Developing a collaborative framework for construction projects in emerging economies

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Abstract

Purpose - The construction industry is a primary contributor to the development of emerging economies such as the Kurdistan region of Iraq. However, the sector is underperforming, and products are not meeting expectations. A lack of collaboration is considered a significant contributor to these issues. Various researchers have identified factors to improve collaborative approaches. However, there is still a lack of clear frameworks to help implement collaboration in the construction industry, especially in emerging economies.

Design/methodology/approach - This article utilises a review of literature, questionnaire and interviews with experts in the construction industry in order to develop a framework to achieve collaboration in construction projects.

Findings - The research presents a framework that distributes the factors of collaboration over the project lifecycle stages in accordance with the RIBA Plan of Work 2007. Each factor is divided into a set of enabling conditions which must be satisfied to ensure any given specific factors is delivered. Additionally, the framework suggests appointing a collaboration champion at the beginning of the project to manage the process.

Originality/value - The research contributes to scarce literature about collaboration practices in the Kurdistan region, and in emerging economies in general.

Keywords - Collaboration, construction, project management, sustainability, Kurdistan, emerging economies.

Paper type – Research paper

1. Introduction

Construction projects are essential elements in the growth of nations globally. This contribution increases in the case of emerging economies; there is a direct link between the volume of construction and developments in those countries (Lopes et al., 2002, Ofori, 2007). Despite this importance, the construction industry is facing many social, cultural and financial barriers in emerging economies (Tamošaitienė et al., 2021). A lack of collaboration has been determined as a primary obstacle that has resulted in underperformance of the industry in those countries (Gerges et al., 2017, Ofori, 2000). Fragmentation in the construction industry

has resulted in a significant gap in performance in construction industry products (Phua, 2006). There is a growing necessity to address those issues for improving the management of construction projects in emerging economies (Narayanan and Huemann, 2021). According to Morrell (2015) the big gap in the performance of the construction industry, caused by a lack of collaboration, would be considered as a scandal in any other industry. Therefore, construction stakeholders need to take serious actions to solve this problem.

Research focused on collaborative approaches in the construction industry has increased considerably over the last two decades. Researchers have referred to a wide range of benefits of collaboration such less adversarial relationships (Black et al., 2000), reducing delays (Bresnen and Marshall, 2000), cost reduction (Koraltan and Dikbas, 2002), minimising the environmental impacts (Ahmed et al., 2020), achieving long-term targets and continuous improvements (Eriksson, 2010), client satisfaction (Morrell, 2015), improving productivity and sustainability (Dao and Chen, 2021), and gaining a competitive advantage in the market (Hughes et al., 2012). Additionally, many authors, in various countries, have explored factors to improve collaborative approaches to working in the construction industry. For instance, Black et al. (2000) in the UK, Lu and Yan (2007) in China, Bidabadi et al. (2015) in Iran and Nursin and Latief (2018) in Indonesia have looked at identifying factors to enhance collaborative methods. However, despite a considerable amount of literature on factors of collaboration, there is still a considerable lack of research on how to deliver such factors and at what stage of the project lifecycle those factors need to be delivered. Therefore, the implementation of collaboration in the construction industry is far from effective. Particularly in developing economies, where construction practitioners face additional challenges in adopting collaborative approaches (Dao and Chen, 2021). Researchers have indicated that the construction industry has an urgent need for ensuring collaboration between involved stakeholders (Tulenheimo, 2015, Liu et al., 2017, Shelbourn et al., 2007).

The Kurdistan region is no exception; the construction process is found to be highly uncommunicative and to have an evident lack of interaction between participants (Zebari and Ibrahim, 2016). Despite that, the construction sector has grown rapidly in the last decade (Jabary and Hira, 2013), and contributed significantly to economic developments and provided a substantial number of jobs (Shatz et al., 2014). Construction projects have a tremendous role in various aspects of life in the Kurdistan region (Solaiman, 2020). However,

the fragmentation in the sector has resulted in construction projects that perform poorly and hence fail to meet the expectations of highly demanding customers (Mustafa, 2017). Lack of cooperation between construction industry stakeholders is one of the most crucial hindrances in the Kurdistan region (Al-Jaf and Saeed, 2020). Similarly, in another investigation on the effectiveness of construction teams, Ali and Anwar (2021) described inadequate communication and lack of collaboration as the main problems encountered in the region. Collaboration problems were also identified as one of the primary causes for inadequate risk management process on construction projects in the Kurdistan region by Ali and Wali (2020). Faris et al. (2019) identified a set of factors that can improve collaboration in the context of the Kurdistan region. However, construction practitioners still lack guidance on how to apply those factors in the industry. There is a lack of regulations and standards to clarify construction industry practices in the region (Shawkat et al., 2018). Neamat and Yitmen (2017) explained that construction industry stakeholders should collaborate to establish and understand innovative processes for delivering construction projects. This paper fills this gap and provides a structured framework through which to implement collaboration on construction projects in the Kurdistan region of Iraq.

The developed framework has two main characteristics; firstly, in order to determine in which stage the factors should be provided, they are distributed over project lifecycle stages. Secondly, each factor is explained in the form of a set of enabling conditions or tasks. For satisfying each factor, all required conditions under that factor should be met. This allocation is necessary to manage the process practically. The aim is to enhance construction practices by improving collaboration and contribute to developments in the region. As Ofori (2015) stated: researchers have a duty to contribute to improving the construction industry in developing countries, thereby helping millions of people overcome poor socio-economic situations.

2. Construction project lifecycle stages

Projects in the construction industry, like many other industries, pass through several steps before being delivered to end-users. In this research, the Royal Institute of British Architects (RIBA) 2007 plan of work is utilised to explain project lifecycle stages. The RIBA 2007 plan of work is used because of its international recognition and widespread use. Additionally, in Kurdistan, there is a significant lack of standards and regulations in the building projects

(Shawkat et al., 2018) and, like in many counties in the Middle East, a significant amount of construction projects use protocols similar to British standards (RTI International, 2008). This is due to the close economic relationship between the Middle East and the UK, which has resulted in the dominance of British architects, engineers and project managers (Gerges et al., 2017). Another reason for using the RIBA 2007 plan of work, not a newer version, is that the stages explained in the RIBA Plan of Work 2007 are very similar to steps followed in the region. RIBA Architecture (2008) divided the project lifecycle into five main phases: preparation, design, pre-construction, construction and use (Table 1). Since this study focuses on delivering construction projects, only the first four stages are considered as outlined below:

[Insert Table 1]

2.1. Preparation

A construction project starts with an idea to cover a need. A plan to improve productive capacity or to add to public services. Different solutions might be proposed before identifying a suitable option. A feasibility study is undertaken to determine whether the solution can proceed as a project or whether it can be delivered in a realistic way. Then, the project is evaluated in terms of targets, cost, timeline, and available resources. The client needs to spend adequate time on the early stages to deliver the projects successfully and to reduce variations in later stages of design and construction (Zou et al., 2007).

2.2. Design

A design professional, usually an architect, develops conceptual design plans for the project. Then, to develop detailed design plans and drawings, various specialist engineers need to be involved in the design team. The team specifies details and obtains clients approval to proceed with specified information. Later, in the technical design stage, the task is to refine and amplify basic design suggestions by various parties, to develop documents to be used in the construction process (Bennett, 2007). The design stage is complicated; therefore, it is essential to involve all main stakeholders, such as contractors, to work collaboratively to deliver project goals (Bemelmans et al., 2012). This collaboration will increase practical experience, reduce design changes and smooth the delivery of projects.

2.3. Pre-Construction

This stage refers to the selection of organisation that conducts the construction works, the contractor, and the tendering process. Bennett (2007) explained that the tendering process is performed in different ways, such as prequalification tendering, open tendering, invited tender, and negotiation. In this stage, most construction projects face difficulties due to a lack of standards and patterns of contract negotiation in emerging economies (Narayanan and Huemann, 2021). Therefore, a collaborative process between governing parties is essential at this stage to ensure that potential contractors are selected carefully. It is necessary to allow adequate time for the tendering stage and to provide sufficient details. In some cases, in order to gain time for construction works, clients tend to shorten the bid-awarding phase. This short time in negotiations with the contractor can result in claims, disputes, delays and cost overruns (Iyer and Jha, 2005).

2.4. Construction

The process of appointing a contractor could be extended to the mobilisation stage of the construction phase. Commonly, mobilisation refers to the works carried out after selection of the contactor but before the start of work on site. Later, the necessary project information will be issued to the contractor, and practical construction works will commence. It is vital at this stage to provide all information required to parties responsible for construction works to avoid delays and underperformance. In addition to the main contactor, many other parties need to be appointed such as subcontractors, specialists and consultants. However, the involvement of those different parties is at different stages; some of them may not even meet each other (Winch, 2010). That is one reason for fragmentation in construction projects. Enhancing a collaborative environment between those involved parties is crucial to provide steady progress and deliver client needs (Baiden et al., 2006).

3. Research methods

Various approaches are adopted to deliver the project targets such as review of literature, questionnaire survey and interviews. The research started with a comprehensive review of the literature to identify factors needed to improve collaborative working in the construction industry. The review resulted in determining 23 factors of collaboration, hereinafter, referred to as preliminary factors because they were identified from global literature not specific to

the Kurdistan region. Those preliminary factors were used to develop a questionnaire survey using a 5-point Likert scale, ranging from 1 as least important to 5 as most important. Table 2 explains the preliminary factors in the form of questions. The questionnaire was used in the construction industry in the Kurdistan region to glean local information about enhancing collaborative working. To identify participants and to ensure an adequate sample for the study, responsible organisations were contacted, such as the Ministry of Construction and Housing and the Kurdistan Contractors Union. In this study, the population comprised 3,000 construction organisations located in three different governorates of the Kurdistan region: Erbil, Dohuk, and Sulaymaniah. It was impractical to obtain a completely random sample as the majority of these organisations lacked internet services and participants needed to be visited in person.

Cluster sampling was therefore more appropriate for this study. This involves dividing a population into groups or clusters in which inter-group variations are likely to be small while intra-group variations are larger (Fellows & Liu, 2015). The sample can be grouped into clusters according to any naturally occurring situation; for example, geographical area (Saunders, Lewis, & Thornhill, 2009). The list of organisations provided by the Kurdistan Contractors Union provided the sampling frame; these organisations were based in different local administrative areas in the Kurdistan region (Erbil, Dohuk, and Sulaymaniah). Clusters were then randomly selected from the organisations that were reachable. The clusters were similar to one another but they included participants from different professions with varying levels of experience in the construction industry. After the process of data collection, 227 questionnaires were included for data analysis, the profile of participants of the questionnaire survey are presented in Table 3. The preliminary factors used to develop the questionnaire and their median and mode scores are shown in Table 2.

[Insert Table 2]

[Insert Table 3]

In order to identify final factors in the context of Kurdistan, Exploratory Factor Analysis (EFA) was performed on the collected data. EFA is a statistical approach that strives to explain relationships among a set of observed variables (participants' Likert scale answers) in a

smaller number of unobserved variables, called factors (Field, 2013). The analysis resulted in a set of six factors considered as essential to deliver a collaborative process. The identified factors are shown in Table 4 below.

[Insert Table 4]

These final factors are used to develop a framework to implement collaboration using a qualitative method. Firstly, the factors that enable the collaboration process were conceptualised using results from previous stages and a review of the literature. Secondly, to validate those factors and the framework, 10 semi-structured interviews were conducted at a senior level with participants from different construction organisations. All the interviewees are the professionals that already participated in the first stage of data collection. Where in the first stage of data collection, a questionnaire survey was used to determine the importance of factors of collaboration. At the interview stage, senior professionals of the construction industry are targeted, those that have considerable experience and hold key positions in their organisations. Since an only a group of practitioners is targeted for interviews' sample, a cluster sampling technique is adopted.

Fellows and Liu (2015) described cluster sampling as a non-random sampling technique, in which the population is divided into some clusters or groups, and the data are collected from specific clusters. After selecting a cluster to be surveyed, a simple random sampling technique is adopted to choose participants within the cluster. It is an effective technique in reducing cost and time by examining small samples from requested clusters only (Saunders et al., 2009). From the first stage of data collection, the questionnaire survey, participants can be divided into four clusters based on their experience in the construction industry. Those identified clusters are practitioners with less 5 years of experience, 6-10, 11-15 and more than 15 years. At this stage, the targeted group is the fourth cluster with professionals with more than 15 years of experience. The profile of interview participants is shown in Table 5 below. The interviews were undertaken through skype with each interview lasting around 45 minutes. The data were processed and analysed through Nvivo 12, which is an effective software for analysing interview data (Bazeley and Jackson, 2013). The research design is shown in Figure 1.

[Insert Table 5]

[Insert Figure 1]

4. Framework establishment

Key to the development of the framework is the distribution of the factors of collaboration over the project lifecycle stages. The purpose of this distribution is to present the factors in a practical way and to be able to identify when they should be provided. It is important to recognise that construction practitioners understand practical tasks more than theoretical explanations. Especially in a developing economy such as the Kurdistan region, construction practitioners are not familiar with collaborative approaches and lack theoretical knowledge about those methods (Wali, 2020). The aim is to provide construction managers with a pragmatic guide to implement the framework. Therefore, to clarify how to provide those factors, each factor is divided into a set of tasks or enabling conditions which must be satisfied to ensure any given specific factors can be delivered. Those enabling conditions stem from the results of different phases of the research. Firstly, the comprehensive review of global literature about construction practices helped in conceptualising preliminary factors that are required to deliver collaboration (Cheng et al., 2000, Shelbourn et al., 2007, Xue et al., 2010, Rahman et al., 2014, Bidabadi et al., 2015, Lu and Yan, 2007, Bemelmans et al., 2012). Secondly, the literature about the housing sector in Kurdistan revealed the missing factors that are necessary for this process (Shawkat et al., 2018, Mustafa, 2017, Zebari and Ibrahim, 2016, Neamat and Yitmen, 2017, Al-Jaf and Saeed, 2020, Saber and Wali, 2020). The outcomes of the first two phases were used to develop the questionnaire survey, shown in Table 2. Later, the instrument was used to survey the opinion of construction practitioners in the Kurdistan region. Finally, the outcomes of analysing the perception of the construction practitioners in the region through factor analysis identified the most essential conditions. Based on outcomes of all phases, this research defines collaboration as *''A systematic process, in which relationships and communication lines are clearly defined between project members, and those project participants behave according to a shared vision and adoption of the right terms of contracts.''* The developed framework is shown in Figure 2.

[Insert Figure 2]

4.1. project vision

The framework commences with establishing a shared project vision at the beginning of the preparation stage. The shared project vision is one of the most critical factors that contributes

to the success of a project. According to Tamošaitienė et al. (2021), conflict and misunderstandings between industry stakeholders are crucial barriers that hinder construction projects in the Middle East. Therefore, the early establishment and maintenance of the project vision are the most significant tasks for senior management (Christenson and Walker, 2004). The authors explained that project vision should have certain characteristics such that it must be understood, motivational, credible and demanding. After agreement on the common vision, the framework suggests that client and contractor agree to appoint a collaboration champion to manage the process. Since involved stakeholders change over the project lifecycle, appointing a collaboration champion from the preparation stage will provide essential continuity throughout the process. The collaboration champion could help in transferring information, duties, and legal obligations between parties. Other authors used proportionate approaches, for examples, to enable partnering, researchers have recommended appointing an experienced facilitator to explain the concept of collaborative working and manage the process adequately (Cheng and Li, 2002, Cheng et al., 2000). The benefits of appointing a champion to help deliver specific project outcomes is already recognised. For example, in RIBA Green Overlay (2007), in order to obtain sustainability targets, the client could consider appointing a sustainability champion. Later, the collaboration champion will be responsible for evaluating the process and to check whether enabling conditions are met at each stage of the project delivery. The first task of the collaboration champion will be obtaining senior management's approval on the vision. To form a collaborative delivery process top management should agree on the shared vision (Cheng and Li, 2002).

4.2. Relationship definition

By the end of the preparation stage, the complexity of construction projects increases rapidly due to the need to involve several parties. Starting from the concept design stage, design teams need many experienced professionals from different areas to undertake the required duties. Additionally, besides the members of the design team, the involvement of practitioners with practical experience on construction works is necessary. Lack of involvement of contractors has resulted in a lack of practical experience at the early design and planning stage (Rahmani, 2021). Subsequently, designs are lacking buildability and clarity that makes it difficult for construction teams to understand intricate details. Therefore, it is

important to involve contractors and subcontractors to bring practical experience into the design stage (Chan et al., 2004). Consequently, the framework recommends identifying potential partners at the very beginning of the design stage. However, determining stakeholders is not enough to have well-defined relationships. The success of collaborative relationships could only be achieved by establishing clearly defined roles and responsibilities (Koutsikouri et al., 2008). Therefore, after identifying potential partners, the next step will be identifying the roles and responsibilities of those parties.

4.3. Communication

The next task is to determine how these stakeholders approach each other and communicate. Establishing communication lines is a necessary step towards enhancing collaboration, especially, an agreement between the client and the main contactor to communicate and share information. Black et al. (2000) indicated that clear communication channels between contractors, clients and consultants could minimise problems happening on construction sites. It can facilitate the exchange of contract documents, drawings and specifications. Then, through fast communication, many issues could be dealt with promptly, and delays are reduced (Bidabadi et al., 2015). Various approaches can be used as a means for improving communication such as scheduled or on-site meetings. The main principle is to have a clear idea of how to approach each other. The next task is to ensure there are adequate technological resources, hardware and software packages, to enable effective communication on construction projects. Technology adoption is essential to achieve a collaborative process in construction projects (Arayici et al., 2011). Technological resources might be simple tools as emails, or sharing information through clouds or advanced construction management software. Emerging economies are struggling to adopt technology effectively due to a lack of a skilled workforce (Singh Dubey et al., 2021). Therefore, the third task under the communication factor is to appoint skilled staff to deal with that technology. This task is particularly important in constructions sectors such as that in Kurdistan as many projects face a lack of skilled personnel (Abramzon et al., 2016).

4.4. Systematic process

After identifying relationships and communication approaches, project stakeholders must agree on a systematic way to deliver the project. It is necessary to decide on a systematic

process before awarding contacts and the starting of work on the construction sites. A systematic process should identify ways to share risks, solve conflicts and evaluate performance between construction parties (Lu and Yan, 2007). The systematic process in this framework commences by identifying a process for risk-sharing between participants. Meng (2013) insisted a lack of risk-sharing methods is the most significant barrier to implementing collaboration. Therefore, construction parties must agree on a risk-sharing process before awarding contacts. The next decisive element of process definition is setting a gain-pain sharing approach. Conflicts exist in all projects; however, having a clear strategy to deal with those disputes could reduce their effects to a minimum and increase organisational performance (Maiti and Choi, 2021). The last component is to determine a process to evaluate project performance, under the supervision of the collaboration champion. It is important to continuously assess performance to ensure the collaboration process is working effectively (Wu et al., 2008). Therefore, to deliver a systematic process, strategies must be set for risk sharing, conflict resolution and performance evaluation.

4.5. Contractual agreements

Another crucial factor in the framework is contractual documents, particularly as most of the adversarial relationships in the construction project, have resulted from harsh terms in traditional contacts (Martin and Benson, 2021). Construction projects can overcome those issues and implement collaborative principles only by employing the right types of contractual documents (Akintan and Morledge, 2013). Indeed, Hughes et al. (2012) described collaboration as a process that depends on the use of the correct terms of contacts in which everyone understands and respects other personnel's roles and responsibilities. In a collaborative process, contracts should be awarded after involved organisations define relationships, communication approaches and a systematic management process. Contractual documents need to be prepared to include gain- pain sharing and all other agreed terms between parties. Then, it is important to ensure that all parties trust the terms of the contracts to build a collaborative environment (Khalfan et al., 2007). The last stage before awarding the work will be signing the agreed terms of contacts. This stage should be done before entering the construction stage. However, in many cases, additional services might be required, that need the involvement of new suppliers. Subsequently, additional contractual

documents might be required during the construction stage as well. Nevertheless, subsequent contracts should be subject to the same considerations to ensure collaboration.

4.6. Behaviour of participants

The behaviour of participants is an essential factor in any project and its importance increase in a complex industry such as construction. Individual behaviour was identified as a leading contributor to the success of construction teams in the Kurdistan region by Ali and Anwar (2021). The behaviour of people involved acts as an overarching factor; it affects projects from the very beginning to the last stages of project delivery. A major challenge facing adopting collaborative approaches in the construction industry is that it requires a change in behaviour and attitudes of participants (Koraltan and Dikbas, 2002). It is necessary to recognise and respect the cultural and behavioural difference among project practitioners. Despite those differences, involved parties should agree to provide and share resources to achieve a collaborative process. Managing behaviours is vital because collaboration depends very much on individual behaviour (Bresnen and Marshall, 2000).

The behaviour of participants can be labelled as 'the soft factor' in this framework. Shelbourn et al. (2007) described the behaviour of people as a soft factor that needs to be improved throughout the project lifecycle. In emerging economies, a gap that exists in soft skills has reduced the capability of many companies (Singh Dubey et al., 2021). In many cases, enabling conditions of soft factors are seen as ambiguous. To clear this confusion and provide a practical guide on how to deliver this factor, this framework requires two conditions. Firstly, all parties should recognise and respect the cultural differences between organisations and individuals. Many issues that hamper collaboration practices are due to cultural differences of people (Nursin and Latief, 2018). Particularly these differences could affect the way parties share resources with others. Therefore, the second condition is that all parties agree to provide and to share resources with other parties, despite their differences. It is necessary to ensure resource sharing among construction teams (Cheng et al., 2000), because performing some tasks on projects may require resources that belong to different parties.

5. Interview analysis and discussion

The experts interviewed provided an in-depth understanding of the applicability of the collaborative framework in the construction industry of Kurdistan region. The framework was

explained in detail for interviewees, then a range of prepared questions was asked; an open discussion followed each question. The data collected in interviews are processed and analysed using Nvivo 12. Interview records were transcribed and analysed for identifying common themes. This process of qualitative analysis resulted in three themes in transcripts, which are benefits, challenges of implementation and recommendations on the framework. Those identified themes are related to different aspects and tasks in the framework. The outcomes of the data analysis and opinions of experts are discussed below under 4 subsections based on the sequence of the interview questions.

5.1. The feasibility and satisfaction with the framework

The first theme in the interviews was to understand whether experts were satisfied with the framework in general or not. Responses of interviews help in ensuring that the conceptual framework is authentic and reliable (Burke and Gaughran, 2007). The distribution of the tasks over the RIBA plan work was discussed with experts. All the interviewees had a consensus and agreed on the feasibility of the framework. The interviewees agreed that framework consists of a sensible and a clear process that can be implemented, one of the interviewees quoted *'' the swim lane is very clear and designed with adequate process……. it will give a better output if it applied to any project''.* Another participant said *''The framework looks sensible and feasible and includes all needed aspects''.* Professionals also pointed to the practicality of the framework *''the framework is practical, and is not that difficult to implement''*. Since this collaborative approach is not familiar in Iraqi Kurdistan, it was necessary to ensure applicability and practicality of the framework in the region (Koraltan and Dikbas, 2002).

5.2. Collaboration champion for managing the process

The second theme discussed with interviewees was appointing a collaboration champion as a means for implementation of the framework. The respondees strongly agreed on appointing collaboration to lead the process. An interviewees stated *''insisting on appointing collaboration champion for managing the process is very important''*. An expert explained that having a collaboration champion appointed mutually between client and contactor will reduce change orders happening on projects, consequently reducing disputes. The interviewees also heightened that appointing a collaboration champion will be beneficial for clarifying roles and responsibilities *''as a specific person will hold the responsibility to*

implement the framework''. Collaboration is aided by clarifying roles regarding managing the process (Patel et al., 2012). However, an interviewee described that for this appointment to be effective, senior management should make sure collaboration champion is hired by mutual agreement between client and contractor and acts as a joint staff of both parties.

5.3. Barriers to implementation

Regarding the challenges that framework implantation might face, experts referred to several points. When asked about the obstacles this process might face, lack of awareness towards collaboration was the most frequent. For instance, an expert answered *''the lack of awareness of construction industry practitioners of the importance of collaboration role in project success''* another one responded *''lack of proper understanding of the key aspects present in the collaborative framework by practitioners in various construction projects because they do not know that much about collaboration''*. Similarly, Wali (2020) found that the lack of education is the main barrier facing implementing collaborative construction practices in the Kurdistan region. The author called for increasing level of awareness of construction stakeholders through training, workshops, and seminars. An interviewee explained that lack of awareness could result in resistance to change because construction practitioners are used to traditional ways of project delivery. *''I think resistance to change always exists when you want to apply something new in construction projects''*. However, the construction industry could overcome this resistance by increasing the awareness of stakeholders toward the benefits of collaboration (Arayici et al., 2011). Similarly, in these interviews, the participants agreed that enhancing the level of awareness towards the benefits of collaborative practices can reduce resistance to change and increase the number of partners willing to engage in collaborative projects. Therefore, responsible organisations must strive to increase the level of awareness in the construction industry in order to overcome the barriers of adopting collaboration.

Lack of skilled personnel to undertake the task of the framework was another barrier from the analysis of the interviews. Since the construction industry in Kurdistan struggles with the availability of skilled staff (Shawkat et al., 2018), it is necessary to ensure there are enough qualified personnel to undertake specific tasks. Overcoming those barriers will not be automatic. However, with forward-looking management, developing economies can solve the main issues and continue fast developments (Lee et al., 2020).

5.4. Additional recommendation and future study

In the final part of the interviews, participants were given a chance to add additional comments that they have on the collaborative framework. A point raised was to make sure that construction projects are provided with enough technological resources required to perform smart tasks. It is a real challenge to embed technology in collaborative working frameworks in the construction industry (Xue et al., 2010). Especially in emerging economies where the construction industry faces poor technological development (Elkhalifa, 2016). Thus, construction stakeholders in Kurdistan region need to make sure construction projects are provided with adequate technological resources. Additionally, a respondent stated that construction teams should be aware of the collaborative framework related responsibilities. Obviously clarity of roles and responsibilities is a primary condition of collaboration (Meng, 2013). Another respondent noted that the collaboration champion needs to explain the process to all involved parties and ensure there is an adequate understanding of the process between parties *''collaboration champion should make sure client and contractor understand tasks and factors within the framework and they know what are their responsibilities''*. Therefore, the collaboration champion must be a professional that has an in-depth understanding of collaborative working and can determine the responsibilities of involved parties.

The framework designed to facilitate collaboration has been reviewed by an expert panel and the findings are considered reliable. Further study can use specific construction projects as case studies to apply this framework and report the outcomes of the implementation. Researchers can investigate how the adoption of smart technologies can improve collaboration.

6. Conclusion

This research presents a structured framework in the form of factors of collaboration to improve construction practices. Factors of collaboration are distributed over the project lifecycle stages, and each factor is divided into a set of tasks required to enable that specific factor. The RIBA plan of work was utilised to identify project lifecycle stages. The framework is developed to be implemented in both the public and private sectors. However, Construction practitioners are used to adversarial relationships in the Kurdistan region, and

implementing a collaborative framework needs to be done gradually. The private sector may show more flexibility towards changing practices than the public sector. A reason for that is government policies that impose many restrictions on public construction projects. These regulations do not help in enhancing collaboration practices. In order to implement effective collaboration in the public sector, the Kurdistan Regional Government needs to impose new rules through responsible organisations such as the Ministry of Construction and Housing. New policies are essential at the bid awarding stage in order to adopt the developed framework. The framework suggests appointing a collaboration champion to manage the process. The KRG must make sure both client and contractor are obliged to appoint a collaboration champion to manage the process. This can also be inspected through quality control teams of the Ministry of Planning, which is responsible for supervising the construction sector (public and private) and ensuring the quality of products. Furthermore, to implement collaboration successfully, involved stakeholders in the construction industry need to work together to increase awareness of practitioners.

Like any other study, this research has its limitations. It would have been better to validate the framework in a real project and examine it practically. Practical validation would have given a great understanding of the outcomes of the implementation of the developed framework. However, practical validation was not feasible due to constraints of time and cost.

Additionally, it is not possible to guarantee that respondents of surveys have not been subjective in their responses. The study is based on the practitioners view in the construction industry in the Kurdistan region. Therefore, the findings are limited to the context of that region. Although construction projects face similar problems in developing countries, in order to generalise results in a broader context, different procurement routes, governmental policies and contact types used need to be considered. The article contributes to the scarce literature on collaborative practices in Kurdistan region, and emerging economies in general.

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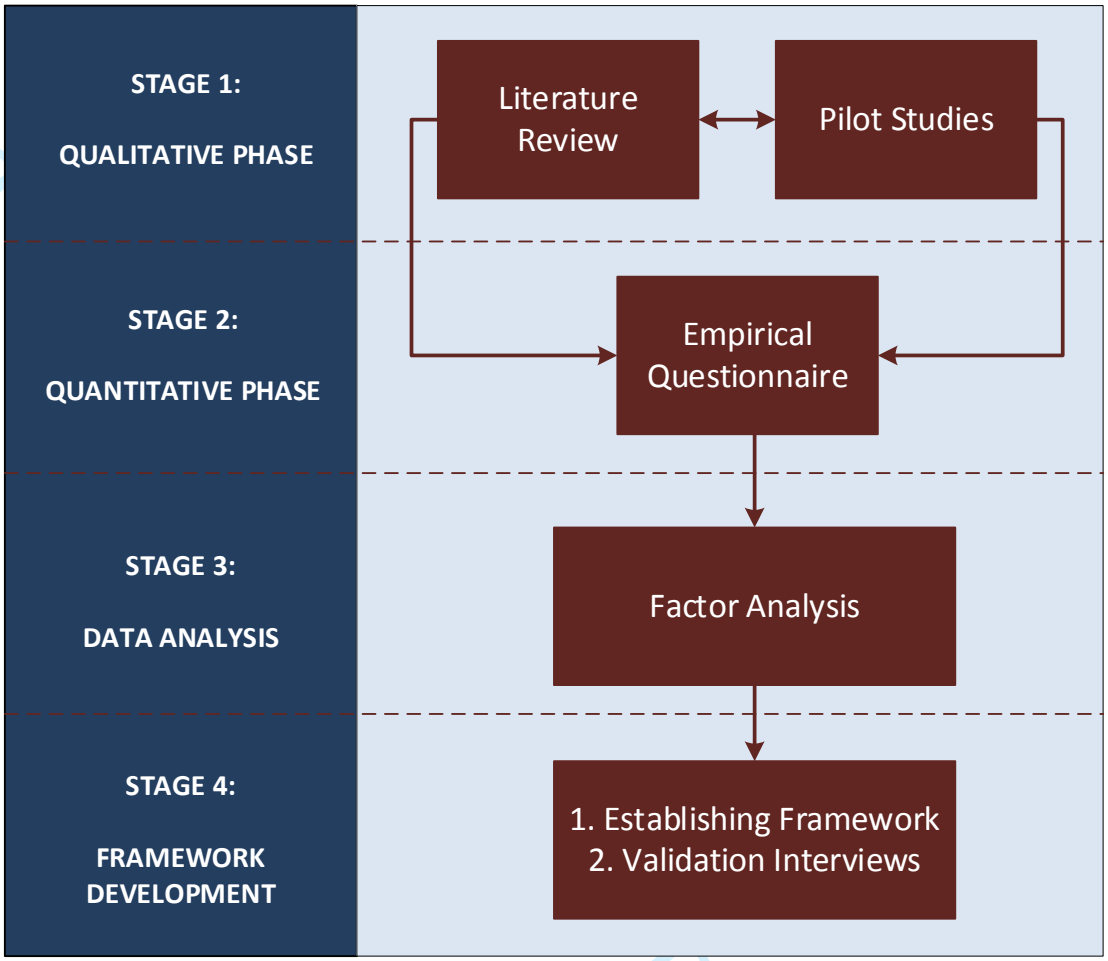

Figure 1: Research design of this study

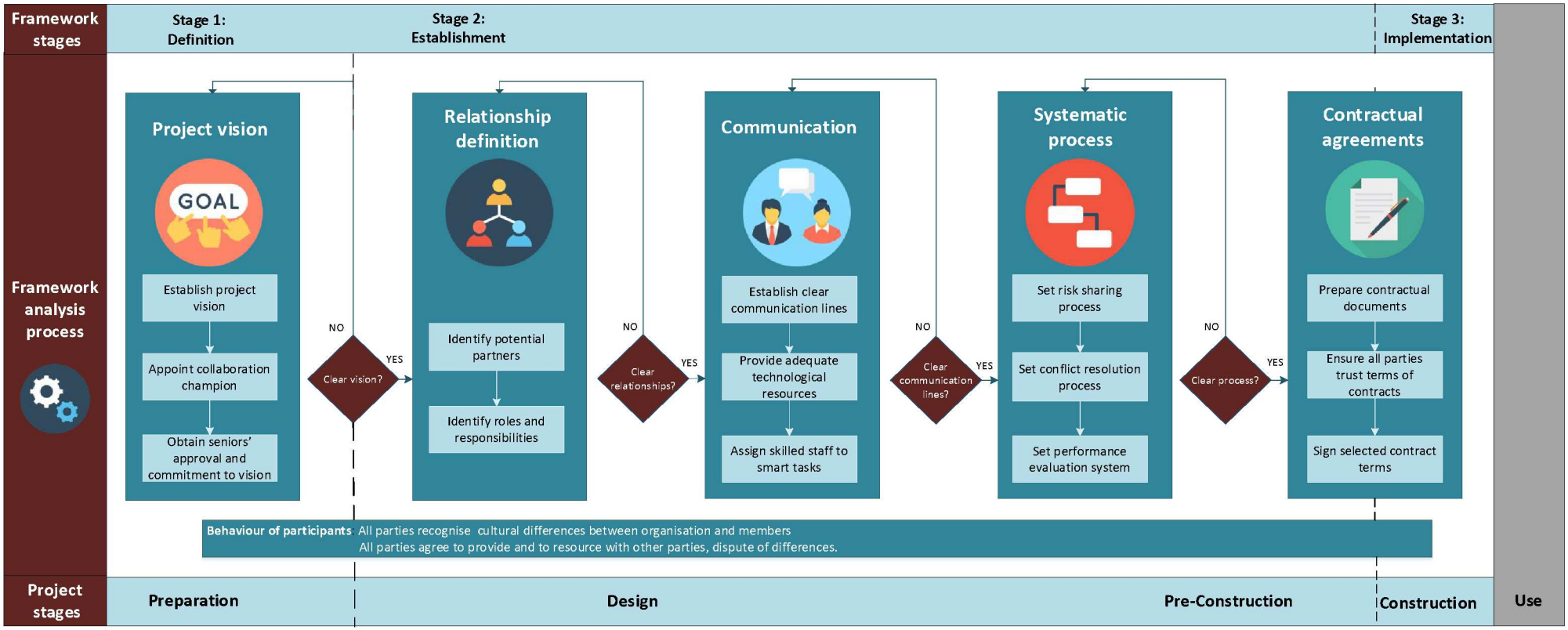

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Figure 2: The developed framework for improving collaboration

Table 1: RIBA plan of work 2007 adopted from (RIBA Architecture, 2008)

Preparation		Design			Pre-Construction			Construction	
Appraisal	Design Brief	Concept	Design Development	Technical Design	Production Information	Tender Documentation	Tender Action	Mobilisation	Construction to Practical Completion

Table 2: Preliminary factors of collaborative working and their ordinal data

Survey questions (preliminary factors)	Median	Mode
(1) All involved parties in the project trust each other	4.0	4
(2) All parties trust that terms of the contract will be implemented	4.0	4
(3) The type of contract is appropriate for the project	4.0	4
(4) Communication lines are open and clear between different teams	4.0	4
(5) Communication lines are open and clear between members of the same team	4.0	5
(6) Stakeholders are using ideas from different participants to improve project performance	3.0	4
(7) Mutual goals are set between the key participants of the project	4.0	4
(8) Key parties understand the clear and shared vision of the project	4.0	4
(9) A clear process for conflict resolution is set in the project	4.0	4
(10) Senior management is committed to delivering the project vision	4.0	4
(11) Senior management is encouraging all members of the project team to deliver the vision	4.0	4
(12) All involved stakeholders are committed to the project vision	4.0	4
(13) A strategic plan of benefits and risk sharing is set between involved parties	4.0	4
(14) The cultural differences of involved project participants affect the way they behave	3.0	4
(15) Each party provides the appropriate resources to deliver the project vision	4.0	4
(16) Each party is willing to share their resources with other parties	4.0	4

(17) The main contractor is involved at the beginning of the project life cycle	4.0	5
(18) The major subcontractors are brought in at an early stage of the project	3.0	4
(19) A systematic way to evaluate the performance of the project process is used	4.0	4
(20) Roles and responsibilities of all team members are defined at an early stage of the project	4.0	5
(21) Roles and responsibilities of participants are clear to everyone	4.0	5
(22) The project teams are provided with enough technological resources	4.0	4
(23) There are enough skilled staff and workers to perform different tasks in the project	4.0	5

Table 3: Profile of respondents to the questionnaire survey

Experience in the construction industry			**Profession**		
	Freq.	Percentage		Freq.	Percentage
Less than 5	44	19	Client's Representative	38	17
6-10	81	36	Project Manager	74	33
11-15	44	19	Design Team	38	17
More than 15	58	26	Main Contractor	32	14
Total	227	100	Sub-Contractor	12	5
			Other	33	14
			Total	227	100

Table 4: Final factors of collaboration identified from Exploratory Factor Analysis

Items	Eigenvalues	% of variance shared
Factor 1: Project Vision	7.261	29.295
Factor 2: Behaviour of participants	1.774	5.364
Factor 3: Communication	1.487	4.233
Factor 4: Relationship definition	1.215	2.862
Factor 5: Contractual Agreements	1.031	2.105
Factor 6: Systematic Process	1.019	2.087
Total		45.947

Table 5: Profile of the interviewees

Sector		Governorates		Experience in the construction industry		Profession	
	Freq.		Freq.		Freq.		Freq.
Public	5	Erbil	4	15-20	3	Project Manager	3
Private	5	Dohuk	3	20-25	3	Contractor	3
		Sulaymaniah	3	More than 25	4	Client's Representative	2
						Designer	2