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TRANSACTION COSTS IN AUSTRALIAN CONSTRUCTION PROJECTS

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ABSTRACT

Construction projects involve transaction costs (TCs) both during the pre and post-contract phases. If these costs are not managed appropriately, they can lead to project cost overruns. The purpose of this study is to explore the transaction costs, their determinants and mitigation strategies in the Australian construction industry. Qualitative data were collected by conducting semi-structured interviews with professionals who have been working as contract administrators, project managers, quantity surveyors and construction managers. The data were then analysed using thematic and content analysis techniques by using NVivo software. The research identified context-specific transaction costs such as statutory charges, opportunity costs, cost of compliance, and lost-time costs. Moreover, the findings indicate that factors affecting transaction costs are interrelated; hence, each factor affects more than one type of transaction cost. It was also found that rules and regulations imposed by regulatory bodies, the type of bidding procedure used, and the use of non-integrated procurement methods increase transaction costs. Further, mitigation strategies for minimising TCs such as recruitment of qualified experts, building trust and relationships, and the use of digital technologies such as BIM, drones and point cloud were identified.

Keywords: *Construction Industry; Cost Overruns; Project Cost; Transaction Costs.*

1. INTRODUCTION

One of the success factors for construction projects is to complete them within budget. However, various researchers in Australia and other countries frequently reported project cost overruns. Terrill et al. (2016) identified that up to 52% of construction projects experience cost overruns. Similarly, Love et al. (2013) found that an average of 12.22% of projects had experienced cost overruns. The most prevalent causes of cost overruns as identified by previous researchers were design changes, increases in the prices of construction materials, labour shortages, variations in scope, and force majeure (Abidin & Azizi, 2021). However, most of these causes are related to production costs. Indirect costs, unforeseen costs, or costs related to the transactions between project parties are often overlooked. According to Li et al. (2013), construction project cost includes not just the production costs, but also transaction costs (TCs) such as the cost of bidding, acquiring information, processing claims, and contract administration and dispute resolution. Also, Guo et al. (2016) explored TCs and classified them into pre-contractual and post-contractual. According to Rejeh et al. (2015), pre-contractual TCs are costs

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incurred before signing the contract such as costs related to information gathering, communication, tender documentation, bidding, feasibility studies, environmental impact assessments, and negotiations. Post-contractual TCs are costs incurred on activities such as set-up and running, enforcement, decision-making, and dispute resolution after signing the contract. Nonetheless, previous studies did not thoroughly examine how these TCs and their determinant factors affect the project cost performance and propose mitigation strategies for each transaction cost. Therefore, this study is conducted to fill the aforementioned knowledge gap. Hence, this research aims to explore context-specific transaction costs and their mitigation strategies.

2. LITERATURE REVIEW

Previous studies revealed that the cost of a construction project consists of both production and transaction costs (Winch, 2006; Li et al., 2015; Rajeh et al., 2015). These TCs were categorised into the two main phases of a construction project: pre-contract and post-contract TCs. Rajeh et al. (2015) discussed that pre-contractual TCs are related to information gathering and procurement, whereas post-contractual TCs are related to contract administration and enforcement activities. Pre-contract costs are borne as a result of time spent on procurement activities before signing a contractual arrangement and post-contract TCs incur due to the time spent implementing and monitoring activities after contracts are signed. Li et al. (2015) expanded pre-contract TCs by introducing costs incurred in drafting contracts, negotiation of agreements, training, site visits, attending meetings, conducting feasibility studies, transition observations and bidding. Furthermore, post-contractual TCs were also expanded by including costs related to setting up and running, bonding, dispute and conflict resolution, verifying compliances, and decision-making (Li et al., 2015). According to a study by Elbaz et al. (2020), TCs occur throughout the lifecycle of a construction project, and there are hidden TCs involved in a project, such as lost-time costs, trust damage costs, delay recovery costs, emotional costs, which are intangible yet can influence the total construction project cost. This signifies that apart from pre-contract and post-contract classification, there are hidden TCs as well. Further, it was identified that outsourcing from external organisations incurs extra TCs such as negotiation, measuring, and monitoring costs (Rajeh et al., 2015). Over the years, the complex and dynamic nature of construction projects has resulted in many cost overruns (Afzal et al. 2020). According to Love et al. (2013), 95% of a sample of 58 Australian infrastructure projects have been impacted by cost overruns. Love et al. (2013) suggest that Australia is likely to have high rates of cost overruns. In light of the aforementioned findings, many researchers have attempted to reduce cost overruns in construction projects. According to Durdyev (2021), identifying the causes of cost overruns was considered a good starting point for optimising project cost performance. Durdyev (2021) identified the main causes for cost overruns in construction projects such as inaccurate estimations, design problems, and shortage of skill and experience. Lee et al. (2009) argued that TCs that develop throughout project phases can also result in cost overruns and ultimately reduce the profitability of contractors. However, it can be opined that the majority of published construction management research focused on the production cost rather than the TCs.

3. RESEARCH METHODOLOGY

The three main research approaches commonly used include qualitative, quantitative, and mixed. The qualitative research approach is well suited to this research because it allows for the exploration and critical analysis of a wide range of ideas from a diverse group of industry professionals. According to Ary et al. (2018), there are various data collection methods specified under the qualitative research approach such as observations, interviews, literature review, ethnography, case study and historical review. Among these methods, interviews were used as the research method in several past research studies related to TCs (De Schepper et al., 2015; Haaskjold et al., 2020; Wu et al., 2021). This research used semi-structured interviews as the data collection instrument. The interviewees comprise of 10 industry professionals, namely construction managers, quantity surveyors, project managers, and contract administrators. The participants have experience ranging from 3 to 28 years. According to Malterud et al. (2016), data collection via interviews can be stopped when the interviewees start giving similar answers to the questions or at saturation point. After completing eight interviews, it was discovered that the interviewees provided similar responses. As a result, the data collection's saturation point was determined to be eight. However, the researchers conducted two more interviews and completed the data collection. The semi-structured interview consists of two sections. The first section was designed to collect background information about the interviewees, and the second section consists of open-ended questions related to TCs. Some of the questions include: "In your opinion, what are the typical TCs in Australian construction projects?" "Do you think that TCs have an impact on project cost performance? If yes, please explain"; "What strategies would you suggest to reduce TCs?" All the interview questions were carefully crafted to obtain data that help to meet the study's objectives. The semi-structured interviews were conducted on a face-to-face basis and virtually. Each interview lasted approximately 30 to 40 minutes. Both notetaking and recording were carried out with the consent of the interviewees, and this helped to generate verbatim transcriptions of all the interviews. There are various approaches for analysing qualitative data such as narrative, content, thematic, grounded and discourse analysis (King & McCarthy, 2018). Content and thematic analysis approaches are widely used methods because they allow for an objective study of textual material, topics and concepts (King & McCarthy, 2018). Furthermore, content analysis allows for the comparison of diverse viewpoints and descriptions of current practices (Smith & Firth, 2011). Thus, this method of data analysis is effective for this research, in identifying the many features and viewpoints on TCs and their impact on project cost performance. Thematic analysis was conducted to identify themes from the verbatim transcripts of the ten interviewees, and the themes were further analysed using the content analysis technique. NVivo 12 software was used to carry out the thematic and content analysis for this research study. The software was used in identifying multiple themes, comparing theme labels, and looking for interrelationships across themes.

4. FINDINGS

4.1 PRE- AND POST-CONTRACTUAL TRANSACTION COSTS

One of the most reported pre-contractual TCs was searching costs which include costs associated with conducting a feasibility study to determine the type of development, scouting a suitable land, conducting market research on profitable investments,

professional fees associated with calculating the capital requirement, and preparing a preliminary cost plan, researching the rates of materials, and numerous site visits. The second most cited category of cost was negotiation costs. As outlined by Interviewee 5, "*It is not as simple as picking up the phone and asking them for the price they want to give and closing the deal upright. It takes a day or two to follow up with suppliers and subcontractors because there will be many back-and-forth meetings".* Another important pre-contractual TC was the bidding cost. This cost includes all the document preparation costs, acquiring bonds and insurances (i.e., bid bonds, professional indemnity bonds, and cost of acquiring building licenses). Interviewees mentioned statutory charges as another pre-contractual TC. It was also emphasised that planning and building permits should be obtained from the relevant local council or registered building surveyor before commencing construction. This is a lengthy procedure that involves gathering documentation, filling out forms, adhering to planning standards, and justifying any variances. These activities require additional time and effort from the professionals, implying a different type of transaction. Participants identified several other TCs, including the cost of obtaining a software license and legal fees for contract preparation. Interviewee 9 (IR9) suggested that opportunity cost is also a TC. For example, as per IR9, "*during the process of obtaining a planning permit for a proposed school project in Melbourne, the council promised the client that if they agree to upgrade the water main running to the proposed site and the surrounding neighbourhood, the proposal would be approved immediately. As a result, the client was forced to bear the cost of upgrading the water main as an opportunity cost to obtain the planning permit for the profitable project".* Procurement costs were the most reported TC in the post-contract period. The contractor has to manage subcontractors, suppliers and labourers, all of which require different contract documents to be drafted. TCs incur as a result of these procurement actions. Moreover, the data collected revealed that post-contractual TCs include negotiation costs as well as administrative costs associated with handling variations, claims, and change orders, as well as managing supply chain activities. Conflicts and disagreements between parties are prevalent throughout the transactions, resulting in conflict resolution expenses and additional administrative expenditures that can be categorised as TCs. IR2, representing a contracting organisation said that "*TCs are a portion of company development costs. Furthermore, he defined them as expenses such as marketing, advertising, client entertainment, payroll tax, fringe benefits tax, vehicle costs, and cost of managing the fleets all of which are necessary to keep the business running".* Several interviewees said that there are significant costs associated with simply complying with clients in Australia, particularly when working with aged care and childcare clients. This approach will necessitate a lot of communication and paperwork with subcontractor's employees and requires a devoted professional throughout the project. Other post-contractual TCs include the cost of purchasing safety equipment, the cost of maintaining registrations and licenses, and bank charges. Regarding the comparison of the extent of pre and post-contractual TCs, the interviewees gave different responses. More than half of the participants said that most TCs occur during the pre-contract stage. Their rationale was based on the idea that, except for some unforeseen costs, the post-contract stage would contain a rough outline of the transactions to occur. The pre-contract stage, on the other hand, may result in a range of transactions, with the quantity of work required being unknown. The respondents who reported that the post-contract stage would have higher TCs were assuming that the post-contract stage would be the longest and most complicated of the two stages, depending on the type and size of

the project. As a result, compared to the pre-contract stage, there may be many transactions involved throughout that procedure. However, all the interviewees agreed that it is difficult to exactly tell which stage has the highest.

4.2 EFFECT OF OWNER'S AND CONTRACTOR'S BEHAVIOUR ON TCS

All the interviewees agreed that the owner's behaviour has an impact on TCs. It was discovered that a client's lack of experience in the construction sector would have a significant impact on TCs. Because clients may not make diligent decisions promptly. Moreover, the interviewees have addressed how the client's relationship with the other stakeholders and their demeanour affects project TCs. Both of these behaviours would increase the number of transactions in the project, resulting in higher administration, negotiating, and statutory costs. Lack of contractor experience, due diligence, and motivation in working as a team were all cited as factors that impact TCs. The contractor's opportunistic behaviour was another key influencing element for TCs. According to the responses, unbalanced bidding is a common contractor's behaviour. Frontloading is a way of unbalancing a bid in which a bidder overestimates the unit price of the items planned to be completed early in the project while underestimating the unit price of the items scheduled to be completed later. This will increase the number of claims for low bids later in the project. Consequently, transaction expenses will be incurred as a result of the drafting of claims, continuous negotiations, and additional effort for the project team in the administration of claims. Furthermore, another participant remarked that the contractor's negative attitude toward risks, by attempting to avoid and transfer all risks to the other stakeholders, would result in unnecessary TCs.

4.3 EFFECT OF PROJECT MANAGEMENT EFFICIENCY ON TCS

The respondents mentioned that project management efficiency, expertise, leadership, and knowledge have an impact on TCs. Project managers' inefficient behaviour would result in project delays, rework and variations, which results in greater transaction expenses, especially in the post-contract stage. Meanwhile, most respondents stated that unnecessary TCs such as enforcing costs and information costs are incurred as a result of the project management team's lack of quality communication. Greater project uncertainty produces higher TCs because it allows an opportunistic trading partner to jack up its bids, do extra work, and demand various claims, which rises post-contract TCs, according to the findings. Another set of respondents stated that failing to have a good action plan for project risks will result in higher TCs as a result of the need to interact and consult in-house or external experts to find solutions. Around 70% of the responses mentioned that an incomplete design or missing schedules will create many ambiguities which will lead to dispute resolution costs, site meeting costs, and searching costs. Additionally, some participants claimed that the majority of project TCs are attributed to insufficient contract paperwork. Because not properly drafting contracts will result in unnecessary TCs such as rework, disagreements, and losses. About 50% of respondents mentioned that the complexity of a project would result in greater TCs because there will be more micro-components to look at when the project is more complex, and more transactions will be involved in understanding the project. Another respondent, on the other hand, said that project complexity is multi-varied, arguing that a laid-back customer might make a difficult project simpler. As a result, the impact of complexity on TCs will be determined by the trust and synergy between the client and contractor. Whereas in the respondent's opinion, all these factors are interlinked. According to the replies gathered

from the interviews, most respondents believe that TCs have a substantial impact on project cost performance. The results showed that a maximum of 2% of the construction project cost consisted of TCs. IR8 illustrated his point with a scenario that occurred in one of his ongoing projects, a high-rise building in Melbourne's CBD. "*Since the design phase, the building has had private screens in the terraces. However, the architect has not completed a feasibility analysis on this design, and it was identified during the construction stage that special approval was needed to add these screens. This resulted in additional TCs that eventually impacted the total project cost due to further delay charges."* Another example given by an interviewee is that, on average, roughly 10% of the cost of a construction project is committed to consulting fees. Clients, on the other hand, manage to obtain consultants for 2-5 percent of the fee proposed instead of 10%. As a result of decreased TCs, these consultants will be unable to provide high-quality designs, documentation, and project management. At the end of the day, the 8% savings will be irrelevant because project cost overruns will outnumber savings. However, IR5 stated that TCs are not very huge to impact an overall construction project cost materially.

4.4 STRATEGIES TO MITIGATE TCS

The data analysis yielded many strategies that may be used to minimise TCs. According to the findings, most experts strongly advised employing an experienced project team since technical competency and experience can minimise a significant amount of unnecessary TCs incurred during project transactions. The interviewees agreed that the most important element of a project is the project scope and contract. As a result, having a well-defined scope, good documentation, and readily available information would reduce most TCs. Following that, most participants suggested strategies such as maintaining uniform procedures and policies, as well as allocating sufficient resources within the organisation. Furthermore, since bidding behaviour was found to be a significant factor influencing TCs, it was suggested that a more transparent pricing technique could be used, and more competitive bidding procedures could be implemented. Maintaining a positive relationship between the contractor and the client, and developing trust with the consultant or contractor, was suggested as a passive approach to reducing TCs. Summary of the strategies are presented in Table 1.

Table 1: List of strategies to minimise TCs

Categories	Strategies to Mitigate Transaction Costs
Technical Competency	Recruiting a qualified and expert project team
	Recruiting a project team who are diligent in decision making
	Recruiting employees who are competent in using new software and platforms.
	Implementing a proper methodology before negotiating with clients
Scope and Contract	Allowing appropriate time to go through contract documentation.
	Incorporating more time to plan and research.
	Having information readily available to use
	Maintaining clear and proper documentation and records
	Trying to maximise the detailing of the project
Organisational Aspect	Having a proper organisation structure with a key point of communication
	Establishing standards procedures and templates
	Installing efficient software/systems for compliance works
	Implementing digital technologies such as BIM, drones and point cloud
	Focus on procuring sufficient resources to cater to project needs

Categories	Strategies to Mitigate Transaction Costs
Bidding Behaviour	Encouraging a more transparent bidding procedure Advising on more competitive bidding than bidding low Advising on an apple-to-apple bidding procedure Conducting an advanced feasibility study before factoring
Trust and Relationships	Entrusting the selected builder from the beginning Use a single and double-pointed contractor base Making good relationships with all parties with mutual trust
Client's Behaviour	Recruiting a consultant/Superintendent if having less experience and knowledge in construction projects Following a timely payment system Having sufficient capital/funds in hand before entering a project Indulge more time to decide the requirements and scope of the project Taking decisions diligently and on time
Procurement Aspect	Installing efficient software/systems for procurement Involving more collaborative procurement methods which increase early contractor involvement. Following selection criteria or a matrix to find the best-suited procurement method
Contractor's Behaviour	Increasing transparency during variations and claims Following a more diligent approach with clients Implementing more flexibility in project works
Leadership and Management	Maintaining a strong leadership Agreeing on a proper conflicts management process Implementing a swift, smooth, and an efficient communication system Planning on a sustainable vendor management procedure
Proper Planning	Proposing to add an extra percentage to cover up TCs at the planning stage Incorporating more time to plan and research Applying a proper feasibility
Risk Allocation	Identifying project risks from an early stage Implementing a fair risk allocation process

5. DISCUSSION

5.1 TCS IN CONSTRUCTION PROJECTS

A list of distinct types of TCs in Australian construction projects was found during the analysis and categorised under two main phases of projects. Several academics have found a similar type of TCs to those discovered through this study. Such as searching costs, cost of feasibility studies, bidding costs, documentation cost, cost of site visits, negotiation costs, bank charges, setting up and running costs, cost of administering contracts and claims, dispute resolution costs, cost of compliance, and legal charges (Li et al., 2012; Li et al., 2015; Guo et al., 2016; Anderson et al., 2020). This shows that regardless of the geographical locations, these sets of fundamental TCs are common in construction projects. Business development costs are one of the newly found post-contractual TCs. According to the analysis, business development costs include payroll tax, fringe benefits tax, car charges, and fleet management costs. These costs occur during transactions between the contractor and the suppliers when procuring resources and they

have an impact on construction project costs. These TCs may change with the economic stability of the country and government regulations. Another important post-contractual TCs obtained in this study is marketing costs. Elbaz et al. (2020) stated in their study that TCs can occur at any time during the project's life cycle. Hence, marketing costs could be identified as TCs incurred near the end of the project's post-contract period which will be borne by the client. Therefore, marketing costs will include generating commercials, locating advertisers, and erecting mock-up houses among other things. Apart from the above-described TCs, most respondents noted another sort of TC which is a time cost. Based on the findings of the literature analysis, this type of cost was also classified as intangible TCs (De Schepper et al., 2014).

5.2 FACTORS AFFECTING TCS

It was found that the client's lack of experience has a huge effect on the project's TCs. This is because the lack of experience could lead to several requests for information which has transaction cost implications. Li et al. (2012) stated that the effectiveness of the owner's experience in similar projects would be determined by the lessons learned from finished projects. This means that experienced owners can make informed decisions, reducing the cost of time losses to obtain approvals. Unclear scope will cause the owner to change his requirements at any time. This will increase the TCs by requiring reapplication for planning approvals as a result of design adjustments, and there will be extra administration costs owing to the changes. This factor was also highlighted by other researchers, that owner-initiated changes have become a substantial factor that affects TCs (Li et al., 2012; Guo et al., 2016). The contractors' experience and expertise in construction projects and solid relationships with subcontractors are found to have a significant effect on the TCs. Previous study has shown that if a transaction occurs frequently, it provides a level of trust that reduces the need for more expensive protective coverage and offers opportunities for learning (Melese et al., 2010). The opportunistic behaviour of the contractor was also the key factor affecting TCs. When a contractor opportunistically bids for a construction project by providing a low price in anticipation of seeking reimbursement during the project's execution by way of raising an absurd number of claims is an example of opportunistic behaviour. As a result, extra TCs will be paid when administering claims and dispute resolution when settling contract parties' unfair and unethical behaviour. Similarly, a previous study has identified that construction contractors frequently engage in excessive risk-taking, which results in negative financial accruals (Ikuabe et al., 2020). According to the findings of this study, most of the day-to-day TCs in a project, such as the cost of administration of claims and change orders, and dispute resolution, are heavily dependent on project management efficiency. Similarly, several research studies have argued that the project management team should have the technical expertise necessary for project tasks (Walker & Wing, 1999; Li et al., 2012; Li et al., 2015). Furthermore, the quality of communication within the project management team was found to have a significant influence on TCs. Likewise, in a study based on collaborative construction projects, quality of communication was found to be one of the factors that affect TCs (Anderson et al., 2020). According to the theory of TCs, the transaction environment involves complexity, uncertainty, frequency, and asset specificity (Williamson, 1998). Similarly, the expert interviewees believed that these elements were regarded as the most significant aspects impacting TCs in the construction industry. It was found that administrative costs and business development costs can increase if the project complexity is high. Project uncertainty was also pointed

out as the factor that impacts TCs. By the same token, empirical research shows that environmental uncertainty increases TCs (Guo et al., 2016). Uncertainty could be related to the type of materials to be used, material prices, weather conditions, soil conditions and contract conditions. Finally, the interview responses uncovered the bidding procedure, as well as the authority's regulations and requirements as factors influencing TCs. There are a variety of bidding techniques, including open bidding, competitive bidding, nominated bidding and E-tendering. As a result, each operation will have different steps and administrative needs, which will increase or decrease TCs during the bidding process. Farajian (2010) acknowledges that a lower level of competition can result in lower TCs during the pre-contract stage, but the overall project costs will likely be higher as a result of the less competitive procurement process. Through the analysis of the responses of the expert interviews, contradictory opinions about the impact of TCs on project cost performance resulted. Based on the findings of this study, TCs account for no more than 2% of the total project cost in Australia. However, Dudkin and Valila (2005) found that contractors in the United Kingdom spend between 0.24 and 0.57 percent of project costs on TCs, while TCs in the Czech Republic is around 0.25 percent of the contract value. Some interviewees had an opinion that a TCs percentage is too small to affect the overall project cost because the effect of such a small amount can be easily recovered once the project begins to make profits. On the other hand, others believed that, while such a small sum would not have a substantial impact on the project's cost, it would be critical to keep track of all the costs that had a material impact on the project. Given the conflicting opinion of the interviewees, it is suggested that large datasets should be collected and analysed quantitatively to verify the percentage of TCs in Australian construction.

6. CONCLUSIONS

The influence of TCs on project cost performance was explored in this study. This was investigated by conducting semi-structured interviews with professionals in the Australian construction sector. Different types of TCs were revealed through this study; among them, statutory charges, compliance costs, and opportunity costs are newly discovered pre-contractual TCs in the Australian environment. Similarly, newly identified or context-specific post-contractual TCs include business development, marketing, and time-lost costs. Furthermore, it was identified that TCs have an impact on project cost performance, both directly and indirectly, despite the low percentage of the impact. Furthermore, the owner's and contractor’s lack of experience and knowledge, negative demeanour towards the project, contractor’s opportunistic behaviour, rules and regulations implied by construction authorities, bidding procedures, and non-integrated procurement methods, have been highlighted as factors that can cause TCs to increase unnecessarily. Several mitigation strategies for minimising TCs were also identified. These include recruitment of qualified experts, building trust and relationships, and the use of advanced software or digital technologies such as BIM, drones and point cloud. Moreover, it was revealed that all these factors and mitigation strategies are interrelated; therefore, one strategy alone may not mitigate the effect of TCs on total project cost. This research has both theoretical and practical implications. The findings of the study are an important addition to the body of literature on TCs. Because this study contributed distinct factors that affect the TCs, in addition to the findings available in the existing literature. Some of these factors include the bidding procedure as well as the rules and regulations imposed by the industry's governing bodies. From the practice point of view, stakeholders

involved in the construction of building projects can adopt the strategies identified in this research to minimise transaction costs or avoid unnecessary TCs in their projects. This will eventually aid them to reduce project cost overruns. Although this study met its aim and objectives, it has some limitations. The data collection for the study was limited only to the opinions of professionals who work for main contractors and cost consultants. Consequently, the views of the owners and other stakeholders were not considered. Moreover, the focus of this research was on TCs associated with building projects. Therefore, it is suggested that future studies can explore the views of other stakeholders such as owners, material suppliers, and subcontractors on TCs, and analyze the data using mixed methods to arrive at a more accurate percentage of TCs. Additionally, further research might be conducted by collecting data from other countries' construction industries and develop context-specific strategies.

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