AVOIDING DISPUTES THROUGH EFFECTIVE PROCUREMENT IN LARGE CONSTRUCTION PROJECTS

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Disputes in construction projects are known to adversely affect project and project management success. Fortunately, it is possible to avoid some disputes in construction projects despite the widespread belief that they are inevitable. Research shows that disputes in construction projects in some developing countries are rooted in incompetence and a general lack of professionalism of internal project stakeholders, which are linked to inadequate procurement of goods and services in projects. Accordingly, the research reported in this paper aimed to develop a framework to minimise the occurrence of major contract disputes in large construction projects in a certain developing country. The framework is expected to facilitate effective procurement across the project's pre-construction and construction phases and foster successful project delivery and performance. The research employed problem-solving methodology focusing on two case study projects in the developing country. This involved problem definition; information gathering; generation of multiple solutions; analysis and selection of a solution; and intra-design verification. The research highlights that minimising disputes on large construction projects should involve ensuring effective procurement of goods and services.

Keywords: contracts; disputes; developing countries; procurement

INTRODUCTION

Occurrence of disputes in construction projects is frequent (Iskandar *et al.,* 2021) and inevitable, more so in complex projects (Cheung and Yiu 2006; Hardjomuljadi 2020). These disputes are generally unfavourable to a project as they usually hinder the realisation of the project's main objectives (Fenn 2007). Although they are perceived as inevitable, construction disputes, fortunately, can be managed by, preferably, entirely avoiding them or at least minimising their negative effects (Kyalisiima *et al.,* 2022; Otim *et al.,* 2022). To accomplish that, it is important to understand the events and conditions that cause the disputes and be able to anticipate and predict their occurrence (Fenn 2007; Tanriverdi *et al.,* 2021).

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Although construction disputes are attributed to various sources including poor contracts, changes in project scope, and opportunistic behaviour, among others (Kumaraswamy 1997; Fenn *et al.,* 1997; Cheung and Yiu 2006), some studies have shown that some disputes are rooted in lack of professionalism among internal project stakeholders (Otim *et al.,* 2022) and incompetence of internal stakeholders (Kyalisiima *et al.,* 2022). Competence, however, is a part of professionalism, whose other principles include integrity and responsibility (Otim *et al.,* 2022). In their respective research, Kyalisiima *et al. (*2022) and Otim *et al. (*2022) show that incompetence and a general lack of professionalism are linked to inadequate procurement of goods and services in projects. As Flyvbjerg (2022) states that projects do not go but rather start wrong, construction projects often commence with inadequate procurement that escalates to a chain of events and challenges that culminate in disputes. As such, the research reported in this paper aimed to develop a framework to minimise the occurrence of major contract disputes in large construction projects in a certain developing country (anonymised as per the ethical structure under which the study was done). The framework is expected to facilitate effective procurement across a project's pre-construction and construction phases, fostering successful project delivery and performance. Procurement in construction entails the purchase of construction-related services with the aim of creation of new structures, alteration, refurbishment, or demolition of existing structures (Scottish Government 2011). Construction procurement processes are key in ensuring the right project delivery stakeholders are engaged in the project. As averred by some authors, procurement is arguably one of the most important processes in the project cycle (Otim *et al. (*2022). Correct procurement for construction projects leads to adequate project delivery stakeholders (especially contractors and consultants) hence eliminating the downstream causal factors for construction disputes and mitigating dispute occurrence (Kyalisiima *et al.,* 2022). Conversely, inadequate procurement increases project exposure to construction disputes. As such, construction procurement should be managed effectively. Crucially, construction projects are unique in various aspects including design and location (Davis *et al.,* 2008) and, therefore, different procurement strategies/systems suit different construction projects (Turner 2007).

A procurement strategy is an organisational system that assigns specific responsibilities and authorities to people and organisations and defines the various elements in the construction of a project (Davis *et al.,* 2008). It outlines the key means by which the objectives of the project are to be achieved (Morledge *et al.,* 2006), and includes traditional, integrated, management and collaborative strategies (Davis *et al.,* 2008). However, an effective procurement process is not limited to procurement strategies. Morledge *et al. (*2006), for instance, suggests that a procurement procedure should include functional needs assessment, selection of an overall procurement philosophy, design of procurement system, setting of contractual relationships and appropriate supply chain, and implementation. Several governments have created comprehensive procurement procedures tailored to their policies (OGC 2007; Scottish Government 2011). That, however, is not the case for some developing countries, such as the subject country, for which studies have shown that the systematic selection of procurement strategies is often ignored (Kyalisiima *et al.,* 2022). The resulting use of inappropriate procurement strategies is a catalyst for the occurrence of disputes.

METHOD

Whereas this paper focuses on the case studies in Otim *et al. (*2022) and Kyalisiima *et al. (*2022), other literature recognise that inadequate procurement is one of the primary factors in the causation of construction disputes (Conlin *et al.,* 1996). Both case studies were debt-financed public sector infrastructure projects in a certain developing country, implemented under EPC (Engineering, Procurement and Construction) contract arrangements involving multinational stakeholders, and costing between half a billion to two billion US Dollars. Case studies enable in-depth investigation of a subject or phenomenon in its natural setting (Yin 2014).

To develop a framework to minimise the occurrence of major contract disputes in large construction projects in the case study developing country, this paper adopts the problem-solving methodology. The problem-solving methodology is a well-established and widely adapted process of finding solutions to various difficult or complex issues including design problems (Khandani 2005; Vorus 2017). It is a process of closing the gap between what is and what is desired and involves devising ways to answer questions and to meet or satisfy a situation which presents a challenge, offers an opportunity, or is a concern (Isaksen *et al.,* 2000). As guided and inspired by Isaksen *et al. (*2000), Khandani (2005), Pahl *et al. (*2007) and Vorus (2017), the problem-solving methodology, as adopted in this paper, involved the following:

(1) Problem definition - Establishing the need and stating it in clear and unambiguous terms to create a statement of specifications to be achieved by the solution.

(2) Information gathering - Collecting information through searching relevant literature, particularly papers in major industry journals and textbooks, to aid in both active and passive discovery of solutions. This helped in the identification of the weaknesses and strengths of existing or previous solutions from which inspiration could be drawn in the proceeding phases of the problem-solving process.

(3) Generation of multiple solutions - Creating a set of concepts that potentially satisfy the specifications of the solution, and creatively building new ideas and adapting existing solutions to improve the solutions to the problem. Brainstorming—the most common creativity technique—was used to generate ideas due to its simplicity and ease of adaption. Concept maps were used in generating and recording ideas during brainstorming to organise ideas and stimulate creative thinking.

(4) Analysis and selection of a solution - Reviewing/examining the different options and selecting the best solution for the problem. This entailed evaluating the options, modifying and/or merging them into a preferred solution. Evaluation involved subjecting the options to common criteria and selecting the one that best met them.

(5) Intra-design verification: Problem-solving would typically involve implementing and evaluating (validating and verifying) the solution to ascertain whether it achieves the intended purpose (Khandani 2005). However, due to the limitation of time, the evaluation of the proposed framework was limited to intra-design verification i.e. checking that the solution was built right during the process of designing it. Intra-design verification was done on a concurrent engineering basis (Khandani, 2005), with the resulting process/flow chart being analysed and continuously fine-tuned while the framework was being designed by a focus group (the authors), until the solution was deemed appropriate.

Framework to Improve Procurement

"Projects do not go wrong, they start wrong." Research has demonstrated that projects often start wrong by getting the front-end wrong (Flyvbjerg 2022), and a project going wrong manifests in several ways including frequent and protracted disputes. It is, therefore, reasonable to theorise that the conditions suitable for the roots of disputes are usually created at the start of a project and, correspondingly, those conditions can be prevented at that stage. So how can incompetence and a lack of professionalism—the identified root of disputes in the case study projects—be quashed at the start of a project and later in its execution? It boils down to ensuring that the right people (i.e., individuals, contractors, consultants likely to uphold the principles and values of professionalism) are engaged and maintained at the right time and under the right circumstances. This falls within the ambits of procurement management and contract administration. Indeed, research has identified the improper application of procurement and project delivery systems as a root cause of incompetence on projects (Long *et al.,* 2004). The following 2-stage framework—focusing on the selection and effective implementation of an appropriate project procurement system, and the selection and maintenance of the right key players/people—is, therefore, proposed to ensure that, with respect to professionalism, a project starts right and stays right during its execution.

STAGE 1: Choosing an Appropriate Project Procurement System
Masterman (2002) defines a procurement system as the organisational structure a client adopts for the implementation, and at times the eventual operation, of a project i.e., traditional/separated, integrated or management-oriented procurement systems, and their variants. Correctly choosing the most appropriate procurement system best guarantees that a construction project is unlikely to encounter significant difficulties and is concluded successfully (Masterman 1992). Procurement systems/approaches—particularly the contract strategy component—should be chosen on a case-by-case basis as projects, whether being undertaken by the same client and/or in the same environment, are still unique. If an integrated EPC/turnkey arrangement, for instance, worked well for one construction project, it does not necessarily mean it will be appropriate for a similar project since key factors like competence, maturity and experience of the contractor may not be replicated. Considering the design weaknesses, the EPC Contractors exhibited in the case study projects, it might have borne better results to engage more competent specialist designers separately and works contractors to implement the designs under the supervision of competent project managers (consultants), in management-oriented, instead of an integrated, procurement systems.

Much as the public procurement guidelines of the case study country highlight a few conditions under which procurement systems such as turnkey, traditional, integrated, etc., can be adopted, they are insufficient as there are no specific and systematic guidelines/ procedures for selecting an appropriate procurement system, considering the uniqueness and complexity of large construction projects. Adapted from the literature on the subject (Alhazmi and McCaffer 2000; Masterman 2002; Love *et al.,* 2010; Greenhalgh 2011), the 7-step procedure presented hereafter is proposed for the selection of an appropriate procurement system (Figure 2).

Step 1 - Identification and clarification of project objectives and constraints (e.g., site conditions, regulations, risk appetite etc.)

Step 2 - Preliminary/rough screening of the different procurement systems: List the merits and demerits of the different procurement systems with respect to the project's identified objectives and constraints. With expert judgement, feasible procurement systems can be shortlisted for further evaluation.

Step 3 - Definition of procurement assessment criteria (PACs): Define criteria for evaluating the procurement systems based on the client's needs. Criteria (which can be modified to suit the project's context) may include (but not limited to) risk avoidance, timing/programme, and controlling variation, managing complexity, level of quality, cost certainty, competition, management, and accountability.

Step 4 - Determination of client's value system/priorities (weighting and ranking PACs): Use pairwise comparison to prioritise/ assign weights to the PACs (client needs) to determine their level of importance to the client/project and the magnitude of the difference in importance. Pairwise comparison is a simple additive weighting method based on multi-attribute utility analysis—a often-used; easy-to-learn methodology applicable to appraisal of complex engineering projects (Rogers 2012).

Step 5 - Weighting of feasible procurement systems from preliminary screening: Guided by procurement appropriateness charts such as in Figure 1, use expert judgement to assign scores to the feasible procurement systems for each PAC i.e., a 1-to-5 scale (poor, acceptable, good, very good, excellent).

		Appropriateness of contract strategy in meeting project objectives				
Project objectives parameter	*Objectives*	*Traditional*	*Construction management*	*Management contracting*	*Design and manage*	*Design and build*
Timing	Early completion	×	✓	✓	✓	✓
Cost	Price certainty before construction start	✓	×	×	×	✓
Quality	Prestige level in design and construction	✓	✓	✓	×	×
Variations	Avoid prohibitive costs of change	✓	✓	✓	✓	×
Complexity	Technically advanced/ highly complex building	×	✓	✓	×	×
Responsibility	Single contractual link for project execution	×	×	×	✓	✓
Professional responsibility	Need for design team to report to sponsor	✓	✓	✓	×	×
Risk avoidance	Desire to transfer complete risk	×	×	×	×	✓
Damage recovery	Ability to recover costs direct from the contractor	✓	×	✓	✓	✓
Buildability	Contractor input to economic construction to benefit the department	×	✓	✓	✓	×

Figure 1: Appropriateness of procurement routes, Source: (Greenhalgh 2011)

Step 6 - Evaluation of procurement systems (weighted matrix): For each procurement system, get the sum of the product of the scores and their respective PAC weights.

Step 7 - Selection of the most appropriate procurement system: The procurement system with the highest total weighted score is considered the most appropriate for the project with respect to the client's needs. After this step, a Gateway Review should be done as a compliance mechanism to provide assurance that the selection of the procurement system was done right.

Note, however, that it is important to have suitably competent people within the organisation to undertake choosing the appropriate project procurement system. This can be achieved by employing individuals with the requisite qualities (experience and qualifications) and/or training/upskilling them, where feasible, to undertake the task. Otherwise, external expert guidance (consultants) would need to be procured as per the guidelines in Stage 2 (choosing and maintaining the right people).

STAGE 2: Choosing and Maintaining the Right People

Once an appropriate project procurement system is chosen, it is imperative that the right players (contractors, consultants, etc.) are selected to implement the project. The selection of project players is guided by a procurement process involving tendering/bid submission, bid evaluation and award of contract. The right players, in this case, are those who are most likely to uphold the fundamental principles of professionalism i.e., are competent, responsible and have integrity.

Selecting the right players can be facilitated by setting bid evaluation criteria that target those desired qualities in a potential contractor or consultant (as in Table 1). Studies, however, show that, traditionally, the evaluation of tenders and selection of contractors for public projects are typically based on the idea of taking the lowest bid price—an approach which is one of the leading causes of problems in project delivery, including delays, poor quality and prevalence of claims and disputes (Russell and Skibniewski 1988; Holt *et al.,* 1994; Mbachu 2008; Horta *et al.,* 2013; Cheaitou *et al.,* 2019). That being the case, many studies believe that the most crucial factors/criteria are (and should be) capability, reputation, and experience (Tiong and Alum 1997; Singh and Tiong 2006; Cheaitou *et al.,* 2019). Correspondingly, (Kumaraswamy 1997) puts forth that investigating performance on recent projects is one step in the process of attempting to anticipate contractor performance with reference to an upcoming project. Moreover, the specific procurement guidelines/regulations and criteria for such public construction projects tend to vary from one country to another (Bochenek, 2014). Accordingly, procurement process decisions, such as the choice of an appropriate tendering system (e.g., open competitive, selective/restricted competitive, negotiated etc.), should be in accordance with prevailing local procurement regulations. Figure 3 illustrates the public procurement process/cycle as per the case study projects' local guidelines/regulations.

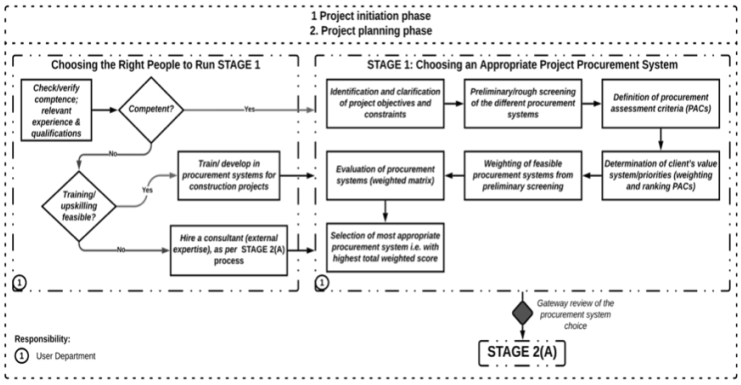

Figure 2: STAGE 1-Choosing an Appropriate Project Procurement System

Noticeably missing in this procurement process were provisions for Gateway Reviews after significant milestones/phases (e.g., decision by the Contracts Committee), which would be a compliance mechanism to provide assurance that the procurement was done right. Also, to ensure selection of suitably qualified contractors or consultants, the case study projects' local regulations provided for due diligence; however, they fell short of specifying when due diligence should be done in the procurement process and left that to the discretion of the procuring entity. Ideally, this should inform the evaluation process. Figure 4 illustrates Stage 2 of solution framework regarding selection of the right contractor/consultant in the context of the case study country's public procurement process/cycle.

Similarly, the selection of specific individuals to serve in key roles on the project (e.g., project managers, designers, construction managers etc.) should be thorough to ensure that the right people are appointed. Contracts usually provide staffing requirements and guidance on how project personnel can be appointed or dismissed. But are those provisions sufficient or even effectively implemented? The case study projects' contracts, for instance, only specified the required experience and qualifications for the key roles, and the evaluation of proposed candidates was based on submitted curricula vitae (CVs) with no evidence of any extra effort to verify the contents of those CVs. Experience on the projects showed that evaluating proposed candidates solely based on their CVs was insufficient as cases of a stellar CV leading to the appointment of an individual ill-suited for the task were recorded e.g., a resident project manager with poor communication skills.

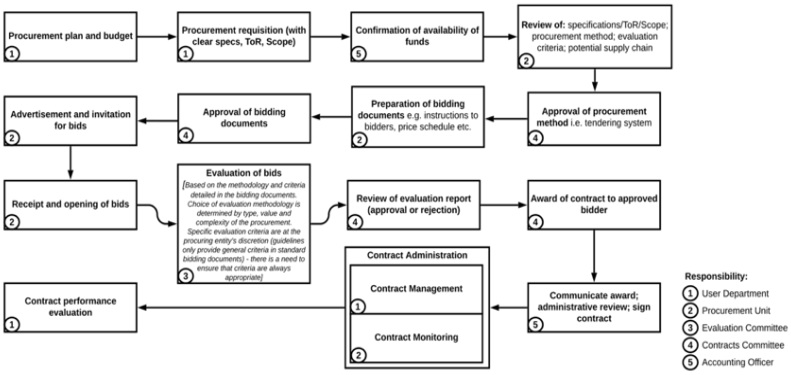

Figure 3: Case study projects' local public procurement process/cycle

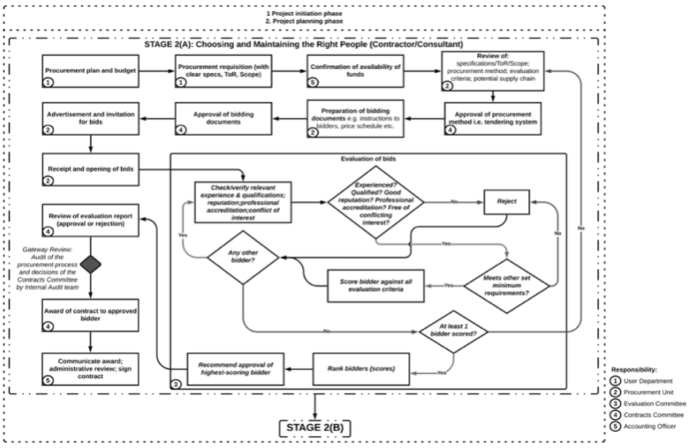

Figure 4: STAGE 2(A)-Choosing and Maintaining the Right People (Contractor/Consultant)

On that account, it is proposed that the evaluation of appointees to key roles in implementation of a project's contract should be in-depth, verifying and guided by the criteria in Table 1, as a minimum. Further, new appointees to key roles should be required to serve a probationary period that ends with an assessment of their performance in the assigned roles on the project, upon which their approval for permanent deployment should be based. That notwithstanding, continuous monitoring of the performance of key roles during project implementation should be done to verify and encourage the individuals' strengths while enabling timely identification and addressing of any weaknesses.

This could entail/invoke measures such as upskilling, reskilling, reassignment, or termination, as may be deemed appropriate for the improvement of the performance of

the key roles on a case-by-case basis. To get some indication of the professionalism of a potential player e.g., employer, contractor, consultant and/or their proposed personnel, the following criteria (Table 1) should be included among the evaluation criteria within the project's tendering and personnel appointment processes. On a project, human resource matters can be devolved so that each party deals with the personnel under their direct control following the proposed framework. The parties' relationship regarding human resource management (e.g., performance appraisal and feedback) would be guided by the contract(s) between them.

Table 1: Professionalism evaluation criteria

Criteria	Requirement	Principle of professionalism
Relevant qualifications	Skills/knowledge to satisfactorily perform the respective roles on the project.	Competence
Relevant experience	Experience in delivering similar projects or roles.	Competence
Professional accreditation/regulation	Affiliated/accountable to and/or regulated by a recognised professional body.	Integrity; Responsibility; Competence
Reputation	Past clients/supervisors have a good opinion of them and vouch for their performance, work ethic/conduct.	Integrity; Responsibility; Competence
Conflict-of-interest	No vested interest that may compromise judgement and proper performance of functions on the project.	Integrity

Figure 5 shows Stage 2 of the solution framework regarding choosing and maintaining the right key personnel/roles during project execution, in the context of the case study country's public procurement process/cycle.

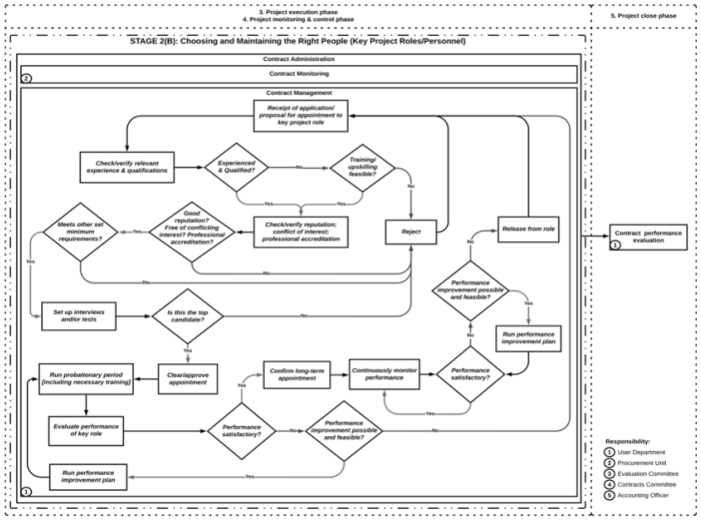

Figure 5: STAGE 2(B)-Choosing and Maintaining the Right People (Key Roles/Personnel)

CONCLUSIONS

Studies in a certain developing country—upon which this paper is based—have linked incompetence of project delivery stakeholders and their general lack of professionalism to contract disputes in large construction projects. Incompetence and a lack of professionalism in large construction projects were in turn associated with inadequate procurement of goods and services in the projects. The roots of some contract disputes in the large construction projects in the country in question could have been severed at both the preconstruction and construction phases of the projects by ensuring effective procurement of good and services. Accordingly, this paper proposes a solution framework for such contract disputes that provides a systematic process for choosing an appropriate procurement system for a construction project from the onset and choosing and maintaining the right people to deliver the project (i.e., people/contractors/consultants likely to uphold the principles of professionalism:

competence, integrity, and responsibility). By preventing the emergence of contract disputes, the proposed solution framework should foster successful delivery and performance of large construction projects. We therefore recommend the solution for empirical evaluation and eventual implementation.

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