

# IS THE COMPETENCE OF INTERNAL STAKEHOLDERS IN CONSTRUCTION PROJECTS AN ANTIDOTE TO CONSTRUCTION CONTRACT DISPUTES?

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Previous research on construction disputes has focused on identifying general sources of disputes. However, the occurrence of disputes follows causal sequences which have not been sufficiently studied. With increasing investment in megaprojects, the construction industry is bound to suffer consequences of disputes whose occurrence mechanisms have not been thoroughly investigated. Against this background, research was undertaken to improve the understanding of causal sequences of sources of disputes to facilitate better project performance. The research adopted a single case study strategy of an infrastructure megaproject. Secondary data including project reports, contract documents, minutes of meetings, and project communications were collected and analysed using thematic analysis. The findings show that while the sources of the dispute studied are numerous, their primary cause is the limited competence of internal project stakeholders. The results demonstrate the need for improving the competence of construction professionals in the areas of construction contracts, procurement management, contract administration, and project governance.

Keywords: competence, developing countries, disputes, infrastructure, megaprojects

## INTRODUCTION

Investment in megaprojects is increasing across the globe because of their associated benefits which include the creation of sustainable employment, improvement of the environment, and improvement of productivity (Flyvbjerg, 2014). Megaprojects have a significant impact on society, the economy, and the environment (Risk Group, 2017). However, the performance of megaprojects is affected by construction disputes that occur frequently during construction (Arcadis, 2021). Construction disputes are some of the main factors responsible for the unsuccessful completion of projects (Rauzana, 2016). After their occurrence, construction disputes often take a long time to be settled (Arcadis, 2021) which often results in stagnation of project activities and subsequent project delays. Furthermore, settlement of construction disputes involves transaction costs and often leads to financial claims. As such, construction disputes are undesirable, yet recurrent in the construction of megaprojects.

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Available literature suggests that emphasis has been put on general factors that lead to construction disputes with less concentration on their causal sequence. Most of the literature has not indicated competence aspects of project stakeholders to be an important factor in causing disputes yet the human resources are involved in all project activities. The fact that occurrence of disputes has not declined (Arcadis, 2021) implies generalisation of dispute sources is not appropriate (Love et al., 2008). This calls for case-by-case investigation of the events leading to occurrence of disputes. The need to investigate the escalation process of disputes in megaprojects inspires the work in this paper. The paper concentrates on the identification of a mechanism of occurrence of a construction dispute in a single case study. Understanding the causal sequence of construction disputes identifies a primary dispute source (Kumaraswamy, 1997; Love et al., 2011) where the limited organisation resources can be focused to eliminate the corresponding secondary sources and the dispute(s). Therefore, the research aimed to determine the mechanism of occurrence of disputes to contribute to the realisation of better performance of construction megaprojects.

### **Sources of Construction Disputes**

A dispute is a circumstance in which two parties disagree over the assertion of a contractual right, leading to a contract decision, which then becomes a legal dispute (Arcadis, 2021). Kumaraswamy (1997) emphasises that the management of disputes should follow the identification of the sources of disputes. The importance of identifying sources of construction disputes lies in the fact that it helps to ensure proper management of disputes. Understanding the sources of construction disputes is a prerequisite for appropriate dispute management (Love et al., 2008). The causes of construction disputes are varied, and often multiple (Love et al., 2008). Extant literature identifies several sources of construction disputes. The common sources include: the failure of stakeholders to comply with contractual obligations (Arcadis, 2021), payment delays (Kumaraswamy, 1997), poor project management (CRUX, 2020), scope change (CRUX, 2020; Arcadis, 2021), inadequate contract management (CRUX, 2020), errors and omissions in contract documents (Cheung and Pang, 2013).

The above literature suggests that efforts have been made to identify general sources of disputes in the construction industry and megaprojects in particular. However, the identified dispute sources are non-exhaustive considering the unique nature, complexity, and vast stakeholder involvement in projects (Soni et al., 2017). Since most of the researchers have used questionnaires to research the causes of disputes, the factors provided by the literature lack contextual meaning and have not hindered the reoccurrence of construction disputes (Love et al., 2011). Trends in Arcadis (2021) and CRUX (2020) imply that sources of construction disputes are dynamic and differ for different contextual situations. As such, characterisation and generalisation of sources of disputes is inadequate (Love et al., 2008) and therefore the need for source sequencing of disputes ((Hietanen-Kunwald and Haapio, 2021).

Love et al. (2011) argues that many researchers have falsely attributed the actual causation of construction disputes to single events and ignored the chain of events that lead to disputes. Hietanen-Kunwald and Haapio (2021) also asserts that disputes are often the end of the escalation processes and the real underlying causes need to be investigated broadly. Cheung and Yiu (2006) shows that the immediate causes of disputes are only triggering events that follow various underlying events and processes. Love et al. (2008) and Love et al. (2011), among others, emphasise the need for further research to study construction disputes and identify their underlying

causes to supplement the existing body of knowledge. Studying escalation processes of disputes is vital in understanding the primary causes of construction disputes (Hietanen-Kunwald and Haapio, 2021). Further investigations, including case studies, are necessary to obtain an ameliorated understanding of the underlying conditions that contribute to construction disputes (Love et al., 2011).

## **METHOD**

To identify a mechanism of causal factors for construction disputes, a desk study was conducted on a single case study to undertake an in-depth investigation (Saunders et al., 2019) of the sources of disputes during the construction phase. The case study had large amounts of data and the available resources were only sufficient for one case study. Although case study research is not theoretically generalisable, the purpose of this study was to provide exemplary knowledge from the case (Thomas, 2010). A desk study was appropriate since there was sufficient and reliable secondary data from the case study project. A desk study involved reviewing the secondary data of the case study to identify disputes and map mechanisms of the factors that led to the disputes. The desk study involved a critical review of over 10,000 pages of project documents. The documents included 11 contract documents the employer had with three key project stakeholders, 108 project progress reports, 36 project management consultant's reports, 70 files of minutes of meetings, 6 reports by a panel of experts, 3 project audit reports, and over 200 project letters. Minutes of meetings were official representation of agreement by all involved parties and therefore portrayed collective responsibility. Reports and letters were project documents based on evidence portraying the true project facts and were considered to represent collective responsibility. Informed consent was sought from the client organisation and anonymisation of the project and project stakeholders was a priority. Therefore, for this paper, the project and its stakeholders will be unidentifiable.

The project documents were analysed using thematic analysis with the aid of NVivo 12 software (Grbich, 2013). The desk study aimed at identifying disputes and mapping the escalation of the causes that led to the occurrence of disputes. Analysis of documents involved familiarisation of data, coding, and theme formation and refinement (Braun and Clarke, 2006) that were done concurrently. The thematic analysis was done inductively (Saunders et al., 2019) to identify all potential links to the disputes under consideration. The researchers also used interpretivism to incorporate their subjective interpretation of the causal factors as a supplement to document analysis (Saunders et al., 2019). The themes that highlighted the factors that led to the dispute were mapped into a causal mechanism and visualised on a relationship diagram. Timeframes of occurrence of the causal factors were identified to demonstrate that time logic was fulfilled between causes and effects.

The case study is a public infrastructure project under construction in a developing country (country Y) and is referred to as "Project Z" in this paper. Country Y is a developing country working towards middle-income country status and Project Z was initiated to support the country's economic development. The government of Country Y is represented by a government agency which is the client organisation of Project Z and a ministerial body. Among other duties, the government ministerial body was responsible for procurement of the contractor and owner's engineer for Project Z. Project Z is a flagship megaproject with a lump sum cost exceeding \$1.5 billion. The project involves multinational stakeholders including the contractor, owner's engineer, panels of experts, and the lender. The contractor is responsible for Engineering,

Procurement, and Construction and was procured under a turnkey procurement strategy. The project had the involvement of two asynchronous owner's engineers during the construction phase. Construction of Project Z commenced in the early 2010s and was still ongoing as of April 2022 with more than three years overrun.

Preliminary analysis of "Project Z" documents suggested the existence of many disputes between the contractor and the owner's engineer. Disagreement on the withdrawal of payments made to the contractor is one of such disputes and is the focus of this paper due to the relatively high attention it was given by various project stakeholders in project documents.

## **FINDINGS**

### *Triggering Event: Withdrawal of Payments Initially Made to the Contractor*

Findings show that the dispute between the owner's engineer and contractor resulted from the withdrawal of interim payments initially made to the contractor. The contractor disputed the decision of the owner's engineer to recall a percentage of payments initially made to the contractor. This was because the deduction resulted in a negative net payment that was bound to affect the successive interim payments. The contractor then decided to suspend the application of interim payments for over a year. As a result, project activities stalled and resulted in a contractor's claim worth 1.5% of the EPC contract price and additional time equivalent to 11% of the planned project duration. Withdrawal of the contractor's payment was only a triggering event for the dispute between the contractor and the owner's engineer. As suggested by Cheung and Yiu (2006), the research uncovered a mechanism of causal factors (highlighted in Figure 1) that led to the withdrawal of initially certified payment. Figure 1 shows the mechanism of occurrence of the dispute that was triggered by the withdrawal of the payment previously made to the contractor. The oval and rectangular shapes represent the causal factors whose cause-effect relationship is represented by arrows. The periods of occurrence of the causal factors are indicated to show that the chronological sequence of cause and effect was satisfied. The mechanism shows that the causal factors belong to two major categories i.e., the pre-contract phase (denoted as T0-N) until contract formation (denoted as T0) and the contract administration phase denoted as T0+N (where N is time before or after T0).

### **Causal Factors During the Pre-Contract and Contract Formation Phase**

#### *Limited competencies of internal project stakeholders*

Competence is the combination of training, skills, experience, and knowledge that a person has and their ability to apply them to perform a task safely (Health and Safety Executive, 2021). Competence also entails positive values and attitudes (Chan and Yeung, 2020). As such, the attributes of competence considered in this paper include skills, experience, knowledge, attitudes, and positive values of the human resources. The findings show that limited competence manifested in the human resources for all the major stakeholders i.e., the employer, contractor, and owner's engineer. Analysis of data and authors' subjective judgement shows that limited competences were one of the primary factors that escalated into the dispute. Limited competence manifested in various attributes. The employer had inadequate knowledge of procurement strategies for megaprojects. The contractor had limited workmanship skills and inadequate knowledge of some international design codes and project quality management. The owner's engineers had inadequate experience in undertaking engineer's roles on mega projects, and inadequate knowledge in project quality control contract administration and procurement strategies. The owner's engineer also showed negative values such as

a lack of commitment to the project. Therefore, aspects of limited competence manifested in both pre-contract formation and post-contract formation phases.



Figure 1: Mechanism of occurrence of the dispute

*Inadequate knowledge of employer of procurement for mega projects*

Analysed secondary data suggested that the employer procured an inexperienced consultant and owner's engineer for Project Z. The owner's engineer who was also appointed as the consultant for the pre-construction activities had insufficient experience to undertake such roles for megaprojects. This was the responsibility of the employer to ensure procurement procedures were followed and in turn appoint the most appropriate organisation. Using the researcher's subjective interpretation, the appointment of the inappropriate consultant suggested limited competence of the human resources. The employer seems to have considered least cost as a major selection criterion. As is common with traditional contracting, the procurement selection criteria focused on the least cost and the less experienced organisation met the cost criteria. Procurement based on the least cost is not recommended for megaprojects. Turner (2022) guides that procurement for megaprojects should rely on economic advantage rather than the least cost. The human resources of the employer seem not to have had sufficient knowledge about the best practices.

*Inexperienced consultant*

The consultant who assisted the employer in the preparation of the EPC contract was not experienced in megaprojects. The consultant was expected to be technically competent and was responsible for drafting the EPC contract with input from the employer. Therefore, the inadequate experience and knowledge of the consultant resulted in an inadequate EPC contract. The EPC turnkey contract for the >\$1.5 billion Project Z was based on World Bank's standard bidding document for small works not exceeding \$10 million. The consultant (owner's engineer) lacked the necessary skills to draft a suitable contract for the technically complex Project Z mega project. Despite the ongoing project, the same owner's engineer was relieved of duty by the employer after the expiry of their contract due to their unsatisfactory

performance inspired by limited competencies of human resources. Inadequate skills, knowledge, and experience of the owner's engineer directly contributed to their failure to fulfil contractual obligations. Among other tasks, the owner's engineer was responsible for ensuring quality control and assurance for Project Z. Their human resources lacked the necessary competencies and often approved inadequate drawings and failed to supervise activities as per drawings.

#### *Inadequate EPC contract*

The EPC contract for Project Z was an arm's length contract since the contractor and employer had no previous work relationship. The EPC contract was a modification of contracts for small projects not exceeding \$10 million under the World Bank framework. As such, most of the contract terms were unsuitable for megaprojects. The EPC turnkey contract on Project Z emphasised control through the principle-agent relationship between the contractor and the owner's engineer. For instance, the contractor had to seek the design approval of the owners before undertaking any activity. This high level of control is unexpected for a >\$1.5 billion project that Project Z was and is suitable for small projects (Turner, 2022). As Turner (2022) emphasises, trust is key in mega projects, and this is promoted by a principle-steward relationship. Based on trust, turnkey contracts should specify desired project outputs to be met by the contractor (Turner, 2022). The EPC contract instead required the contractor to seek approval of work methodologies from the owner's engineer. This should not be the case for turnkey projects. It was therefore expected for the principle-steward relationship based on trust to be reflected in the EPC contract for Project Z.

#### *The inadequate contract between the employer and owner's engineer*

The contract between the owner's engineer and employer emphasised the control of the contractor's activities and promoted distrust of the contractor. This contradicts the requirement of trust required in megaprojects (Turner, 2022). The contract should have considered the contractor as a steward and the role of the owner's engineers would be to oversee rather than micro-manage the megaproject. The inadequate contract was partially responsible for the incompetent human resources of the owner's engineer. The contract between the employer and the owner's engineer only stated the level of education and experience requirements from the human resources. There was no mention of required competencies and continued development of human resources. Complex projects have dynamic demands and call for innovation rather than following traditional project management practices (Turner, 2022). Innovation requires the application of a variety of competencies and skills that should have been included in the contract. This implies that the planning of the human resources (PMI, 2017) was inadequately done. Since the development of human resources was not required in the contract between the owner's engineer and employer, the dynamics of Project Z seem to have been too complex for the owner's engineer. However, training would have imparted the necessary skills to administer the contract better. Development of human resources requires resources that will unlikely be paid by a project-based organisation whose aim is to maximise profits. Development of human resources would have been enforced if it was a contractual requirement.

#### *Ambiguous contract*

The EPC contract was ambiguous and promoted biased interpretation by the contractor and owner's engineer. For instance, some design codes were not specified which led to different preferences by the owner's engineers. The contractor, with the acceptance of the owner's engineer, considered certain standards on which designs, and installations were based. The successor owner's engineer preferred different

international standards. All this was a result of a contract that allows for subjective interpretation. Good contracts are usually detailed enough with a specification of international standards and design codes to guide the project. This was not the case with Project Z. For the unspecified standards, it was up to the contractor and owner's engineer to agree on a standard for consideration. The disadvantage of this is that opportunistic behaviour and prior experience can lead to the adoption of less appropriate standards as was the case for Project Z. Sufficient contract details would have eliminated ambiguity and the subjective judgment by the stakeholders.

### **Causal Factors During Contract Administration**

#### *Inadequate knowledge and skills of the contractor*

The contractor's inadequate knowledge and skills were responsible for the inadequate designs, poor workmanship, and poor-quality work. These characterise the failure of the contractor to fulfil contractual obligations. Adequately skilled human resources would ensure designs are done following the appropriate international standards and installations are made as per the approved drawings. As such, issues of inadequate designs and poor workmanship would not manifest. The EPC contract highlighted the education and experience requirements of key contractor's human resources. However, relevant competencies were not mentioned. Megaprojects like Project Z are complex and require dynamic approaches (Turner, 2022). Training and continued development would have been important in the skills development of the project's human resources.

#### *Limited skills, knowledge, and negative values of owner's engineer*

The limited competence of the owner's engineer was shown in different aspects. The owner's engineer had insufficient experience to supervise complex megaprojects, inadequate knowledge, and skills which resulted in approving inadequate designs and certifying defective work. Further details have been referred to in the section discussing the "failure of owner's engineer to fulfil contractual obligations". Another aspect of competence was the lack of commitment of the owner's engineer to the project. The owner's engineer exploited the two months before the expiry of their contract for their benefit. They had less commitment to the project and approved substandard work knowing that another owner's engineer would replace them for the remaining project duration

Although the owner's engineers had no motivation to commit to their contractual obligations in that period, it was their responsibility. Since they still had a running contract with the employer, the owner's engineer had to respect the contract and fulfil their obligations. Their action of negligence explains their incompetence in terms of lack of commitment. Lack of commitment to the project goal led to work not conforming to the employer's requirements. Commitment would have encouraged the preservation of a relationship by cooperating and prioritisation of the long-term benefits of maintaining the relationship over attractive short-term alternatives (Chohan, 2020). There was no more relationship to preserve since the employer had fallen out with the owner's engineer and no relationship existed before the project. Therefore, the arm's length contract partially contributed to the limited commitment of the owner's engineer and their selfish action.

#### *Failure of the owner's engineer to fulfil contractual obligations*

Some activities were undertaken without drawings while others were characterised by poor workmanship, low quality, and deviations from approved designs. It was the owner's engineer's responsibility of managing project quality management and contract administration. One of their obligations was to approve all designs before

construction and installation. As such, the owner's engineer neglected their contractual duty and failed on major obligations of ensuring the contractor's adherence to the contract and ensuring project quality management. One of the ways to ensure compliance of the contractor to the contract is withholding payments if the contract requirements are not realised. The owner's engineer instead certified payments for such works considering them as complete milestones. This meant there was hardly any penalty for the contractor's contractual faults and therefore a loophole that would encourage the contractor to deviate from contractual obligations. As such, this partially inspired the contractor in deviating from their contractual obligations.

#### *Failure of the contractor to fulfil contractual obligations*

The contractor was responsible for Engineering, Procurement, and Construction. As such, designs were a major deliverable and prerequisite for any construction activity. However, some project activities were undertaken without design drawings. For such activities, the execution was done without prior approvals by the owner's engineer as required in the contract. Some designs were inadequate, and installations were of inadequate quality and poor workmanship. As such, the contractor deviated from the contract and employer's requirements and failed to fulfil contractual obligations. For turnkey procurement strategies, the contractor is responsible for all project phases from detailed designs to commissioning. Detailed designs are a major deliverable under such procurement strategies. Engineering principles and best practices emphasise the need for considering designs as prerequisites for construction. A contractor being guided by engineering principles was not expected to make installations without designs. Furthermore, the EPC contract for Project Z specified that construction and installations should follow designs approved by the owner's engineer. This, therefore, implies that the contractor ignored industry best practices and deviated from the contract in cases where installations were done without designs.

#### *Opportunistic behaviour*

Opportunistic behaviour was another reason for the failure of the contractor to fulfil contractual obligations. The contractor took advantage of desperate project situations to fulfil their interests. For instance, when the owner's engineer failed in project quality management, the contractor continued to provide inadequate quality work. Opportunistic behaviour is common human behaviour in projects based on a principle-agent relationship in which agents are self-interest-seeking (Chohan, 2020). The contractor on Project Z took advantage of the owner's engineer's limited competence and commitment to fulfil self-interests. The contractor persuaded the owner's engineer to certify and pay for the inadequate quality work. Limited competencies and commitment of the owner's engineer provided a fertile ground for the contractor to complete as many milestones as possible before the change of the owner's engineer. The opportunistic behaviour of the contractor in Project Z exposed the agency problems related to principle-agent relationships. This is because any loophole in control was an opportunity utilised for opportunism by the contractor at the cost of the project.

#### *Principle-agent project governance*

The opportunistic behaviour of the contractor resulted from a principle-agent relationship on Project Z. The contractor was treated as an agent while the owner's engineer acted as the principle despite the contractor being responsible for engineering, procurement, and construction. The relationship between the contractor and owner's engineer relied on distrust and contractor had to work under close supervision of the owner's engineer. As such, the relationship between the contractor

and the owner's engineer was entirely dependent on control. This principle-agent relationship encourages parties to concentrate on what is good for themselves rather than the project resulting in agency problems such as opportunistic behaviour. The principle-agent relationship was inappropriate for Project Z since it was a megaproject with aspects of technical complexity. Recent body of knowledge in which many empirical studies are synthesised and captured in Turner (2022) shows that principle-agent governance is inappropriate for megaprojects. The use of a principle-steward governance system would have mitigated the opportunistic behaviour of the contractor since it encourages all parties to prioritise what is best for the project.

#### *Non-conformance to employer's requirements*

The findings show that the discovery of non-conformities to the employer's requirements inspired the owner's engineer to deduct the interim payments previously done to the contractor. Non-conformities with the contract and employer's requirements were identified for electro-mechanical works after payment for the same milestone was reached. The non-conformities majorly included defects, poor workmanship, poor quality work, and work done without drawings. The owner's engineer raised the non-conformities with the contractor, but the latter was reluctant to rectify the non-conformities. As such, the owner's engineer decided to deduct the previous payments as a compliance mechanism for the contractor to rectify the non-conforming works. The failure of stakeholders to fulfil contractual obligations and an ambiguous EPC contract resulted in work not conforming to employer's requirements.

## **CONCLUSIONS**

Construction disputes are frequent in megaprojects and their occurrences follow a chain of events that originate from a primary source(s). The research findings showed that several factors contributed to the causation of the dispute in Project Z although it was pronounced by a triggering event. All the causal factors were linked to competence issues in which limited competencies of the project stakeholders during tendering, design, and construction phases of the project. Although the dispute and its causal factors was identified on a megaproject case study in a developing country, the findings may be generalisable empirically not theoretically on other projects in various projects. The findings therefore portray the importance of ensuring project stakeholders especially the project management team have sufficient competence attributes. Training and continuous professional development of human resources through the lifecycle of the construction projects can improve their competencies. Therefore, there is a need to emphasise proper human resource planning to ensure adequate estimation, acquisition, and development of human resources during the lifecycle of megaprojects. From the research undertaken and reported in this paper, the authors contend that the competence of internal stakeholders of infrastructure projects is an antidote to contract disputes in infrastructure projects. The authors suggest undertaking of further case study research on the causation mechanisms of independent disputes to identify causal factors for specific disputes.

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