SYSTEMATIC LITERATURE REVIEW ON COMMUNICATION IN CONSTRUCTION PROJECT MANAGEMENT: ISSUES AMONG PROJECT PARTICIPANTS

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ABSTRACT

Project communication is an important aspect that needs to be stressed in project management to ensure good project delivery in the construction industry. All the key players in construction must represent a good communication flow among themselves to avoid misunderstanding that later will affect their performance and reputation. However, there are still have issues among themselves while communicating. These communication issues are not only happening in Malaysia but in many other developing countries that are involved in the construction industry. However, there are insufficient studies on these communication issues involving project participants. Hence, the present article employs a systematic literature review to determine the issues of communication among project participants in the construction industry. The study was combined many research designs and the review was referring to ROSES (Reporting Standards for Systematic Evidence Syntheses) protocols. This research employs a systematic literature review of selected published indexed journals from Web of Science and Scopus. The findings identified several communication issues that can be categorized into different themes, which are; (1) accuracies, (2) timeliness, (3) distortions, (4) barriers, (5) under loading, (6) overloading, (7) misunderstanding, (8) gatekeeping, (9) procedures, and lastly (10) financial. Furthermore, the study also presented several significant contributions for practical purposes and a body of knowledge. The findings also described the importance of good strategies to overcome the communication issues and to look at the potential impact of those solutions on the whole progress of the projects.

Keywords: Project Management, Communication, Construction, Systematic Literature Review, Impact

1. INTRODUCTION

Project management is the adaptation of information, expertise, resources, and strategies to project actions so that stakeholder needs and aspirations are met or exceeded (Darwish, 2017). In project management, the works will go through several phases: project initial phase, planning phase, implementation phase, and closing phase. These phases are called as project management life cycle. The performance of all projects depends on the smooth delivery of each phase in the project lifecycle and the proper application of project management. Therefore, any project's performance is heavily reliant on successful project management practices. As a result, project management is commonly used in the construction industry. All project management phases must be handled well and followed accordingly to achieve effective project management. Failure to practice good project management will lead to project delays as a whole. There are many researchers conducted in identifying the factors contributing to project failure and delay in developing countries and some other developed countries. In Egypt, for example, studies conducted by Abd El-Razek et al., (2008) in building construction found out that among the factors of project delay are delay in contractors' payment, design changes by owners or their agents, and financing by contractors during construction. Aziz and Abdel-Hakam (2016) carried out a different study which discovered that limited contractor exposure, bad site administration and monitoring by contractors, destitute execution by subcontractors, as well as lack of financial allocation for apparatus are the reasons behind the delay of infrastructure work.

Nevertheless, research carried out by Khoshgoftar et al. (2010) in Iran produced somewhat dissimilar causes of work delay; poor organization, site administration, contract administration, and little communication involving both sides. Rafieizonooz et al. (2015) too discovered nearly the same reasons which lead to work delay in Iran: little commitment, unsuccessful site management, bad site administration, and poor interaction between parties. According to Bajjou & Chafi, (2020), lack of training for employees, lack of planning and unskilled workforce, and ineffective planning and scheduling are several factors that cause project failure in Morocco. In India, project objectives cannot be achieved successfully due to lack of contractor motivation, inappropriate or outdated construction methods, lack of safety precautions, low productivity of labor and lack of communication, and sub-standard contract (Doloi et al., 2012). Research conducted by Orangi et al. (2011) in a developed country (Australia) found out that design changes and mistakes, lack of communication between designers and contractors, and client and project team contributed to delays in pipeline projects. In Malaysia, among the factors that lead to project delay in the construction industry identified by many studies are; changes order, contractor experience, financial and coordination problems, labor productivity, ineffective planning and scheduling, communication among project participants (Abdul Kadir et al., 2005; Sambasivan & Soon, 2007; Alaghbari et al., 2007; Hamzah et al., 2012; Yap et al., 2019). Even though several researchers in different countries identified many factors contributing to project delay, not all factors proceed for in-depth studies on this factor.

One of the factors is communication. Communication is a broad aspect need to consider by all the project parties in the construction industry. Every project's success depends on effective communication; thus, the project parties cannot overlook this aspect. It is crucial to ensure that all parties involved in the construction project receive timely information. (Safapour et al., 2020). Project communication also concerns how communication should be carried out by the organization's key players, mainly internal and external employees. Müller and Turner (2010) suggested that communication must be further probed into as it is a crucial area in project administration. Communication skills are vital in advancing any project in which project management seems to have been carried out. The communication aspect is significant for success, particularly in large projects. When broader and more complicated the communications are, the more influential the final result is (Johannessen & Olsen, 2011). Internal and external contacts are significant for the success of projects. External communication is linked to information flow management or communication management to meet external stakeholders' needs (Johannessen & Olsen, 2011). When the projects' complexity is minimal, the understanding of communication is utilizable, where internal and external communication increases when the exchange rate is high. This author also addressed the critical reason for a project's failure, highlighted the lack of leadership (coordination, preparation, and technological solutions), the resistance to substantial, insufficient resources, and evolving priorities. Project communication indicated that the project's scope and pace of change would change as the project's social needs are changed. It shows that the communication process and elements must align with the changes of the technology and the demand of the project communication players (sender and receiver) regarding the communication tools that they are comfortable using and at the same time effective to everyone. Larger projects require more coordination processes to deal with systematic dependency. One of the industries that need a consistent communication procedure for both internal and external employees is the construction industry. Internal communication helps project team members to discuss project goals and scope early on in the planning stage. All project members, on the other hand, must ensure that the details of the activities are well known to external participants.

1.1 Research gap - current research on communication problems in the construction industry faced by project participants

The central idea of this study is led by the numbers of issues involved in the project construction industry determined by several papers (Zidane & Andersen, 2018; Shah, 2016; Tawil et al., 2014; Santoso & Soeng, 2016; Durdyev & Hosseini, 2019; Oshungade & Kruger, 2017; Aziz & Abdel-Hakam, 2016; Nyoni & Bonga, 2017; Nawi et al., 2016; Banobi & Jung, 2019; Gamil & Rahman, 2017; Olanrewaju et al., 2017; Gómez-ferrer, 2017; Alzeraa et al., 2018). Those studies identified many issues and one of the issues is communication. Communication is important not only in the construction industry but also in other industries. Problems in communication can lead to many problems such as misunderstanding, poor cooperation, late response, less feedback, the uncertainty of feedback, the poor relationship among employees, and many more (Gamil & Rahman, 2017; Olanrewaju et al., 2017; Alzeraa et al., 2018). Although there are many studies related to communication issues in construction, those studies fail to address the specific problems faced by all the project participants for both internal and external stakeholders of the project while not classifying all the communication issues identified as a specific group. Once the organization identified each problem specifically, it is much better if those problems were classified into several groups. Hence, easier to monitor and improve the problem based on classified communication issues. However, if the project participants do not explicitly address the communication issues, it will be challenging to find an effective solution to reduce this problem. Additionally, existing studies also do not state the solution for each problem identified in communication (Alzeraa et

al., 2018; Berenger & Agumba, 2016; Maqbool, 2018) to confuse the project participants in searching for the solutions to communication issues. Therefore, it is essential to correct these flaws in the literature, specifically considering the communication issues related to construction among all internal and external stakeholders (Johannessen & Olsen, 2011). Hence, this review paper is conducted. The review is directed by a fundamental research question- What are the communication issues faced by project participants in the construction industry? This study aims to fill the gap by review systematically the earlier related studies to gain more understanding of identifying the specific communication issues involved in the construction industry. The reasons to choose communication issues as the main idea in this SLR is because the communication issues are not widely discussed by the researchers even though communication is among the top five factors that lead to the construction project delay (Project Management Institute, 2014; Amade et al., 2015; Riazi & Nawi, 2018; Durdyev & Hosseini, 2019). The researcher is more focused on the other factors that might affect project delivery as wholes such as financial, design changes, lack of materials, and payment delays (Zidane & Andersen, 2018; Shah, 2016; Durdyev et al., 2017). Therefore, this study aims to look at the specific problems that lead to communication issues in the construction industry. By identifying the specific issues, the problems can be avoided and the project delivery can be improved. To answer the research question, a systematic literature review is conducted in this study. This is because SLR is more effective than conventional literature reviews as this SLR might reduce the probability of bias by using a pre-defined, transparent, and replicable methodology (Mengist et al., 2020). In addition, SLR has the advantage of using unique content parameters when searching for primary publications by known search engines. This method differs significantly from the traditional literature reviews that we used previously. As a result, this SLR was employed to identify the communication challenges faced by the project participants in the construction industry, the effects of these issues, and possible solutions to reduce these problems. This SLR selected journals about this matter from two high indexed databases; Web of Science and Scopus.

2. METHODOLOGY

2.1 The review procedure – ROSES

Systematic literature review (SLR) differs from traditional narrative reviews by adopting replicable, scientific and transparent producers. It helps collect all related publications and documents that fit our pre-defined inclusion criteria to answer a specific research question. It uses straightforward and systematic procedures to minimize bias during searching, identification, appraisal, synthesis, analysis, and summary of studies (Mengist et al., 2020). According to Pussegoda et al. (2017), it is necessary to have a transparent reporting system when conducting a literature review. Also, a good review will fail if there is no transparent reporting. As a result, their effectiveness in decision-making is jeopardized due to methodological flaws (Haddaway et al., 2018). The analysis protocol that directed the present study is ROSES, Reporting Standards for Systematic Evidence Syntheses. According to Haddaway et al. (2018), ROSES was created primarily for scientific assessment and concern in management. . ROSES focuses on the early and middle phases of the review process, i.e., searching, sampling, retrieving data, and critical evaluation, although there is little information on the synthesis. This is a necessary feature of a form that strives to apply to a broad range of synthesis methods. This versatility is believed as a critical strength of ROSES. In any systematic analysis, synthesis is a highly complex and context-specific method. It would be unusable and impractical to create a universally applicable reporting standard for all possible synthesis types. ROSES seeks to enable researchers to ensure that they provide the right information with the correct level of detail. This is indeed a necessary feature of a system that strives to apply to a broad range of synthesis techniques. ROSES is thought to have an essential quality in its flexibility. According to Haddaway et al., (2018), each systematic research uses a highly dynamic and context-specific method called synthesis. Creating a widely acceptable reporting standard for all conceivable synthesis forms would be useless and impractical. ROSES aims to make it easier for researchers to provide the correct details at the right level of detail (Mohamed Shaffril et al., 2020). The authors began their SLR based on this analysis protocol by formulating relevant research questions for the review. The authors then described the systematic search strategy, which consists of three main sub-processes, namely detection, screening, and eligibility (inclusion and exclusion criteria). The authors then proceeded to evaluate the quality of the selected articles, whereby the authors described the technique applied to ensure that the articles to be reviewed are of quality. Ultimately, the authors explained how the study's data was abstracted, interpreted, and validated (Mohamed Shaffril et al., 2020). The authors then moved on to assess the content of the chosen papers, describing the method they used to ensure that the articles examined were of high quality.

2.1.1 Research question formulation

The PICo method was used to formulate the research question for this analysis. PICo is a method that

writers can use to help them come up with a good research subject for their study (Mohamed Shaffril, Samsuddin, et al., 2020). The basis of Pico developed through several main concepts which are; population or issue, interest (topic concern), and context (scope). Therefore, based on these principles, three critical aspects included in the review are project team and project participants (population), communication issues (interest), and construction industry (context). These aspects direct the authors to formulate their central research question. Hence, the research question for this paper is: (1) What are the communication issues faced by project participants in the construction industry?

2.1.2 Strategies for systematic searching

The key steps for systematic searching techniques are as follows:

i. Searching

Searching is the first crucial step in conducting SLR. In the first stage, several keywords were selected to search for related studies from the database in the search string. Two databases; Web of Science and Scopus, provided the literature resources for this study. These databases were selected because they offer the most inclusive social science coverage (Norris & Oppenheim, 2007). For example, the Web of Science provides more than 100 million articles in 33,000 articles and 5,200 social science publications (Analytics, 2017).

On the contrary, Scopus is comprised of 21 educational institutes and encompasses beyond 300 librarians and academicians (Burnham, 2006). As suggested by Okoli (2015), the keywords are established based on the research question. Mongeon & Paul-Hus, (2016) agree that Scopus and WoS in databases have broad coverage, looking not just for science and technology but also for social sciences. Furthermore, both databases can be lead databases due to many advantages they have in a systematic literature review, such as advanced search functions, extensive papers (indexing more than 5000 publishers), and monitoring of the content. Table 1 illustrates a thorough search string. The search procedure in the two databases produced an amount of 225 documents.

Table 1: The search string

Database	Search string
Scopus	TITLE-ABS-KEY ((“communication problem” OR “communication issue” OR “information delivery”) AND (“construction project participants” OR “project team” OR “project manager”))
Web of Science	TS= ((“communication problem” OR “communication issue”) AND (“construction project participation” OR “project team” OR “project manager”) AND (“construction industry”))

ii. Screening (including eligibility)

Based on the database's sorting function, this study automatically screened all 225 selected papers. As it is quite difficult for all of the available journals to be reviewed by researchers, Okoli (2015) suggested that they could review according to the selected time phases. Concerning the search strings, the Scopus and Web of Science websites generated 65 and 160 research papers, accordingly. Only one paper was marked as similar during the screening process, and it appeared on both websites. Referring to the search process on the selected database, the number of studies related to communication problems in the construction sector among the project participants has increased since 2016. According to Higgins et al., (2018), the publication timeframe restriction should be allowed if it is known that similar research would only be published within a specific time frame. Hence, the authors decided to extract articles from five years back, 2016 until 2020. These selected years were chosen as these had the current articles published by other authors, and most of the data are considered new and updated. Consequently, the time phase between 2016 and 2020 was selected among the criteria to be considered. Just articles that contain statistical analysis and are featured in journals were emphasized to ascertain the precision of the reviews. To prevent any misunderstandings, only journal papers written in English from all fields of study were included in the analysis. Hence, after the removal of 161 irrelevant articles, only 63 papers remained for the next step. The next step is to determine eligibility. The authors manually checked the recovered papers to ensure that all of the articles that remained after the screening phase met the requirements. The title and abstract of the papers were read as part of this process. This process excluded 43 papers due to different research scopes. Therefore, there were only 17 papers chosen for the next step.

iii. Synthesis (including quality appraisal and data abstraction and analysis)

After the screening process, the 17 papers were continued for synthesis. The quality appraisal is crucial to look at the quality numbers of the selected articles to be evaluated for this study. This process is conducted by investigating other SLR papers that use the same method. To conclude a particular investigation field using systematic reviews, a small number of articles are needed based on the study by Mohamed Shaffril et al. (2019). According to Robinson and Lowe (2015) in Haris et al. (2020), the recommended papers are within 10 to 15 papers for a systematic review, while Mohamed Shaffril et al., (2019) reviewed a total of 18 articles in their study (Haris et al., 2020). A total number of 19 journals were reviewed by Haris et al., (2020) for their report. Thus, the screening process led to a relatively small number of papers which was still considered adequate for the systematic literature review. The total number of articles selected for this paper is 17 articles. The next step is data abstraction and analysis. The research process involved assessing and extracting relevant information from synthesized data and the conclusion of selected papers. Descriptive and inferential statistical methods will be used to evaluate the data from the selected list of publications. Synthesizing or assessing consolidative information via a qualitative or mixed-mode approach is the most recommended strategy (Mohamed Shaffril et al., 2020). The current research chose the qualitative approach, where 21 papers were extensively read by the researcher in the abstract, findings, and discussion pages. For further analysis, the final list of publications that were found to be significant was downloaded. The papers used about 9.3 percent of articles from the original total publications in the databases for further investigations. Henceforth, this analysis employed a bigger sample size than Perevochtchikova et al. (2019) and Yang et al. (2018) as they utilized 0.7% and 2.8% of the actual amount of articles in the databases regularly (Mengist et al., 2020). The systematic study was qualitatively carried out using thematic analysis for this thesis. This technique allows the arrangement of large data volumes. It also allows researchers to construct a systematic and rational study using a well-organized methodology (King et al., 2004). Thematic analysis is a productive approach to study to discover more about people's behaviors. It has different methods, but the most common method follows a six-step procedure: adjustment, coding, creating themes, reviewing themes, defining and identifying themes, and finally writing up (Simwaka et al., 2020). In this study, the researchers followed these steps accordingly. The ROSES flow diagram of systematic searching strategies in this SLR paper is shown in Figure 1.

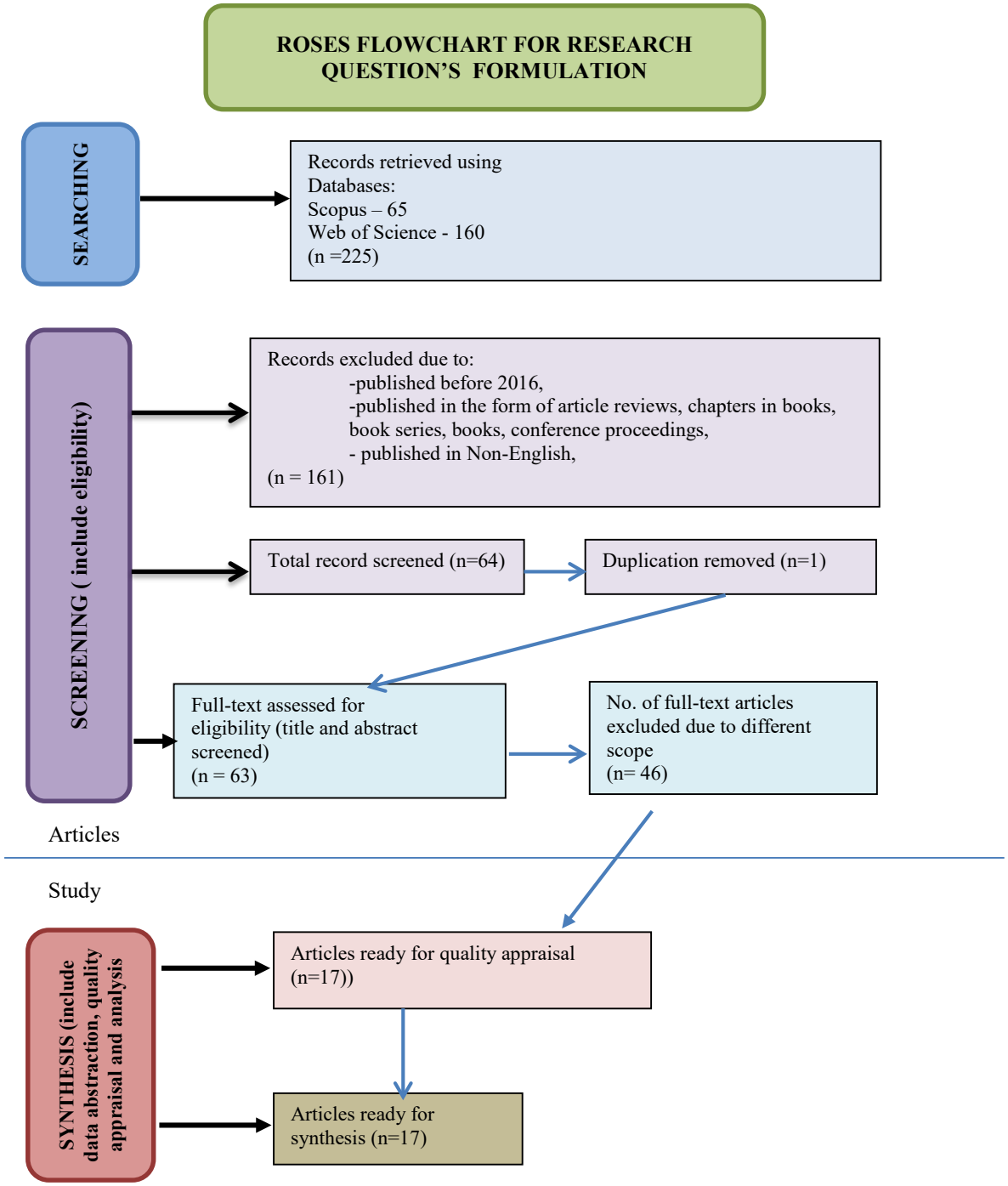

Figure 1: ROSES flow diagram adopted and modified from (Sordello et al., 2020)

3. RESULTS

3.1 Background of studies

The full number of chosen articles was 17 articles. These 17 articles have been classified into several groups, such as based on years, organization types, and types of research methods conducted by the researchers in these selected articles.13 studies focused on private sector respondents, while only one study was conducted in the public sector. The remaining three studies had a combination of respondents from various public and private sectors, NGOs, international, and joint ventures. 10 studies employed a quantitative approach, four studies applied a qualitative

method, and the remaining three studies used a mixed-method technique. The details of these groups were recorded in Table 2. In addition, the fluctuating numbers of total articles selected for this SLR from 2016 until 2020 are recorded in Figure 2.

Table 2: Summary of Background of Studies

No.	Author (s)	Year	Organization Types			Research Method		
			Private	Public	NGO, Joint Venture, International	Quantitative	Qualitative	Mixed-method
1.	Nasirzadeh et al.	2020	/				/	
2.	Kania et al.	2020	/			/		
3.	Khoury	2019	/					/
4.	Pandit et al.	2019	/			/		
5.	Akunyumu et al.	2019	/			/		
6.	Ballesteros-Sánchez et al.	2019	/	/	/			/
7.	Kwofie et al.	2019	/	/		/		
8.	Castillo et al.	2018	/			/		
9.	Eze et al.	2018	/			/		
10.	Pozin, Nawi, Lee, Yaakob, & Hanafi	2018	/				/	
11.	Tran et al.	2017	/					/
12.	Boon Hui, Abdul-Rahman, & Chen	2017	/				/	
13.	Badi & Diamantidou	2017	/			/		
14.	AL Mousli & El-Sayegh	2016		/		/		
15.	Senaratne & Ruwanpura	2016	/	/			/	
16.	Zulch	2016	/			/		
17.	Chalker & Loosemore	2016	/			/		

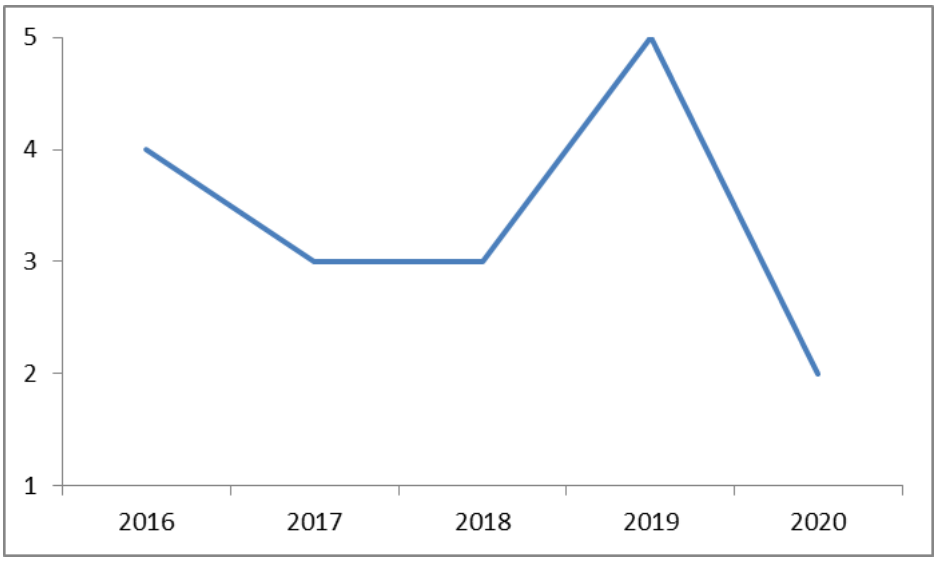

Figure 2: Year of Publication

3.2 The themes

From 17 selected papers, 10 themes were identified in this SLR paper. The themes are accuracies, timeliness, distortions, barriers, underloading, overloading, misunderstanding, gatekeeping, procedures, and financial. These themes are communication problems found in these 17 articles using thematic analysis. These communication problems were identified during the synthesizing stage and each of the selected articles was evaluated thoroughly to come out with the themes. After that, thematic analyses were conducted to make it more specific. Table 3 shows the summary of the themes.

i. Accuracies

Accuracy in communication is essential to ensure that any misunderstandings in interpreting the messages do not happen. All the information received by the receiver must be the same as the messages sent by the sender. Most of the communication problems in construction are caused by inaccuracies of information among the team members. This paper highlighted 13 articles that show accuracies as one of the communication problems in various construction projects. These articles were written by (Kania et al., 2020; Khoury, 2019; Pandit et al., 2019; Ballesteros-Sánchez et al., 2019; Castillo et al., 2018; Kwofie et al., 2019; Eze et al., 2018; Tran et al., 2017; Yap et al., 2017; Al Mousli and El-Sayegh, 2016; Senaratne and Ruwanpura, 2016; Zulch, 2016; Chalker and Loosemore, 2016).

ii. Timeliness

Based on the Communication Theory, communication barriers are of different kinds and possess various characteristics, including environmental and physical barriers. Time is considered one of these communication barriers as it is the barrier to creating quicker and faster communication channels. Several articles found that timeliness contributes to significant communication problems in construction projects (Kania et al., 2020; Akunyumu et al., 2019; Kwofie et al., 2019; Eze et al., 2018; Tran et al., 2017; Yap et al., 2017; Al Mousli & El-Sayegh, 2016; Senaratne & Ruwanpura, 2016; Chalker & Loosemore, 2016; Badi & Diamantidou, 2017).

iii. Distortions

Distortion is a consequence of communication where the recipient reconstructs the meaning of the message, and the original, intended meaning of a message is replaced with a new interpretation. This problem might give a different meaning to the message and leads to the wrong action by the receiver. Khoury, (2019) and Kwofie et al., (2019) identified this distortion as one of the communication problem indicators in their findings.

iv. Barriers

Communication barriers may include something that prevents or disables communicators from sending the correct message at the right time to the right person or a recipient from receiving the correct message at the right time. This can be categorized into three main categories: physical communication barrier, emotional communication barrier, and language communication barrier. The articles that identified barrier as one of their communication problems in this review are (Nasirzadeh et al, 2020; Khoury, 2019; Akunyumu et al., 2019; Kwofie et al., 2019; Eze et al., 2018; Pozin et al., 2018; Yap et al., 2017; Al Mousli and El-Sayegh, 2016; Zulch, 2016; Chalker and Loosemore, 2016).

v. Underloading

Underloading is one of the communication issues that determines the communication problems faced by the project participants (Kwofie et al., 2019). Under loading in communication can be described as weak communication flow between the sender and the receiver. In construction projects specifically, communication is significant to both sender and receiver.

vi. Overloading

Overloading can lead to multiple tasks where a project's actual progress may be affected if those tasks fail to be managed. When it comes to overloading in a project, communication plays a vital role in ensuring all the tasks follow the duration accordingly. This communication issue was found in articles by Kwofie et al. (2019).

vii. Misunderstanding

One of the severe issues in communication is misunderstanding. The project team usually faces this problem where the project participants misunderstand the instructions and information, which can negatively affect the whole project. Several articles found this problem as one of the communication indicators (Nasirzadeh et al., 2020; Kania et al., 2020; Pandit et al., 2019; Akunyumu et al., 2019; Ballesteros-Sánchez et al. 2019; Kwofie et al., 2019; Castillo et al., 2018; Eze et al., 2018; Pozin et al., 2018; Tran et al., 2017; Yap et al., 2017; AL Mousli & El-Sayegh, 2016; Zulch, 2016; Chalker & Loosemore, 2016).

viii. Gatekeeping

Gatekeeping is the process of deciding what information should be gathered, analyzed, and eventually exchanged. Since so many activities (journalism, public relations, marketing, advertisement, and politics, to name a few) disseminate information to communicate with the critical public through communication networks, the idea of gatekeeping has gained widespread application in communication. (Erzikova, 2018). These authors also found that gatekeeping is one of the communication problems in their studies; (Akunyumu et al., 2019; Ballesteros-Sánchez et al., 2019; Kwofie et al., 2019; Eze et al., 2018; Tran et al., 2017; Senaratne and Ruwanpura, 2016; Zulch, 2016; Badi & Diamantidou, 2017 and Chalker and Loosemore, 2016).

ix. Procedures

According to Gamil and Rahman (2017), the unavailability of communication systems and channels can create problems for the project, especially for the project team members. Therefore, the organization must ensure that its staff is well-equipped with complete procedures and explicit directions to ensure that contact between team members runs smoothly. As for this review, 12 articles stated that procedure is one of the main difficulties affecting communication in the construction business (Nasirzadeh et al., 2020; Khoury, 2019; Akunyumu et al., 2019; Castillo et al., 2018; Kwofie et al., 2019; Eze et al., 2018; Pozin et al., 2018; Tran et al., 2017; Yap et al., 2017; Senaratne & Ruwanpura, 2016; Zulch, 2016; Chalker & Loosemore, 2016; Badi & Diamantidou, 2017).

x. Financial

Financial is considered as one of the indicators of communication problems for this SLR. The research conducted by Kania et al. (2020), Castillo et al. (2018), Eze et al. (2018), and Yap et al. (2017) found that one of the communication problems faced by the project team and other participants are related to financials such as cost deviation budget and insufficient funds. These problems lead to a more significant impact on the communication process. Table 3 shows the summary of communication problems identified in this SLR.

Table 3: Summary of the Communication Problems

No.	Author (s)	Year	Communication Problem Indicators									
			Accuracies	Timeliness	Distortions	Barriers	Under loading	Overloading	Misunderstanding	Gatekeeping	Procedures	Financial
1.	Nasirzadeh et al.	2020				/			/		/	
2.	Kania et al.	2020	/	/					/			/
3.	Khoury	2019	/		/	/					/	
4.	Pandit et al.	2019	/						/			
5.	Akunyumu et al.	2019		/		/			/	/	/	
6.	Ballesteros-Sánchez et al.	2019	/						/	/		
7.	Kwofie et al.	2019	/	/	/	/	/	/	/	/	/	
8.	Castillo et al.	2018	/						/		/	/
9.	Eze et al.	2018	/	/		/			/	/	/	/
10.	Pozin et al., Nawi, Lee,	2018				/			/		/	
11.	Tran et al.	2017	/	/					/	/	/	
12.	Yap et al.	2017	/	/		/			/		/	/
13.	Badi & Diamantidou	2017	/	/						/	/	
14.	AL Mousli & El-Sayegh	2016	/	/		/			/			
15.	Senaratne & Ruwanpura	2016	/	/						/	/	
16.	Zulch	2016	/			/			/	/	/	
17.	Chalker & Loosemore	2016	/	/		/			/	/	/	

4. DISSCUSSION

To make sense of the extant literature and understand how the communication issues might impact the construction, a systematic literature review (SLR) study of communication issues was conducted. The thematic analysis established 10 themes in this paper; accuracies, timeliness, distortions, barriers, under loading, overloading, misunderstanding, gatekeeping, procedures, and financial. This section presented a further discussion of the identified themes that expanded to their impact and also solutions to reduce the communication issues among project participants in the project.

From all the communication issues identified, the study also determined the impact of the issues on the project. This impact must be well addressed by the project participants to avoid the same problems that might happen in the future. One of the significant impacts according to Nasirzadeh et al. (2020) is labor productivity. In their study, the respondents believe that their labor productivity is affected by the project team's communication problems and project participants with foreign workers. According to the study conducted by Kania et al. (2020), the impact of these issues can be seen from several angles including the developer, communication, decisiveness, workplace health and safety, knowledge management, construction crew and equipment performance, planning, risk management, and also team management. This differs from the study conducted by Khoury (2019) as the communication problems here involve geographical boundaries, daily language, team structure, IT skills, innovation, people, learning curve, and also distinct roles. The communication issues that are related to these impacts are inaccuracies, timeliness, barriers, misunderstanding, and financial.

Besides that, the impact of communication problems such as gatekeeping and, procedures can lead to poor safety communication in the construction industry among employers, contractors, and supervisors (Pandit et al., 2019). The information must be exchanged efficiently at the crew level. A synergistic effect exists between the safety climate and crew-level cohesion which is related to the overall communication. Another impact that can be found in this study is the poor connection among team members (Al Mousli & El-Sayegh, 2016; Jadhav, 2018; Nasirzadeh et al., 2020; Gamil & Rahman, 2017). Al Mousli and El-Sayegh (2016) found that the chance of success in construction projects is lowered as the project time, cost, and quality are affected when there are communication problems involved. Jadhav, (2018) stated that the key reasons behind all of the causes of delays in his study are lack of communication and disagreement between project members. Nasirzadeh et al., (2020) found that the project team's main communication problem and participants in an Australian building construction project are communication problems with the foreign workers. Language and cultural differences, limited abilities and participation, fatigue, inadequate monitoring in organizing and work arrangements, award rates, and interaction difficulties with imported workers are some of these issues (Nasirzadeh et al., 2020). These findings are similar to the study conducted by Gamil & Rahman, (2017), where language barriers, inappropriate communication barriers, culture among project teams and staff, and varying education levels are among the problems that cause project delays in construction.

Furthermore, the communications issues identified in this SLR also reflected the whole progress of the project. According to Ballesteros-Sánchez et al., (2019), the communication issues specifically the teamwork and communication insecurity between team members and project managers. Another crucial issue emphasized by the author is that data must be open and complete for the project team to access at all times. To avoid errors and construction deviations, Eze et al., (2018) stressed the essential of clarity, efficacy, and timeliness of instruction and dissemination of knowledge among project participants and the participation of contractors, subcontractors, and other stakeholders in the design phases. Castillo et al., (2018) found the project's budget and financial inefficiency are related to financial and procedures themes among the team members. Eze et al. (2018) also found that insufficient funds allocated to site investigations and wrong timing and money spent during brief project development are related to financial problems as determined in this SLR. Other problems identified as the critical factors responsible for rework incidences on construction work in his study are poor communication with the architects and engineers (design consultants), non-compliance with the specification, lack of knowledge and inexperience of the construction process, the low skill level of labor, and poor communication amongst project participants. These problems are mostly related to inaccuracies, timeliness, and misunderstanding. Al Mousli and El-Sayegh (2016) stated that of the many interaction problems discovered in their reports are little collaboration and communication among the prominent contracting sides, as well as poor management inside the design firm, limited expertise in construction management, a poorly constructed agreement, a shortage of work management as an autonomous qualified service, and limited time for the process of designing. As communication becomes crucial day by day, several approaches need to be taken to mitigate some communication issues, especially for project participants.

The strategies must be developed based on the current problems and must be frequently updated if there are new problems identified. The solution also must be developed compatible with the updated problems and impact

to avoid some other problems in the future. Fail to do so might put the project progress at high risk and overall performance will be troubled. All of the identified impacts from these 17 selected articles are related to the themes developed and thus this communication must be eliminated or reduced to ensure better project delivery in the future. This study recommended several solutions to reduce the impacts of the identified communication problems in the project. Nasirzadeh et al. (2020) proposed using a system thinking approach to reduce the impact of communication problems among foreign workers in Australian building construction. This approach identifies the root causes of decreasing labor productivity and determines the most efficient strategy to enhance labor productivity. Hence, it is believed that a positive impact on a project from improving geographical boundaries, having a common language, enhancing team structure, developing IT skills, encouraging innovation, nurturing people, improving the learning curve, and identifying distinct roles to promote better communication, support coordination, and maintain high morale among the project participants. According to Eze et al. (2018), the top five effects of eliminating rework triggers due to communication were repeated patronage, higher productivity and reduced delivery time, reduced rework and waste, improved employee job satisfaction and morale, and help in achieving the intended objectives and benefits of a project. The performance of a project can be improved should all the communication problems regarding rework be eliminated correctly. All of these solutions might resolve the communication issues related to timeliness, distortions, barriers, under loading, overloading, misunderstanding, and gatekeeping.

Kwofie et al. (2019) also determined the communication problems of inaccuracies, timeliness, barriers, distortions, underloading, overloading, procedures, misunderstanding, gatekeeping and distortions happened in Public-Private- Partnership (PPP) projects. To lessen the problems, it is recommended to adopt ICT models that can engender the needed improvement in PPP communication and information sharing. This suggestion can improve communication among the stakeholders in PPP projects and act as an effective communication central to the success of PPP projects and management. In addition, the study by Kania et al. (2020) proposed another recommendation in overcoming those communication issues and also financial issues related communication. The study suggested the need to develop the management of communication and information flow between construction project participants for the impact to be minimized and the specific deadlines of the project can be met smoothly. Pandit et al. (2019) suggested several ways to combat communication issues of accuracies and misunderstanding related to poor safety communication in the construction industry. One of it is through the establishment of a safety climate and the value assigned to workplace safety. Other than that, investing in efforts to promote crew-level cohesion also can yield significant safety benefits to the organization. Moreover, it is not sufficient to focus on only one of the two examined workplace factors to promote effective safety communication at the workplace. Hence, the focus must be on all the elements that can improve safety communication. Lastly, tracking safety climate and crew-level cohesion continually and intervening whenever necessary to foster effective safety communication among construction workers must be implemented. It would be more advantageous to the organization if the problems were taken care of wisely. The other solutions to reduce communication issues, as recommended by Yap et al. (2017), are a cohesive working environment among project members and promoting collaborative culture for project learning. These solutions can mitigate the communications problems related to accuracies, timeliness, misunderstanding, barriers, procedures and finances in the project.

Meanwhile, Badi and Diamantidou (2017) suggested applying BIM as a social network model, as BIM could work as a useful communication asset for the construction industry. Al Mousli and El-Sayegh (2016) also supported this where designers recommended using building information modeling (BIM) techniques to reduce the clashes between the different disciplines. Nonetheless, it is recommended to shift to alternative delivery methods such as Design-Build or Construction Management at Risk. The involvement of project management consultancy firms is encouraged to assist owners in managing the project from initiation to completion. Other than that, owners must give designers adequate time while preparing for the design and partnering. Teamwork can help reduce interface problems and increase the chances of project success. These solutions can reduce specific communication problems identified in this SLR such as accuracies, timeliness, barriers, misunderstanding, gatekeeping, and procedures. Another suggestion to reduce communication problems in construction is the need for a communication plan and identifying a project structure that defines communication links (Senaratne & Ruwanpura, 2016).

Furthermore, Zulch (2016) developed a model that includes a core set of communication and application skills. The proposal is to help construction project managers develop their communication abilities by using the important management and leadership elements of the model. This model can improve communication as well as management and leadership abilities to ensure the successful execution of projects. According to Chalker and Loosemore (2016), good communication and empathy are consistently the most critical factors in ensuring better project performance. Therefore, it is suggested to increase trust among the project participants and ensure a productive project environment in the future. All in all, even though different authors had identified many solutions to the communication issues in this SLR, this is still dependent on how the organization might adopt and implement those

solutions by considering several factors that they might believe to be useful for the organization and particularly the project participants. According to Yap et al. (2018), many members from various disciplines, such as developers, architects, engineers, surveyors, contractors, and suppliers, build an impermanent project delivery organization in a construction project. Good communication often involves team members cooperating in a collaborative work environment. Successful project management is determined by appropriate communication from the beginning phases (Shakeri & Khalilzadeh, 2020). Maqbool, (2018) suggested that communication, team variables, technical variables, organizational and environmental variables are critical factors for a project's success. According to Rafieizonooz et al. (2015), the improvement of construction project efficiency depends on effective communication among project participants. Hence, communication problems related to finances and procedures can be avoided. Table 4 summarize the themes of communication issues, impacts of the themes, and solution to the problems.

Table 4: Summary of communication problems, impact, and solutions

Communication problems (themes)	Impact	Solutions
• Inaccuracies, timeliness, distortions, barriers, underloading, overloading, misunderstanding, gatekeeping	• Labor productivity • Poor team cohesion • lessen the achievement opportunities in construction work that impact the work duration, expenses, as well as value • The poor connection among team members • Integrity and trust questioned • Impacts of the issues divided into the developer, communication, decision making, knowledge management, safety workplace, project planning, risk, and team management • Lack of communication, coordination, and low morale • Less productive project environment • Low safety information can reduce efficiency cohesion level among construction players.	• using the proposed systems thinking approach to enhancing labor productivity • improving communication team or people management, increasing emotional management, increasing confidence, strengthening leadership skills, improving organizational and management competencies • Developing a model that includes a core set of communications and application skills to support construction project managers in improving communication skills • presenting explicit facts of connection, giving comprehensible info to shareholders, and well-timed info distribution to all shareholders • develop the communication management • Information Technology, the team building, improve communication through innovation • building trust to ensure a productive project environment • created a secure environment, devoting in endeavors to encourage team-level collegiality, encourage efficient security interaction.
• Procedures, financial,	• Delay in progress • Weak team connection and cooperation • The conflict between public and private project teams- leads to slow decision making and progress • Well-being and safety, leadership, value, threat, expenses and agenda, managerial change, technology, invention, interaction and • Information, resource, planning and programming, output, connection with the owner, social means • Rework incidences on construction work; less support, low productivity, increased delivery time, increased rework and waste, low employee job satisfaction and morale.	• the application of information and communication technology (ICT) has rectified the issues • Be more innovative in managing multicultural project teams, Building Information Modelling (BIM) approach, supporting cloud computing technology • Affiliating and group collaboration, adopt BIM strategies, change to different delivery techniques like Design-Build or Construction Management at Risk, participation in work management consultancy • Improve communication management flow • the requirement for an interaction proposal and a work construction that determines interaction networks is acknowledged.

5. CONCLUSION

The main purpose of this systematic literature review is to determine the communication issues in the construction industry. Without a doubt, communication challenges in the construction industry will lead to plenty of construction issues that significantly impact the project's overall progress. Before proposing a solution to eliminate these issues, the project participants must ensure that the root causes of the communication problems are known. It means that project members must determine the exact problems they face in communication and develop a viable solution to these issues. In addition, the present review findings demonstrate that research on communication problems involved in the construction field is slightly understudied, especially for the communication problems in developed countries. Therefore, more research should emphasize communication problems in developed countries and can make a comparison with developing countries. The potential outcome might help both organizations in the construction industries identify the communication issues differences between different development of the countries and applied the most appropriate strategies to mitigate the communication issues in the future. The outcome from developed countries might help developing countries develop their strategies to mitigate project delays in the construction industry. The findings also determine the project team's communication problem indicators when handling construction matters. These indicators are deemed necessary for the construction parties to note to avoid the related problems. Therefore, it is recommended to identify the potential problems related to communication and group them accordingly to avoid the same problems in the future. Another recommendation from this review is to consider geographical factors when searching for suitable solutions. ICT is effective if the project participants are situated in an area with a stable Internet connection. Some solutions might worsen the issues if the needs, objectives, and abilities of the organization are considered when enlisting the solutions. This study offers several remarkable contributions in terms of practical and the body of knowledge. By referring to the study, several parties such as project participants, policymakers, the general public, and researchers can now see that there is a pressing need to identify the root causes of communication problems and develop a good solution to mitigate the problems impact and eliminate them. As for the policymakers and project participants, they can use the available knowledge in this study and compare it to their situations. Furthermore, they also can search for additional information that can help them develop good solutions to avoid the negative impact of the communication problems. Besides, the study also allowed these parties to understand the present situation of communication issues in the construction industry and enables them to develop strategies that are in line with their needs, objectives, and abilities of the organization. The study also informed the researcher about the exact areas and subject of research that should be the focus of their studies. So that more knowledge can benefit the interested parties in the future. Finally, this paper addressed limitations in terms of methodology as this review only selected two databases; Scopus and WoS as the basis for the findings. Hence, the results after searching the communications issues in the construction industry in these databases are quite limited. As a result, it is recommended for future studies using various databases such as ScienceDirect, google scholar, IEEE Explore, and SpringerLink to find other communication issues in the construction industry.

6. DECLARATION OF COMPETING INTEREST

The authors declare that they have no known financial or personal conflicts of interest that may have influenced the work discussed in this paper.

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