabia construction industry: An empirical study. *International Journal of Construction Management*, [e-journal] 21(7), pp.713-23. https://doi.org/10.1080/15623599.2019.1580002

Riggio, M., Alhariri, N. and Hansen, E., 2020. Paths of innovation and knowledge management in timber construction in North America: A focus on water control design strategies in CLT building enclosures. *Architectural Engineering and Design Management*, [e-journal] 16(1), pp.58-83. https://doi.org/10.1080/17452007.2019.1617672

Rotsios, K., Sklavounos, N. and Hajidimitriou, Y., 2021. Successful knowledge transfer in IJVs: the role of trust, partner compatibility and expected benefits. *European Journal of International Management,* [e-journal] 15(4), pp.595–614. https://doi.org/10.1504/EJIM.2021.114625

Sanjeev, M.A. and Surya, A.V., 2016. Two factor theory of motivation and satisfaction: An empirical verification. *Annals of Data Science*, [e-journal] 3(2). https://doi.org/10.1007/s40745-016-0077-9

Sapta, I.K.S., Sudja, I.N., Landra, I.N. and Rustiarini, N.W., 2021. Sustainability performance of organization: Mediating role of knowledge management. *Economies*, [e-journal] 9(3), p.97. https://doi.org/10.3390/economies9030097

Saunders, M., 2011. *Research Methods for Business Students*. 5th ed. London, England: Pearson Education Limited.

Secundo, G., Toma, A., Schiuma, G. and Passiante, G., 2018. Knowledge transfer in open innovation: A classification framework for healthcare ecosystems. *Business Process Management Journal,* [e-journal] 25(1), pp.144-63. https://doi.org/10.1108/BPMJ-06-2017-0173

Senaratne, S., Jin, X. and Denham, K., 2021. Knowledge sharing through social networks within construction organisations: Case studies in Australia. *International Journal of Construction Management,* [e-journal] 1-10. https://doi.org/10.1080/15623599.2021.1966578

Sergeeva, N. and Duryan, M., 2019. Knowledge management as an enabler of sustainable innovation across supply chain in the construction industry. In: *Proceedings of the XXX ISPIM Innovation Conference: Innovation 2019*. 16-18 June 2019. Florence, Italy: ISPIM.

Seuring, S., Müller, M., Westhaus, M. and Morana, R., 2005. Conducting a literature review - The example of sustainability in supply chains. *Research Methodologies in Supply Chain Management,* [e-journal] pp.91-106. https://doi.org/10.1007/3-7908-1636-1_7

Shao, J.J. and Ariss, A.A., 2020. Knowledge transfer between self-initiated expatriates and their organizations: Research propositions for managing SIEs. *International Business Review*, [e-journal] 29(1), p.101634. https://doi.org/10.1016/j.ibusrev.2019.101634

Shen, H., Li, Z. and Yang, X., 2015. Processes, characteristics, and effectiveness: An integrative framework for successful knowledge transfer within organizations. *Journal of Organizational Change Management*, [e-journal] 28(3), pp.486-503. https://doi.org/10.1108/JOCM-12-2013-0251

Shin, M., Holden, T. and Schmidt, R.A., 2001. From knowledge theory to management practice: Towards an integrated approach. *Information Processing & Management*, [e-journal] 37(2), pp.335-55. https://doi.org/10.1016/S0306-4573(00)00031-5

Styhre, A. and Gluch, P., 2010. Managing knowledge in platforms: Boundary objects and stocks and flows of knowledge. *Construction Management and Economics*, [e-journal] 28(6), pp.589-99. https://doi.org/10.1080/01446190903450061

Sun, J., Ren, X. and Anumba, C.J., 2019. Analysis of knowledge-transfer mechanisms in construction project cooperation networks. *Journal of Management in Engineering*, [e-journal] 35(2), p.04018061. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000663

Szulanski, G., 2000. The process of knowledge transfer: A diachronic analysis of stickiness. *Organizational Behavior and Human Decision Processes*, [e-journal] 82(1), pp.9-27. https://doi.org/10.1006/obhd.2000.2884

Tafkov, I., Towry, K. and Zhou, F.H., 2022. The Impact of knowledge transfer on investment in knowledge creation in firms. *Contemporary Accounting Research*, [e-journal] 39(2), pp.1260-96. https://doi.org/10.1111/1911-3846.12738

Tan, W., 2015. Knowledge management in the construction industry: The strategy of Singapore. *International Journal of Construction Management*, [e-journal] 15(1), pp.10-16. https://doi.org/10.1080/15623599.2015.1012138

Thomas, N., 2019. Two aspects of knowledge transfer: what every manager should know about using analogy and narrative. *Development and Learning in Organizations: An International Journal,* [e-journal] 33(1), pp.12-15. https://doi.org/10.1108/DLO-04-2018-0046

Thörnberg, M. and Dusén, A., 2021. Knowledge transfer & role identity: A case study within the client-consultant relationship. Available at: https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1559917&dswid=-7061

Thornhill, A., Saunders, M. and Lewis, P., 2009. *Research methods for business students*. Pearson Education Ltd.

Tornjanski, V., Petrovic, D. and Nesic, S., 2020. Effectiveness of knowledge transfer between project team members in digitally disrupted organizations. *Management: Journal of Sustainable Business and Management Solutions in Emerging Economies*, [e-journal] 25(2), pp.1-14. https://doi.org/10.7595/management.fon.2018.0034

Tranfield, D., Denyer, D. and Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, [e-journal] 14(3), pp.207-22. https://doi.org/10.1111/1467-8551.00375

Uusitalo, P. and Lavikka, R., 2021. Technology transfer in the construction industry. *The Journal of Technology Transfer*, [e-journal] 46(5), pp.1291-1320. https://doi.org/10.1007/s10961-020-09820-7

Van Egmond, E. and Erkelens, P., 2007. Technology and knowledge transfer for capacity building in the Ghanaian construction building. In: *Proceedings of the CIB World Building Congress, Cape Town, South Africa.* pp.14-17.

Vance, C.M. and McNulty, Y., 2014. Why and how women and men acquire global career experience: A study of American expatriates in Europe. *International Studies of Management & Organization*, [e-journal] 44(2), pp.34-54. https://doi.org/10.2753/IMO0020-8825440202

Vlajčić, D., Caputo, A., Marzi, G. and Dabić, M., 2019. Expatriates managers' cultural intelligence as promoter of knowledge transfer in multinational companies. *Journal of Business Research*, [e-journal] 94, pp.367-77. https://doi.org/10.1016/j.jbusres.2018.01.033

Wall, A. and Lippel, R., 2020. Knowledge transfer success-How to facilitate effective knowledge transfer to prevent recurring quality issues. Available at: https://hdl.handle.net/20.500.12380/300674.

Wang, Q.E., Zhao, L., Chang-Richards, A., Zhang, Y. and Li, H., 2021. Understanding the impact of social capital on the innovation performance of construction enterprises: Based on the mediating effect of knowledge transfer. *Sustainability*, [e-journal] 13(9), p.5099. https://doi.org/10.3390/su13095099

Warrick, D.D., 2017. What leaders need to know about organizational culture. *Business Horizons*, [e-journal] 60(3), pp.395-404. https://doi.org/10.1016/j.bushor.2017.01.011

Wehn, U. and Montalvo, C., 2018. Knowledge transfer dynamics and innovation: Behaviour, interactions and aggregated outcomes. *Journal of Cleaner Production*, [e-journal] 171, pp.S56-S68. https://doi.org/10.1016/j.jclepro.2016.09.198

Wei, Y. and Miraglia, S., 2017. Organizational culture and knowledge transfer in project-based organizations: Theoretical insights from a Chinese construction firm. *International Journal of Project Management*, [e-journal] 35(4), pp.571-85. https://doi.org/10.1016/j.ijproman.2017.02.010

Welch, D.E. and Welch, L.S., 2008. The importance of language in international knowledge transfer. *Management International Review*, [e-journal] 48(3), pp.339-60. https://doi.org/10.1007/s11575-008-0019-7

Wiewiora, A., Trigunarsyah, B., Murphy, G. and Coffey, V., 2013. Organizational culture and willingness to share knowledge: A competing values perspective in Australian context. *International Journal of Project Management*, [e-journal] 31(8), pp.1163-74. https://doi.org/10.1016/j.ijproman.2012.12.014

Williams, J., Fugar, F. and Adinyira, E., 2021. Exploring enablers of health and safety knowledge transfer from construction companies to project host communities. *International Journal of Construction Management*, [e-journal] pp.1-9. https://doi.org/10.1080/15623599.2021.2006417

Woo, J.H., Clayton, M.J., Johnson, R.E., Flores, B.E. and Ellis, C., 2004. Dynamic Knowledge Map: reusing experts' tacit knowledge in the AEC industry. *Automation in Construction*, [e-journal] 13(2), pp.203-07. https://doi.org/10.1016/j.autcon.2003.09.003

Yoo, T., 2020. How to use language agents for knowledge transfer? Evidence from translators and multinational organizations in Korea. *Journal of Knowledge Management*, [e-journal] 24(4), pp.899-919. https://doi.org/10.1108/JKM-09-2019-0498

Zebal, M., Ferdous, A. and Chambers, C., 2019. An integrated model of marketing knowledge - A tacit knowledge perspective. *Journal of Research in Marketing and Entrepreneurship*, [e-journal] 21(1), pp.2-18. https://doi.org/10.1108/JRME-03-2018-0018

Zhao, S., Jiang, Y., Peng, X. and Hong, J., 2020. Knowledge sharing direction and innovation performance in organizations: do absorptive capacity and individual creativity matter? *European Journal of Innovation Management*, [e-journal] 24(2), pp.371-94. https://doi.org/10.1108/EJIM-09-2019-0244

Zhou, Q., Deng, X., Hwang, B.G. and Ji, W., 2020. Integrated framework of horizontal and vertical cross-project knowledge transfer mechanism within project-based organizations. *Journal of Management in Engineering*, 36(5), pp.1-15. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000828

Zimpel-Leal, K. and Lettice, F., 2021. Generative mechanisms for scientific knowledge transfer in the food industry. *Sustainability*, [e-journal] 13(2), p.955. https://doi.org/10.3390/su13020955