

CONTRACTUAL GOVERNANCE AS A SOURCE OF INSTITUTIONALISED WASTE IN CONSTRUCTION: A REVIEW, IMPLICATIONS, AND ROAD MAP FOR FUTURE RESEARCH DIRECTIONS

ABSTRACT

Purpose

– The construction industry has been subject to substantial criticism for its short term “hit-and-run” relationships which are focused on win-lose situations. Despite the wide recognition of these problems the industry persistently resists the radical demanded of it. Therefore, the main purposes of this study are twofold. First, to investigate why this might be the case by reviewing the governance problem confronting clients and decision makers in construction procurement, as conceptualised in Transaction Cost Economics (TCE). Secondly, to critically analyse and question the efficiency and effectiveness of various safeguarding approaches, which are taken for granted and commonly practiced in construction, from a lean perspective.

Design/methodology/approach

– The analysis of this paper is based on an in-depth critical review of 76 construction procurement and contractual related articles, ranging from 1994 to 2016, using theories of Lean Construction and Transaction Cost Economics as an analytical lens.

Findings

– Findings reveal that clients and decision makers often tend to safeguard their project-specific assets, against opportunism and exploitation, through the deployment of formal contractual arrangements and governance structures. These arrangements and structures typically dominate the management of the project delivery often to the detriment of the project itself; but because there is a belief that interests are safeguarded, clients and decision

makers feel they have taken the best course of action. This goes a long way to explaining the coherence of the current construction model.

Research implications

– To the best of the authors' knowledge, this paper is the first to demonstrate the usefulness of using principles of Lean construction in association with TCE when analysing construction-procurement related issues. In particular, the use of a 'lean' lens helps to expose the impact of procurement governance arrangements on process flow. The study also provides a potential research agenda that can lead to the development of prescriptive conceptual frameworks for causal analysis of institutionalised waste in construction.

Practical implications

– The paper attempts to expose to clients and decision makers the amount of waste (and unnecessary cost) they embed by adhering to prevailing unfit-for-purpose contractual governance approaches. It also helps decision makers to consider alternative procurement arrangements and organisational techniques that could be of value and support collaborative ways of working.

Originality/value

– The study contributes to the overall understanding of waste in construction by providing insight into various imperfect procurement and contractual arrangements, which are taken-for-granted and impede efficiency and improvement efforts in construction. The findings presented provide a theoretical anchor and rationale for developing alternative approaches to the design and delivery of capital projects.

KEYWORDS:

Construction Procurement; Waste; Transaction Cost Economics; Lean Construction; Institutional Theory; Safeguarding; Contractual Governance

INTRODUCTION

The construction industry is difficult, often regarded as confrontational, risk averse, and lacking trust and capacity for innovation and improvement (Zaghloul and Hartman, 2003;

Rooke *et al.*, 2004; Eriksson and Laan, 2007; Eriksson *et al.*, 2008). These characteristics are attributed to a number of factors including fragmentation (Egan, 1998; Sarhan and Fox, 2013); an adversarial hierarchical structure (Ghassemi and Becerik-Gerber, 2011; Sarhan and Fox, 2013); obsolete procurement methods (Eriksson and Laan, 2007); confusing and treacherous contractual arrangements (Cox and Thompson, 1997; Sebastian., 2011; Hawkins, 2012); a highly competitive, cost-driven environment (Bresnen and Marshall, 2000) and the sequential organisation of construction processes (Koskela, 2000). The prevailing project procurement processes are thought to be a root-cause for these issues (Osipova and Eriksson, 2011) and to adversely affect the extent of cooperation and trust (Eriksson and Laan, 2007). The lack of cooperation and trust have been identified as key areas requiring substantial attention and improvement (Egan, 1998, Latham 1993 & 1994) and are central to overall client satisfaction and project success (Love *et al.*, 1998; Tookey *et al.*, 2001; Osipova and Eriksson, 2011). Matthews *et al.* (2003, p. 1) stress that *“maximizing value and minimizing waste at the project level is difficult when the contractual structure inhibits coordination, stifles cooperation and innovation, and rewards individual contractors for both reserving good ideas, and optimizing their performance at the expense of others”*. Adding to this, this study argues that procurement and contractual systems, as institutional arrangements (Sarhan *et al.*, 2014), are designed to assign liabilities and authorities to people and organizations (Love *et al.*, 1998) at the project and programme levels; and thus structure the borders that shape ‘*the play of the game*’ (Williamson, 2000).

Despite the many criticisms there seems to be a particular project delivery mind set embedded in the organisational fabric of the industry that prevails regardless of the attempts to address the recognised inadequacies - the question is why does this mind set prevail? In order to provide an answer to this question, Transaction Cost Economics (TCE) is used to begin to unpick the current inertia as according to Williamson (2000) *“Any issue that arises as or can be reformulated as a contracting issue can be examined to advantage in transaction cost economizing terms”* (p. 599, 608). Within construction procurement, TCE offers a useful mechanism to analyse conflicting interests among contracting parties (Li *et al.*, 2013) and to understand the hidden costs associated with pre- and post-contract work (See for example Li *et al.*, 2014; Rajeh *et al.*, 2015; Guo *et al.*, 2016).

The study will focus particularly on how self-interest drives opportunism and influences the governance approaches and how this becomes a dichotomy as one organisation seeks to

protects its interests from the opportunism of others whilst continuing to exploit all opportunities themselves. It is proposed that one way to begin to break this seemingly irreconcilable and self-perpetuating cycle is to expose it as a cause of waste hitherto unacknowledged. Therefore, the aims of this study are two-fold. First, to review the governance problem confronting clients and decision makers in construction procurement, as conceptualised in Transaction Cost Economics (TCE). Secondly, to critically analyse and question the efficiency and effectiveness of various safeguarding approaches, which are taken for granted and commonly practiced in construction, from a lean perspective (i.e. the concepts of waste and flow as understood in lean thinking).

CONCEPTUALISATION OF WASTE IN CONSTRUCTION

The formal adaptation and transfer of the new production philosophies into construction projects has been ongoing since the early 1990's (Koskela, 1992). These philosophies were characterised as "lean" from the study of Toyota (Krafcik, 1988), and the term '*Lean Construction*' rose to prominence with the formation of the International Group for Lean Construction¹ in 1993. The concept of lean was formally recommended to the UK construction industry by a Government report (Egan, 1998). Traditionally, the term 'waste in construction' is usually limited or intuitively linked to physical (material) waste. The concept of material waste in construction has been widely addressed but the widened understanding introduced by the seven process wastes identified in the Toyota Production System (TPS) (Ohno, 1988) has struggled to be transferred. Process waste is directly associated with executing tasks and conforms to the current understanding of project management as '*a specific set of operations designed to accomplish a singular goal*' (Project Management Institute²). In this way, production is defined as transforming resources towards the finished product or project and waste can be seen as the inefficient use of resources in the execution of tasks. The disadvantage of this understanding of waste is that it drives the improvement of current processes rather than radical new system design.

Koskela (2000) advances the definition of lean production to the combination of transformation tasks (T), flow (F) and value creation (V). This definition of production as

¹ www.iglc.net

² www.pmi.org

TFV creates two additional dimensions to the conceptualisation of waste as the inefficient use of resources in tasks. The first additional TFV dimension, flow (F), reveals the interdependency of activities across the whole project process. The consideration of flow brings the supply chain and the logistics of getting resources to the point of transformation into focus. Elevating flow to a project production driver also alters the classification of process waste within tasks. For example, waiting within one task may now be necessary to expedite tasks downstream – this waiting is therefore no longer a waste and results in one task being sub-optimised in order to optimise the project. Consequently the pursuit of waste within transformation activities can itself become a cause of waste if it disrupts flow. Erratic and disrupted flow of processes provide further sources likely to cause waste recognised within TPS in two ways - the unevenness of workflow (Mura) and the related concept of the overburden of capacity (Muri) (Liker, 2004).

The second additional TFV dimension is created by considering value creation (V) and brings the customer into focus. The construction sector typically identifies clients and more recently users and stakeholders – the term customer is not commonly used. However, the inclusion of value creation into project production moves the conceptualisation of waste towards identifying what causes value-loss and questions from whose perspective. This conceptualisation will vary from project to project and from customer to customer meaning the understanding of what constitutes value and how it is created becomes an important part of the design of the project production system (delivery including logistics, design and procurement) and the project product (the physical facility or asset created and what it achieves). One aspect of this conceptualisation is the consideration of the organisational, commercial and institutional environments that surround the design and delivery of construction projects. It is this aspect that leads to the primary research question:

'Is there anything in the commercial and institutional environments surrounding construction that is blocking radical new production system design and therefore pinning the prevailing wasteful system in place?'

A small but growing number of studies have attempted to investigate the influence of procurement processes on the generation of waste in construction projects (for example see Jaques, 2000; Gamage *et al.*, 2009). However all of these studies have only focused on the relationship between different procurement systems and the generation of construction

material waste. In the construction management literature, there are hardly any studies that have sought to investigate the role played by institutional processes, within the construction procurement context, in embedding process waste in construction projects.

The understanding of value and value loss (or waste) within these wider organisational, commercial and institutional environments is more difficult to determine not least because it requires a critical evaluation of the activities of different professions, for example lawyers, accountants, human resource managers, quantity surveyors to name a few. These environments and the professions within them also exhibit varying cultures, structures, systems and behaviours. Such an evaluation also needs to draw upon theory from disciplines outside both construction and manufacturing such as economics, law and sociology if it is to begin to explain the coherence and yet wastefulness of the current approaches to construction projects.

To begin to answer this primary research question, the study examines the current commercial and institutional arrangement within construction procurement and attempts to analyse them through the lens of Transaction Cost Economics. The authors then provide some examples of prevailing wasteful and imperfect construction procurement practices. The term 'waste' is almost always synonymous with physical waste (i.e. on-site material waste). However, throughout the following sections of this paper, the term 'waste' refers to the wider conceptualisation of waste as summarised above.

LITERATURE REVIEW METHODOLOGY

This paper critically reviews procurement and contractual governance theories and practices, over the past two decades, using mainstream management and construction management literature. The aim of this critical review is to contribute to the overall understanding of waste in construction by:

- Providing insight into various imperfect procurement and contractual arrangements, which are taken-for-granted and impede efficiency and improvement efforts in construction;
- Exposing to clients and decision-makers some of the unnecessary waste they embed into their projects by adhering to these imperfect governance arrangements; and

- Providing novel explanations as to why these particular imperfect mindsets and governance practices prevail in construction procurement.

To achieve this, a strategy had to be developed for the literature search. In general, researchers need to give careful consideration to the 'comprehensiveness' and 'relevance' of their literature review (Cronin *et al.*, 2008). Additionally, when gathering relevant literature, researchers need to decide, depending on the nature and purpose of their work, whether it's better to include a larger and more dispersed, or smaller and more focussed number of studies (Guetterman, 2015). Each of these two approaches has its own merits and demerits. For instance, the former provides a fuller representation of existing literature on a particular research topic, and can potentially lead to more generalisable conclusions; failing to do this can undermine the statistical analysis and bias the results (Thomas and Harden, 2008). The latter, on the other hand, may enhance the quality and credibility placed in the conclusions, but makes it less easy to generalise.

This study hopes to shed light on a cause of waste hitherto unacknowledged. This, therefore, requires entire reading of the relevant literature selected, with the aim of searching for latent themes (Braun and Clarke, 2006). This interpretative work entails a thorough review of the underlying ideas, assumptions, and conceptualisations informing the content of the data. For this reason, a generic purposive sampling strategy (Bryman, 2012) was adopted for literature review. This strategy is not driven by the statistical imperative of including every available study. Instead, it puts the research questions under investigation at the forefront of sampling considerations (Bryman, 2012). According to Doyle (2003, p. 326), a purposive sample is more appropriate than an exhaustive one, when the aim is explanation rather than prediction. Through this approach, the researcher decides what needs to be known, and deliberately chooses suitable literature which can potentially provide the most relevant information and have the largest impact on the enhancement of knowledge (Patton, 2015, p.276). As clarified by Thomas and Harden (2008), the results of a conceptual analysis will not change "*if ten rather than five studies contain the same concept, but will depend on the range of concepts found in the studies*". Based on these considerations, the study adopted the following approaches for identifying the relevant literature material:

- Targeting peer-reviewed papers published by top journals using electronic search engines (e.g. University's Library OneSearch and Google Scholar) and hand-searching referred

conference papers (e.g. ARCOM, CIB W92 Procurement Systems, and Annual Conference of the International Group for Lean Construction). The main keywords and topics that were searched for and reviewed included: preconstruction services, construction project governance, hidden transaction costs in construction projects, impact of procurement on project outcomes, relationship between procurement and waste (i.e. value loss), contractual governance, misuse of contracts, opportunistic practices, barriers to partnering, barriers to relational forms of contracting, barriers to lean and integrated project delivery, and changing roles of clients and professional service providers.

As a result of this effort, 76 construction procurement and contractual related articles, ranging from 1994 to 2016, were identified and thoroughly reviewed. When qualitatively analysing the articles, a table of information, that categorises information extracted from each paper, was created to help the authors with organising their thoughts (See Appendix 1).

CONSTRUCTION PROJECT PROCUREMENT

The organisational, commercial and institutional environments that underpin project production are enshrined within the project procurement processes and cover every aspect of setting up the transaction from identifying the business case and funding through to the appointment of consultants, contractors and suppliers. In general, increased trustful collaboration between project parties is argued to be an appropriate remedy for many of the industry's challenges (See for example Eriksson *et al.*, 2008; Xue *et al.*, 2010; Sebastian, 2011; Walker *et al.*, 2017). According to Vilasini *et al.* (2011), selecting a suitable procurement system for a particular project is vital for overall productivity of the project, and is one of the most important decisions that a project owner makes in the development of a project. They suggested that procurement systems should be the key starting point for the customisation of lean principles for the construction industry. Oyegoke *et al.* (2009), suggest that construction procurement can be applied to project management processes as a means of defining how production will take place, or as part of the production process as to when, where and how resources could be sourced. Similarly, Pekuri *et al.* (2014) argue that procurement procedures shape the form of the project-organization and the commercial terms binding the project parties; and thus that way they set the boundaries for the functioning of the project operational system (i.e. onsite project delivery). This means that in order to

optimise a project delivery system, we must align procurement and contractual arrangements with the project's operational system.

Due to the difficult nature of many construction projects, clients and decision makers, in practice, tend to allocate risks and seek to safeguard their project-specific investments and assets, from exploitation and opportunism, through the deployment of formal governance mechanisms contained within the contractual arrangements. This applies to all parties across the project chain from high level project funders through to raw material suppliers. Since, most of the clients who procure construction projects lack experience and may only ever build once or twice (Love *et al.*, 2010); they invariably seek advice from lawyers and from those who are familiar with construction contracts and the laws related to them (e.g. quantity surveyors). These lawyers or consultants are accordingly paid, as part of their agreed fees, for providing means for safeguarding their client's rights and transaction-specific assets. Unsurprisingly, in some cases these means can, for example, include the use of privileged conditions of contract, where clients may not mind protecting themselves from any risks, even if, this occurs at the expense of others.

However, in most cases, the intention for or on behalf of client's (experienced or not) is to control opportunism and utilise efficient governance of the transaction. Additionally there may be little awareness of how these procurement decisions and arrangements may affect the likelihood of creating a cooperative environment (Eriksson *et al.*, 2008) and thus impact on project performance and outcomes. In most cases the client advisers are not incentivised to adopt less familiar procurement arrangements that are potentially more efficient than conventional approaches Eriksson *et al.*, 2008) due to institutional pressure (DiMaggio and Powell, 1983; Sarhan *et al.*, 2014). Pekuri *et al.* (2014, p. 39) sought to analyse and conceptualise the problem of procurement in construction and concluded that a more profound questioning of current practice is needed.

TRANSACTION COST ECONOMICS

CONCEPTUAL FRAMEWORK AND FUNDAMENTAL ASSUMPTIONS

It is Coase's seminal article "The Nature of the Firm" (1937) which explicitly introduced the concept of transaction costs into economic analysis; by drawing attention to transaction costs that had been assumed to be zero in prior theorizing. Williamson and his fellows have

subsequently added refinements to Coase's general arguments (see e.g., Williamson, 1975, 1985, 2000; North, 1994). Transaction costs are the costs of specifying what is being exchanged and of enforcing the consequent agreements (i.e. contractual clauses) against the exchange partner (North, 1994; Ting *et al.*, 2007). Williamson (1975) categorises transaction costs into ex-ante and ex-post costs. Ex-ante costs comprise the costs of tendering, negotiating and writing the contract (Rindfleisch and Heide, 1997); while ex-post costs include the costs of: monitoring and measuring performance, implementing quality control systems, cost accounting, establishing layers of the managerial hierarchy, and dispute resolution processes (Rindfleisch and Heide, 1997). Dietrich (1994, p. 33) classifies transaction costs into:

- *Information-seeking costs* – these refer to the investment of time, effort and other resources associated with researching possible alternatives (Tate *et al.*, 2014);
- *Bargaining and decision related costs* – the costs of developing an agreement, negotiating, documenting, selecting potential exchange partners and establishing a contract (Tate *et al.*, 2014);
- *Enforcement related costs* – e.g. management, inspection and monitoring costs as well as costs incurred to resolve disputes arising from the contracted work (Walker and Wing, 1999; Tate *et al.*, 2014).

According to Rindfleisch and Heide (1997), Williamson's (1975, 1985) micro analytical framework of TCE, is underpinned by the interaction between two fundamental assumptions of human behaviour (opportunism and bounded rationality) and two key dimensions of transactions (asset specificity and uncertainty). The complete TCA framework also includes risk neutrality as a third behavioural assumption, and transaction frequency or relational exchange as a third transactional dimension (Williamson, 1985).

Williamson (1985, p. 47) defines opportunism as "self-interest seeking with guile". This implies that given the opportunity, decision makers may deceitfully seek to serve their self-interests. Muris (1981, p. 521, cited in Ting *et al.*, 2007) claims that opportunism arises when a party "*behaves contrary to the other party's understanding of their contract, but not necessarily contrary to the agreement's explicit terms, leading to a transfer of wealth from one party to the other.*" In reality, opportunistic behaviours are part of human nature, and therefore they often exist in exchange-relationships (Ting *et al.*, 2007). However, it can be

argued that although opportunism may, initially, lead to increased outcomes for the opportunistic party, it may equally have the potential to restrict value creation and decrease revenues for both parties in a relationship (Wang and Yang, 2013). This is because considerable amounts of resource have to be spent on enforcing, monitoring and controlling functions instead of employing those resources for productive purposes (Ting *et al.*, 2007).

Bounded rationality simply means that decision makers act rationally but have constraints on their cognitive, analytical and data-processing capabilities, especially in uncertain and complex environments (Rindfleisch and Heide, 1997; Walker and Wing, 1999). According to Dietrich (1994: 19), the concept of ‘bounded rationality’ in transactions is based on two principles. First, that there are limits on the human ability to process information without error. Secondly, that it is not wise to suggest that past experience can help in every situation encountered. Asset specificity refers to investments (transaction specific assets) that have a ‘lock-in effect’ (Tang *et al.*, 2007) because they make it difficult to terminate a relationship and select other parties without acquiring losses. Rindfleisch and Heide (1997) suggest that assets with high level of specificity can be regarded as sunk costs; because they have little or no value outside the focal exchange relationship (Williamson, 1985). There are six main types of asset specificity as identified by Williamson (1991, cited in Rindfleisch and Heide, 1997): (1) site specificity, (2) physical asset (e.g. plant) specificity, (3) human asset specificity (4) brand name capital, (5) dedicated assets, and (6) temporal specificity.

Uncertainty can be defined in its simplest form as what is known in comparison to what needs to be known. During transactions (ex-ante and ex-post contractual stages), two types of uncertainty are encountered: behavioural uncertainty and environmental uncertainty. TCE conceptualises ‘behavioural uncertainty’ as the amount of difficulty associated with monitoring and evaluating the performance of the exchange partners against established contractual agreements (Williamson, 1985); while ‘environmental uncertainty’ is theorised as unanticipated changes in circumstances and the associated complexity surrounding the transaction context (Williamson, 1985). In short, TC theory assumes that the greater the transaction uncertainty and asset specificity and the lower the transaction frequency, the higher is the transaction costs (Bradach and Eccles, 1989). It also suggests that exchange cannot be fully specified ex ante, and that contractual performance cannot be easily verified ex post, due to bounded rationality and uncertainty factors (Rindfleisch and Heide, 1997). Therefore, Williamson developed Coase’s theory further to suggest that economic agents

should primarily seek to economise on transaction costs (Lingard *et al.*, 1998) by deploying efficient governance structures and strategies.

Having provided an explanation to the theory's constructs and main assumptions; next the study presents a discussion about the consequences of the interplay that occurs between these constructs, which in turn lead to a number of governance challenges.

THE SAFEGUARDING PROBLEM AND THE GOVERNANCE MECHANISM

According to the theory of TCE, there are three main types of governance problems that occur during transactions (Williamson, 1985). These are:

- The safeguarding problem;
- The adaptation problem;
- The performance-evaluation problem.

A '*safeguarding problem*' arises when a firm deploys transaction-specific assets and worries that its exchange-partner may opportunistically try to exploit these unique investments (Rindfleisch and Heide, 1997). Accordingly, it can be concluded that asset specificity and opportunism are the antecedents of the safeguarding problem. Figure 1 is a conceptual representation of these governance problems and possible solutions.

Figure 1: A conceptual model of transactional governance problems and solutions

According to Rindfleisch and Heide (1997), the basic premise of TC analysis is that if the three governance problems described above are absent or low, decision-makers will accordingly favour market governance to vertical integration (the make-or-buy decision). Alternatively, if the transaction costs required for overcoming the governance problems exceed the production cost advantages of the market, firms will favour internal organization (Coase, 1937).

Figure 2. The "Buy or Make" decision factors

McNeil (1985) introduced the concept of 'relational thinking' in legal scholarship as a more positive and sustaining form of governance. This can be used to augment the conventional approach to transaction economising and solves governance problems through behavioural norms rather than potential sanctions (Ting *et al.*, 2007).

TCE has the objective of total cost minimisation (Winch, 1989; Rindfleisch and Heide, 1997) because it assumes that transactions will be adequately governed by the institutional arrangements that are most efficient (Bradach and Eccles, 1989). According to North and Davis (1971, pp. 6-7; emphasis in original), cited in Williamson (1990): “*An institutional arrangement is an arrangement between economic units that governs the way these units can cooperate and/or compete. It.[can] provide a structure within which its members can cooperate...or [it can] provide a mechanism that can effect a change in law or property rights*”. This implies that, according to TCE, the institutional arrangement chosen will be that which reduces the total costs (transactional or organizational costs plus production costs) of undertaking and coordinating those activities (Chau and Walker, 1994). When applied to construction clients deploying their procurement arrangements in general, and governance techniques and approaches in specific, this suggests they should also consider the impact of their decisions on a project-team’s performance and total costs. Not to do so might mean a cheaper transactional arrangement leading to a disproportionately higher production cost. This idea now contradicts the previous suggestion that economic agents should primarily seek to economise on transaction costs (Williamson, 1985). These contradictions, therefore, indicate that it is insufficient to expect that the most economic transactional arrangements will implicitly lead to the most efficient institutional arrangements.

Having, provided a review to the ‘safeguarding problem’ as conceptualised in TCE, next the study presents a critical discussion upon a number of imperfect safeguarding approaches that are commonly practiced in construction.

IMPERFECT SAFEGUARDING APPROACHES COMMONLY USED IN THE CONSTRUCTION INDUSTRY

The prevailing transaction approach taken in construction conforms to the “buy it” type of governance where contractual and governance instruments are often adapted from other transactions and performance is evaluated through stringent conditions agreed in advance. In this way, it is anticipated that risks and uncertainties are captured and managed and parties are protected from the opportunistic exploitation of these risks and uncertainties by these governance arrangements. This prevails even though the high transaction cost, asset specificity and uncertainty mean that a vertically integrated “make-it” or production-led

approach is more appropriate where interests are protected through “in-house” or “hybrid” production (see Fig.2). The prevailing approaches for the management of projects and arrangement of transactions are widely documented by professional institutions, for example PMI³, RICS⁴, CIPS⁵ among others. So the contradictory position seems to apply to the execution of many types of projects. However, one project domain which conforms more to the “make it” type of governance would seem to be film and theatre production although it is not investigated here.

In the construction industry the contradictory position is compounded by the prevailing institutional arrangements in which the asset specificity and low transaction frequency creates an opportunistic culture resulting in a myriad safeguarding approaches. When these safeguarding approaches are viewed through a "lean" lens, it can be observed that they are imperfect and create waste. Some of the commonly used safeguarding approaches are now discussed.

STANDARD FORMS OF CONTRACT

Construction parties rely heavily on contract formalisation through the use of standard forms of contracts (Eriksson and Laan, 2007). Theoretically, standard forms of contract optimise the balance of risk and responsibilities between the parties, and eliminate ex-ante transactional costs required for re-drafting and getting familiar with new contracts (Cox and Thompson, 1997). Their main advantage is that they enable a body of experience in their use to be developed among the whole industry (Williamson *et al.*, 2004). This includes the formation of an established body of case law which can assist in the drafting and interpretation of contracts (Laryea and Hughes, 2009). Thus, as a safeguarding technique, they are supposed to reduce the amount of time and risk involved for contract administrators and tenderers as well. However, there are many problems related to the use of standard forms of contract. These forms of contract are drafted by third parties who focused their formulation of the contracts on specific types of projects; thus one of the main problems associated with the use of un-amended standard forms of contract is their inability to adapt to the context in which they

³ Project Management Institute www.pmi.org

⁴ Royal Institution of Chartered Surveyors www.rics.org

⁵ Chartered Institute of Procurement and Supply www.cips.org

operate (Laryea and Hughes, 2009). Nevertheless, in practice, clients rarely use standard-form contracts without making some amendments to them (Laryea and Hughes, 2009), and the same applies to subcontracts (Greenwood, 2001).

A study by Laryea and Hughes (2009) which was based on four observational case studies in two of the top contracting companies in the UK, showed that these amendment made by clients are mostly related to payment issues and legal arrangements. Similarly, an exploratory study of 11 Swedish construction projects, by Opisova and Erksson (2011), reported that in all 11 projects, clients made amendments to the general conditions of contract to transfer more risks to the contractor; many of them were applied to the length of guarantee and additional insurance. Laryea and Hughes (2009) revealed that a general perception exists among contractors that clients, actually, amend conditions of standard contracts and introduce their own special clauses, in order to gain an advantage rather than genuinely to suit the project needs. Additionally, Hawkins (2012) warns us that users making amendments to standard forms of contract at negotiation stages do not always ensure that all the interlinked clauses affected by the amendments are also amended. Thus, in the absence of trust and collaboration, any amendments to contract conditions may lead to ambiguities and encourage opportunistic behaviour. Actually, a study by Love *et al.* (2010) identified onerous and one sided amendments to standard forms, often drafted by lawyers to improve their clients' position, as one of the underlying dynamic factors influencing disputes.

A number of studies show compounding factors by verifying that some contract conditions (i.e. FIDIC, 1999 and NEC, 1993) are very difficult to read, and require at least college-level reading skills to correctly interpret them (Rameezdeen and Rajapakse, 2007; Rameezdeen and Rodrigo, 2013). At the same time, it is important to emphasise that lawyers and specialist surveyors are not the primary users of a contract (Sarhan *et al.*, 2014); it is the project parties' ability to capture their meaning which is fundamental for contract performance (Rameezdeen and Rodrigo, 2013). In general, textual complexity of standard forms of contract, in terms of readability and comprehensiveness, may lead to misinterpretation and lack of common understanding between project parties; thus supporting arms' length relationships and potential time-consuming and costly disputes (Rameezdeen and Rajapakse, 2007).

Additionally, one of the major critiques concerning the adoption of standard form of contracts is associated with the dominance of adversarial dispute resolution mechanisms within many

of these contracts (Mante *et al.*, 2012). Furthermore, the availability of adjudication clauses as contained in standard forms of contract make disputes a less disruptive action for the parties concerned (Love *et al.*, 2010); thereby hindering collaboration efforts. In a study by Mante *et al.* (2012) which aimed to review the influence of procurement methods on dispute resolution mechanism choice in construction, it was found that almost all traditional procurement contracts in the UK (e.g. JCT standard building contracts (2005) and the NEC3 Engineering and Construction contract) offer adjudication, arbitration and litigation as the primary dispute resolution mechanisms. In contrast, standard forms of contract for Project Partnering (i.e. PPC 2000) promote a clear preference for non-adversarial methods of dispute resolution, by providing a problem-solving hierarchy that starts with the client's representative and ends with legislation as the final means of determining the dispute (Mante *et al.*, 2012). The use of the multi-tiered dispute resolution mechanism ensures that relationship-based approaches to resolving disputes are exhausted prior to the use of any adversarial methods. Similarly, Alliancing Contracts in Australia include a "no dispute" clause, in which project participants agree to use an alliance board for resolving all disputes as an alternative approach to arbitration or litigation (Jones, 2000). This allows project participants to resolve any conflicts or issues on site and within the project team, and consequently facilitates earlier settlement of final account (Rahman and Kumrasawy, 2004).

In summary, it seems that the problems of standard forms of contract outweigh their advantages. The heavy reliance on the use of standard forms of contract, established by third parties, brings with it lots of formality and rigidity that stifles cooperation and focuses on the individual parties and their responsibilities; thereby driving a distance between project parties and encouraging opportunistic behaviour (Eriksson *et al.* 2008). According to Cox and Thompson (1997, p. 132):

"...Standard forms of contract are nothing more than instruments used by the parties to seek strict liability and attach blame to events as they occur. Nevertheless, the industry's hands are tied to the standard forms and their traditional methods of contracting, even though they do not deliver satisfactory results. These methods, when linked with the prevailing adversarial culture and fragmented structure lead the parties away from 'trust' towards self-seeking interest ('opportunism')".

Nonetheless, Eriksson and Laan (2007) suggest that the deep-rooted practice of using standard contracts construction is only harmful, if they are used as “*safeguards*” in the absence of strong “*relational norms*”. Without good relationships between the project-parties, once a default occurs, they are most likely to refer back to the clauses of the standard contract which, in turn, may encourage opportunism and lead to adversarial ways of working (i.e. remedies of damages through legal actions). Therefore, it could be argued that the criticism is not about the use of standard forms of contracts; but it is about what is being standardised within these contracts, as well as how people interpret and choose to use contracts. Partnering and alliancing are regarded as practical examples of “relational contracting” (RC) principles (Rahman and Kumrasawy, 2004). RC-based approaches seem to offer a cost-effective means of achieving total project cost minimisation through encouraging mutual trust, collaboration and joint management of risks (See for example Rahman and Kumrasawy, 2002a&b, 2004; Eriksson and Westerberg, 2011).

DISCLAIMER, EXCULPATORY AND PRIVILEGED CLAUSES OF CONTRACT

Shifting project risks to other contracting parties is a general practice in the construction industry (Zaghloul and Hartman, 2003), which may lead to cost wastage and opportunistic behaviours (Clegg, 1992). It is common practice for clients to exert most project risk, if not all, on contractors and designers (Ahmed *et al.*, 1999; Osipova and Eriksson, 2011), in order to have more control whilst passing responsibility (Sarhan *et al.*, 2014). This is achieved through the use of disclaimer clauses or exculpatory language in contract conditions for risk allocation and as a safeguard. In 12 case-studies, by Smith and Bohn (1999), which aimed to investigate the factors which influence the assumptions of risk and the use of contingency by small-medium construction firms, it was reported that “*on many occasions designers work with owners who believe it is the design engineer’s obligation to protect them against all project risks using whatever exculpatory language they can find in defence of their position (p. 102)*”. An example of this includes expressing ‘fitness for purpose obligations’ on project-parties in the contract. Such proposed forms of warranty, which are used to the employer’s advantage, are described by Hawkins (2012) as ‘weasel clauses’ that most insurers will eschew.

An empirical survey that was conducted in the Canadian and the United States construction industries by Zaghloul and Hartman (2003) revealed that inappropriate risk allocation

through disclaimer (exculpatory) clauses in contracts is a major reason for increasing the total cost of a project. The study reported that, under all circumstances, whenever disclaimer clauses existed in contracts, contractors always added risk premiums to the total cost of a project in order to safeguard themselves against these clauses. These attached premiums ranged between 8% and 20% of the total cost of the project, depending on various factors including their relationship with the owner, contract type and fairness. According to Zaghloul and Hartman (2003), the most common *exculpatory clauses* used in construction contracts in descending order are: Uncertainty of work conditions; Indemnification; Delaying events; Sufficiency in contract documents; and Liquidated damages. Adding to this list is 'Site access disclaimer clauses'. Site access is classified by Smith and Bohn (1999) as an internal, predictable and contractual type of risk that falls within the responsibility of the owner. This type of risk can be shared and planned-ahead to secure access; instead of being pushed to contractors in the form of disclaimer clauses, leading to unnecessary additional costs (in the form of insurance or contingencies, adversarial relationships and potential claims and disputes).

In short, it is obvious that 'disclaimer or exculpatory clauses' often used by clients as 'safeguards' may lead to increased costs of projects in the form of unnecessary contingencies and insurances (Cost wastage), restricted bid-competitions (waste of human potential), and potential (timely-consuming) disputes. Compellingly, despite all of these, "*disclaimer clauses continue to be used in some of the newer contractual agreements between owners and contractors such as partnering/alliances*" (Zaghloul and Hartman, 2003, pp. 422).

CONVENTIONAL INSURANCE ARRANGEMENTS

Typically, a client would wish to obtain the broadest possible insurance protection from project-parties against any loss arising from a project (Cushman, 2003). If insurance requirements are too lenient, client's loss exposures may not be covered sufficiently. If requirements are set too stringent (e.g. to cover any losses even if the fault is caused in whole or in part by the indemnified party), the client may have to pay for additional premiums or unnecessary contract costs (Cushman, 2003). In general, main contractors usually follow the same approach when dealing with their project-supply-chain. However, It has been suggested by expert construction professionals that conventional arrangements for

providing insurance cover add unnecessary costs to constructions projects, and can also obstruct collaboration between supply chains (Ndekugri *et al.*, 2013).

This wasted cost, ultimately met by the owner/client, arises through duplication in insurance cover as stakeholders' policies overlap in the risks that they cover (Ndekugri *et al.*, 2013; Mossman *et al.*, 2010). Furthermore, the conventional practice of insuring the liabilities of individual project participants rather than the project risks themselves often leads to defensive attitudes between project participants; thereby hindering supply chain collaboration (Ibid.). In a survey study (Kent and Becerik Gerber, 2010) completed by 415 practitioners, traditional insurance products were identified, based on the respondents opinions, as a main barrier to integrated project delivery (IPD). Subsequently, Ghassemi, and Becerik-Gerber (2011) conducted a qualitative investigation, through nine IPD construction projects in the United States, and revealed that the biggest worry for leading industry professionals concerning adopting IPD to its full capacity is insurance and liability issues; as it was found that insurance products impose liability issues on each project-party separately and thus make collaboration complicated. According to Mossman *et al.* (2010, p. 11):

"If each party to a relational agreement is required to have its own insurance and there is a claim during design or construction, an insurance company could force parties to sue one another in order to trigger insurance coverage, threatening relationships".

It seems to us, therefore, that a 'project insurance' option (Ndekugri *et al.*, 2013) could be an efficient and effective alternative model which enables project participants to optimize the project risks as-a-whole. A single project insurance model may incur higher ex-ante costs than conventional ones; but would fill insurance gaps and reduce the need for litigations and dispute procedures often conducted to determine which member of the supply chain to blame once a damage or loss occurs; thereby leading to enhanced collaboration and work-flow and reduced post-ante costs. That being said, it is important to stress that in order to reap the full benefits of project insurance arrangements, there would be a crucial need need for making project insurance a mainstream option, so that it can become an industry norm.

COLLATERAL WARRANTIES

Collateral warranties are well established, in the construction industry, as contracts which are collateral to the main agreement between project parties. The main objective for their use is to safeguard those parties with a financial interest in the building from any consequent losses arising out of building defects which appear after practical completion (Wordley, 1991). They usually provide a direct contractual linkage between the producing parties and those parties who have long-term interest in the building once it is completed (i.e. the owner, the occupier and the financier) (Hawkins, 2012). Many forms of these collateral contracts provide that the rights and benefits of the warrant (guarantee given) may be passed on, at least twice, to subsequent interested parties (Hawkins, 2012; Wordley, 1991).

The construction industry, in particular the property sector, has been and is still subject to considerable growth in the use of collateral warranties, which are seen as taken for granted safeguards in procurement arrangements. However, little attention has been focussed on assessing their true costs (Wordley, 1991). Putting into consideration the fragmented nature of the construction industry, the predominance of outsourcing, and the way in which most construction projects are procured involving large numbers of project-participants (e.g. architects, consultants, contractors, sub-contractors, specialist suppliers), it is obvious that the number of collateral contracts that interested parties must obtain in order to protect themselves is enormous. Each of these collateral warranties requires careful drafting by lawyers, and each concerned party seeks involving its own lawyer in negotiating the content and extent of the warranty (Ibid.). Thereby, leading to substantial transactional costs and additional management time spent in co-ordinating the responses. It is also worth noting that when design consultants provide collateral warrantee, additional premiums are factored into their professional indemnity insurance to cover their extension of liability (Ibid.); thus increasing the overall cost of the insurance on any one project.

Additionally, there are serious concerns about the ability of the collateral warranty matrix to meet the interested parties' objectives in seeking them (Wordley, 1991). First, the assets backing the warranties are not guaranteed. If the contractor or subcontractor providing the warrantee becomes insolvent, the value of the remedy gets destroyed. As for the designer consultant, the asset backing the collateral warranty is the consultant's professional indemnity insurance, which is annually renewed based on a claims-made basis. There are many events,

at which professional indemnity insurance policies may fail to respond to submitted claims (Ibid.). This includes for example, "*exhaustion of the insured's policy limits during the year in which the claim under the warranty was notified due to the policy limits being applied to another claim, also notified during that period*" (Wordley, 1991, p. 237). This incident for example is outside the influence or control of the collateral warranty recipient, and indicates the difficulties inherent in relying on the consultant's professional indemnity insurance as an asset that backs collateral warrantees.

Secondly, under collateral warranties, the recipient of the warranty 'must' be able to prove breach of contract by the provider of the warranty for there to be any recovery (Wordley, 1991). This implies the use of costly and time consuming litigation which is by no means an acceptable remedy. It therefore appears to us that the latent defect insurance (LDI) options may be a better alternative to collateral warranties. The LDI option provides compensation to the project-parties as a whole without reference to their contractual liabilities; and thus removes the need for any affected party to dispute the issue at fault and to assign blame with a resultant costly delay (Wordley, 1991).

THE NEED FOR EMBEDDING TRUST IN CONSTRUCTION PROCUREMENT

According to TCE, economic actors should seek to overcome the 'safeguarding problem' that arises during transactions by selecting an efficient governance structure (Figure 1). Williamson (1985) developed a theoretical model for the choice of an optimal governance structure for six different types of transaction, depending on their asset specificity and frequency. In general, TCE researchers have conceptualized three general types of governance structure (i.e. market, hierarchies and hybrid/intermixed) which map into price, authority and trust respectively (Williamson, 1985). A comprehensive review by Rindfleisch and Heide (1997), which provided an integration and synthesis of 45 empirical TCA articles, found that the use of vertical integration as a means of safeguarding specific assets from possible opportunistic behaviour is broadly confirmed amongst researchers. However, it was also demonstrated in the reviewed studies that firms can also protect their specific assets by deploying a variety of hybrid governance mechanisms, such as partnering, prequalifications, and the development of relational norms. Eriksson (2006) developed a TCE-based procurement model based on Williamson's (1985) optimal governance model (Figure 3) and argued that:

"According to Williamson (1985), the construction of plant facilities is a typical occasional transaction involving high asset specificity, i.e. a type five transaction. Overall, most construction projects are of that type. However, some projects are significantly less complex than constructing a plant, for example production of small houses with modular construction. Such projects may be categorized as transactions of type 3 or 4. For construction projects in general, the model prescribes medium emphasis on authority, medium to high trust, and low to medium emphasis on price" (Eriksson, 2006, pp. 10-11).

In Eriksson (2006)'s conceptual study, he suggested that TCE's three main governance mechanisms (i.e. price, authority and trust) are strongly linked to three different types of control (i.e. output, process and social control). This implies, according to Eriksson and Laan (2007) that clients can facilitate different levels of price, authority and trust in a transaction relationship through the selection and use of these different types of control. In other words, it is argued by them that clients' chosen procurement procedures and arrangements involve different types of control, which in turn affect the levels of price, authority, and/or trust embedded within a project. For instance, they suggested that bid evaluations which focus on tender price represent a price focus through 'output control'; while bid evaluations which focus on trust-based soft parameters represent a trust focus through 'social control'. It is however important to note that according to Tookey *et al.* (2001), in practice, clients do not adhere to rigid prescriptive procurement guidance and definitions, which regard construction procurement as a set of rationalistic decisions taking place within a closed environment (mechanistic-thinking approach); instead counterintuitive decisions are the norm, leading to the formation of hybrid structures.

Figure 3: Eriksson's (2006) TCE-based procurement model for governance choice

DISCUSSION

In construction, there seems to be two general approaches to selecting a procurement system. The first would focus on designing a project organisation structure including a project operating system based on project needs and priorities, and then adapting a contractual arrangement that aligns the commercial interests of the project parties (e.g. Thomsen *et al.*, 2010) - a production oriented approach which aims to design and enhance flow processes (Koskela and Sharpe, 1994). The second is a risk based approach which is mainly concerned

with overcoming transactional governance problems (see Fig. 1), and considers 'risk' to be the main criterion influencing procurement selection decisions. Advocators of this approach (e.g. Hibberd and Basden, 1996), cited in Love *et al.* (1998), suggest that contractual arrangements should be primarily conducted for risk allocation and mitigation purposes, in that way determining the type of the procurement method that would fulfil the client's objectives. Thus, a debate exists in literature upon whether procurement arrangements should be adapted to support production system requirements or tailored to transactional characteristics.

TCE has the objective of total cost minimisation (Winch, 1989; Walker and Wing, 1999). It aims to reduce both transaction and production costs (total costs). TCE, however, recognises that making decisions about governance structures encompasses a trade-off between transaction and production costs (Rindfleisch and Heide, 1997). A review of 45 empirical TC analysis articles, published from 1982 to 1996, revealed that discrepancy exists among scholars about deciding on whether transaction or production costs have a stronger impact on the choice of governance structures (Rindfleisch and Heide, 1997). Two subsequent studies by Koskela and Ballard (2006, 2012), which aimed to criticise the underestimation of the idea of production in construction management and economic theories, claimed that TCE lacks a proper conceptualization of production and waste; and criticised Williamson's (1985) work due to its weak and biased justification against the optimality assumption. This simply infers that no matter how efficient the governance structure chosen is, there is no optimal/perfect structure. Thus, the extent of non-optimality is waste that needs to be tackled through economising on production activities. Finally, they concluded by stressing that an "*economic organization should aim at minimization of the sum of transaction and production costs, given that different kinds of transactions and productive activities are more efficiently governed by different modes of governance*" (Koskela and Ballard, 2012, p. 731).

In construction, there is no ready-made product to buy (Eriksson and Laan, 2007). Both the client and the project-supply-chain have to interact in order to create the final product. Hence, there are substantial trends towards collaborative ways of working as a means for improving project outcomes; it is therefore important to consider how construction clients and companies tend to protect (safeguard) their project-specific assets, against opportunism, during procurement procedures. Very little, if any studies, have sought to question the efficiency and effectiveness of safeguards crafted by contracting parties in construction procurement. This is an important question as there are trends towards collaborative ways of

working as a means for improving project outcomes. Based on a critical literature review, this study identified various safeguarding approaches (Table 1) and analysed their impact on project performance and outcomes (Figure 4).

Table 1: A categorisation of various safeguarding approaches within construction procurement according to their underpinning theoretical perspective and level of prevalence

Conventional safeguarding approaches based on 'risk allocation' considerations	Less prevalent safeguarding approaches based on 'process flow' considerations
Standard forms of contract	Relational contracting
Use of Disclaimer/Exculpatory clauses	Shared risks and rewards
Traditional insurance arrangements/products	Single project insurance
Collateral warranties	Latent defects insurance

As critically discussed earlier, these 'risk averse' safeguarding approaches based on transactional considerations offer little incentive for cooperation to emerge; instead they entrench wasteful processes across the supply chain and throughout the project life cycle (e.g. opportunism, unnecessary premiums, claims and disputes), as shown in Figure 4. By tailoring procurement decisions to 'transactional' characteristics, clients (or focal companies) concentrate on formal risk allocation, through contractual arrangements, in an attempt to maximise their own profits; thereby neglecting the significance of maintaining and enhancing the flow of production processes, and overlooking the interdependency between project partners in their efforts to maximise value. For these reasons, we stress that procurement arrangements should be crafted to suit the chosen project delivery system and improve flow processes, rather than being tailored to transactional characteristics and dictated by the selected contract type.

Figure 4: General potential impacts of the use of imperfect safeguarding approaches on project performance and outcomes -Modified from Zaghloul and Hartman (2003)

This study was driven by a primary research question that led the authors to examine the current commercial and institutional environment surrounding construction. Through a critical literature review, it was found that very few studies have sought to challenge the phenomenon of coherence within the current prevailing construction business and project

delivery models. In a primary attempt to explore this gap in knowledge, work by Sarhan *et al.* (2014) introduced the concept of '*institutional waste*' within the construction industry and provided five propositions for future empirical investigation. In principal, they argued that the construction industry accedes to imperfect institutional processes, in the form of habitual, imitation or compliance, in order to achieve social fitness (i.e. legitimacy, survival and stability) at the price of production efficiency and effectiveness. They defined the terms '*habitual*' as adhering to invisible, widely shared and taken for granted norms that have been historically repeated; '*imitation*' as consciously or unconsciously mimicking what other more successful organisations do and strictly following imperfect advice from consulting firms and professional institutions; and '*compliance*' as obeying imperfect institutional requirements (e.g. imposing more control in contracts and structural arrangements as a response to problems of a lack of trust).

Subsequently, another study by Sarhan *et al.* (2016) provided empirical data around the critiques of the role and production effectiveness of Tier 1 contractors. They also presented examples of practices that open debate on how to challenge prevailing procurement models for construction. Through literature review and interviews with a number of UK industry experts, they discussed the factors influencing the 'Principal-Agent' relationship demonstrating how that institutional forces (e.g. vested interests and bargaining strength of major industry players) can have an influence on shaping procurement practices. According to them:

"Procurement arrangements often mirror institutional forces. These forces do not necessarily guarantee better value services, they are more likely to serve the interests of large industry players with the bargaining power to create new rules" (Sarhan *et al.*, 2016, pp. 1)

By reviewing three governance problems in construction procurement as conceptualised in theory of TCE, this study shows that whilst safeguarding is critical in construction projects, the drive towards economising the transaction cost moves the institutional arrangements away from effective 'safeguarding' towards the use of cheaper 'adaptation' and 'performance evaluation' as governance methods. This explains why the construction industry persists in using the market or "buying" as a solution to project delivery and leads to imperfect safeguarding. The outcome of imperfect safeguarding, as illustrated in Figure 4, is a lack of

control on opportunistic behaviours and the reduced effectiveness of in-house or cooperative arrangements. Based on this study's literature review and critical evaluation of the safeguarding problem in construction procurement, and building on the work of Sarhan *et al.* (2014 and 2016), the following explanations to the reasons for the persistence of imperfect governance practices in construction procurement are offered (Figure 5).

Figure 5: Institutional factors influencing the choice of imperfect procurement arrangements

IMPLICATIONS AND FUTURE RESEARCH

There is no doubt that inappropriate procurement arrangements may lead to time and cost overruns, adversarial relationships between project parties, and ultimately the failure of projects (Kumaraswamy and Dissanayaka, 1998; Watermeyer, 2012). In general, increased collaboration and mutual trust between project parties, to support and enhance production flow, has been argued to be a suitable remedy for many of the industry's problems (see for example Latham 1993 & 1994; Egan, 1998). These substantial arguments, amongst others, led to the development of various collaborative and relational forms of contracting that have been used across different countries worldwide (e.g. Partnering in the UK, Alliances in Australia, and IPD in USA) with varying levels of success. Compellingly, various empirical studies (see for example Zaghoul and Hartman, 2003; Kent, and Becerik-Gerber, 2010; Ghassemi and Becerik-Gerber, 2011) revealed that the use of risk-averse safeguarding governance arrangements is prevalent to an extent that they continue to be utilised in some of the newer relational contractual agreements such as partnering, alliances and IPD.

This study examined the reasons for the occurrence and prevalence of these imperfect safeguarding governance practices in construction procurement. Based on a critical analysis, the study argued that procurement arrangements should be crafted to support production system requirements and improve flow processes, rather than being based on cost and risk-averse considerations that may lead to sub-optimisation. The question that now challenges future studies is: 'How can we move the prevailing mind set from "risk averse" safeguarding approaches based on mal-applied transactional considerations?' The authors of this study propose exposing to clients and decision makers the amount of waste (and unnecessary cost) they embed through their choice and deployment of imperfect procurement options. Through this study, we can already to some extent identify the 'winners and losers' (see Figures 4 and

5), but empirical evidence is needed to show clients what it really costs to use the 'prevalent coherent construction models'. Figure 6, provides a proposed guide map of how and where future studies should start.

Figure 6: Proposed guide map for future studies

Certainly, Koskela's (2000) Transformation-Flow-Value (TFV) theory of production has helped us to understand and identify many of the causes and origins of waste in construction projects, particularly at the project delivery (production) stage. However, it can still be argued that waste is created primarily from organisational and contractual problems (Williamson, 1991); thus focusing on reducing waste from production alone would be insufficient. Organisations and contracts are essential parts of the production system design; thus poorly aligned (imperfect) governance structures can cause waste (Koskela and Ballard, 2012). Nevertheless, this study argued that it is insufficient to expect that the most economic transactional arrangements will implicitly lead to the most efficient procurement arrangements. Furthermore, the study demonstrated how that an imperfect institutional environment can lead to inferior governance systems and structures (e.g. imperfect safeguarding procurement arrangements), which may cause transaction and production losses (i.e. waste). Waste here can be in the form of monetary, time or effort and can arise ex-ante or post-ante. Based on these arguments, the study suggests that in order to start unpicking the coherence and yet wastefulness of the current construction business models, there is a need to critically evaluate the wider institutional environments surrounding the design and delivery of construction and to assess the norms and cultural-cognitive assumptions of the different professions within them (see Figure 6). Such an evaluation, however, needs to draw upon theory from disciplines outside construction. Three particular theories have been selected by this study as fit for the purpose of this evaluation (Figure 7). These are:

Figure 7: Proposed theoretical research framework for future studies

Building on the five guiding propositions offered in the study by Sarhan *et al.* (2014) where the concept of 'Institutional waste within construction' was introduced, and based on the complementary explanations and recommendations presented in this study, further studies are recommended to conduct an inductive-deductive grounded theory methodology (Strauss and Corbin, 1998) to explore the phenomenon of coherence within the prevailing construction business models, with the aim of investigating the institutional sources of waste in

construction. Interviewing is generally the common method used in grounded theory for collecting data; however a number of emerging studies have justified the use of interpretative case study research in conjunction with the Straussian approach (Pandit, 1996; Halaweh *et al.*, 2008; Pan and Tan, 2011). While there is some debate on how to deal with pre-existing assumptions before data collection in grounded theory, like a number of other qualitative researchers, the authors of this study are of the view that it is impossible to completely isolate theory from research (Eisenhardt, 1989; Pink *et al.*, 2010). The use of propositions (guiding hypotheses) as a priori specification of constructs, before conducting interviews or case studies, as part of a grounded theory methodology, could potentially provide the research study with the following advantages (Ali and Birley, 1999):

- Enabling the researcher to discover issues or effects which have not been considered before the investigation began.
- Providing a guiding focus for the research but also leave the scope open for generating unintended findings or even new hypotheses.
- Allowing the study to makes sense of the disparate information provided by various respondents during analysis stages.

The use of the grounded theory methodology could lead to the development of a wider and more explicit theory of waste relating cause and effect within the wider aspects of construction systems and relationships. The collected data will be coded according to the rigorous procedures defined by the Straussian technique (Strauss and Corbin, 1998). The outcomes of the open, axial and selective coding processes could then be used for presenting a theoretical framework for the prescriptive causal analysis of 'institutionalised waste in construction'; this could be conducted in a similar manner to the approach initiated by Formoso *et al.* (2015) which was however limited in their study to a logistical level of analysis. It is anticipated that such proposed research project can lead to modifications in policy, legalisation and future re-shaping of the roles and responsibilities of the professions and wider participants involved within the construction sector in order to increase the production efficiency and effectiveness of the industry.

CONCLUSION

The construction industry is often criticised for its opportunistic, risks averse, adversarial, and very competitively cost-driven environment. It has been argued that competition and vested

interest absorb a huge proportion of the industry's intelligence and professional vigour. In general, increased collaboration and mutual trust between project parties, to support and enhance production flow, is argued to be a suitable remedy for many of the industry's problems. Since the extent of cooperation and trust is mainly influenced by procurement arrangements and procedures, this study sought to investigate, through a critical review, how construction clients and companies typically protect (safeguard) their project-specific assets against opportunism, during procurement procedures. Based on a critical review, this study demonstrated how that conventional safeguarding processes adopted by construction clients as part of their approach to procurement often complicate the problem rather than solve it. Indeed, this study identified a number of imperfect taken for granted safeguarding techniques (Table 1) which stifle cooperation, lead to unnecessary costs, and entrench wasteful processes across the supply chain and throughout the project life cycle. Moreover, this study revealed the usefulness of using principles of Lean Construction in association with TCE when analysing and deciding on appropriate construction-procurement governance arrangements. In particular, the study demonstrated how that when viewing these transactional-based safeguarding approaches through a "lean" lens, it can be observed that they are imperfect and create waste.

The study offers two main explanations for the prevalence of imperfect construction procurement governance arrangements. First, it seems that clients and decision makers, in their attempt to overcome the safeguarding problem, mainly focus their attention and efforts on reducing ex-ante (i.e. pre-construction phase) transaction costs while giving less attention to the impact of their chosen procurement arrangements on ex-post costs. In that way, procurement decisions tend to be ultimately focussed on contract administration and shifting risks; and, arguably, risk aversion often distracts attention away from core efficiency purposes (Williamson, 1985). The second explanation is based on an institutional perspective (DiMaggio and Powell, 1983; Oliver, 1991). By putting the safeguarding problem into context, it appears that clients conform to imperfect conventional procurement procedures due to institutional pressure exerted on them from third parties (e.g. consultants, quantity surveyors, lawyers, insurance companies, and banks). Clients rely heavily on professional advice from these third parties who may have a vested interest (i.e. social and/or economic motivations) for the wide-spread use of these inefficient procurement procedures. These institutional factors (See Figure 5) combine to create the coherent current model for

construction project delivery and their identification will help the development of more efficient and effective business and project delivery models.

There have been moves within the construction industry towards more collaborative procurement and project implementation arrangements, however a replicable recipe for aligning interests and keeping good intentions in place is still missing. Further studies are, therefore, recommended to examine the roles and responsibilities of the professions and wider participants involved within the construction procurement context. Typically those professionals do not take a central stake in the project outcome, only a stake in the process by which the project is delivered. Do they need to have a bigger stake in the project outcome? Can we develop new knowledge and competencies that could enhance in transforming their functions, and enable their integration into more collaborative teams? How can we unpick the coherent current model? It is proposed that the theoretical research framework and guide map for future studies, presented within this study, can lead to the development of prescriptive conceptual frameworks for causal analysis of waste in construction. The underlying premise is that if we can understand the detailed causes of coherence for the prevailing construction business models and reveal the consequential waste, then the adoption of more efficient and collaborative business and project delivery models may become more widespread.

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Appendix 1: A snapshot of Table of information developed for literature review purposes

Study	Research Method	Main aim(s) of the study	Imperfections within the construction procurement context
Love et al. (1998)	A postal questionnaire distributed to a variety of personnel involved in the procurement process (41 clients and 35 consultants).	To obtain the experience of and attitudes to a variety of procurement methods and the criteria used for selection.	<p>The establishment of a parochial (close-minded) approach to procurement utilisation by experienced clients, which is based on familiarity rather than appropriateness – A “<i>habitation</i>” approach</p> <p>Traditional cost re-imbursement method – this was identified by survey-respondents as the least appropriate form of procurement</p> <p>Architects’ and quantity surveyors’ have a vested interest and bias for the use of traditional lump sum and traditional lump sum with provisional quantities.</p> <p>Clients’ reliance on (biased) dependent consultants’ decisions for the selection of procurement - consultants may have vested interest for the use of traditional procurement routes</p>
Wordley (1991)	Literature review/ opinion based	To examine the respective concepts of both collateral warranties and Latent defects insurance with a view to highlighting the strengths and weaknesses of each arrangement.	<p>Collateral warranties – vagaries of litigation together with its transactional cost, delay and substantial demands on management time; uncertainty about the performance of the asset backing the warranty; increases the overall cost of the insurance on any one project; hinders collaboration and encourages disputes</p>
Eriksson and Laan (2007)	A survey of 87 Swedish construction clients	To analyse how the choices made by clients during the buying process stages affect the combination of governance mechanisms and control types in client-contractor relationship.	<p>Clients’ procurement decisions establish governance forms that facilitate a focus on price through output control, and authority through process control. Trust-breeding procedures entailing social control are seldom used.</p> <p>Comprehensive specification made by the client before the contractor is procured - results in a divorce between design and construction.</p> <p>Bid invitation through open bid procedures - results in many hours spent on design, planning and calculations that are never used, causing waste and non-value adding costs. Additionally, the constant replacement of actors creates inefficiencies, since a new learning curve must be climbed by the supplier each time.</p> <p>The focus on low tender price during bid evaluation</p> <p>Construction actors rely heavily on contract formalization through standard forms of contracts - which are instruments seeking strict liability and attaching blame to events that occur, encouraging non-collaborative behaviour and driving distance between the parties - the common use of standard contracts in construction is only harmful if they are used as safeguards in the absence of relational norms.</p> <p>Output-based compensation (fixed price) <i>is inappropriate</i> - because uncertainties in construction are high - output control through fixed prices may lead to inflexibility since the supplier may resist adapting to changed circumstances</p> <p>The heavy reliance on output control in performance evaluation</p> <p>No or low usage of collaborative use in traditional projects - <i>results</i> in increased need for output and process control, indicating emphasis on price and authority. Examples of collaborative tools include: establishment of joint objectives and continuous evaluation of them, joint project office, shared IT-supported database, teambuilding events and dispute resolution techniques</p>

Figure 1

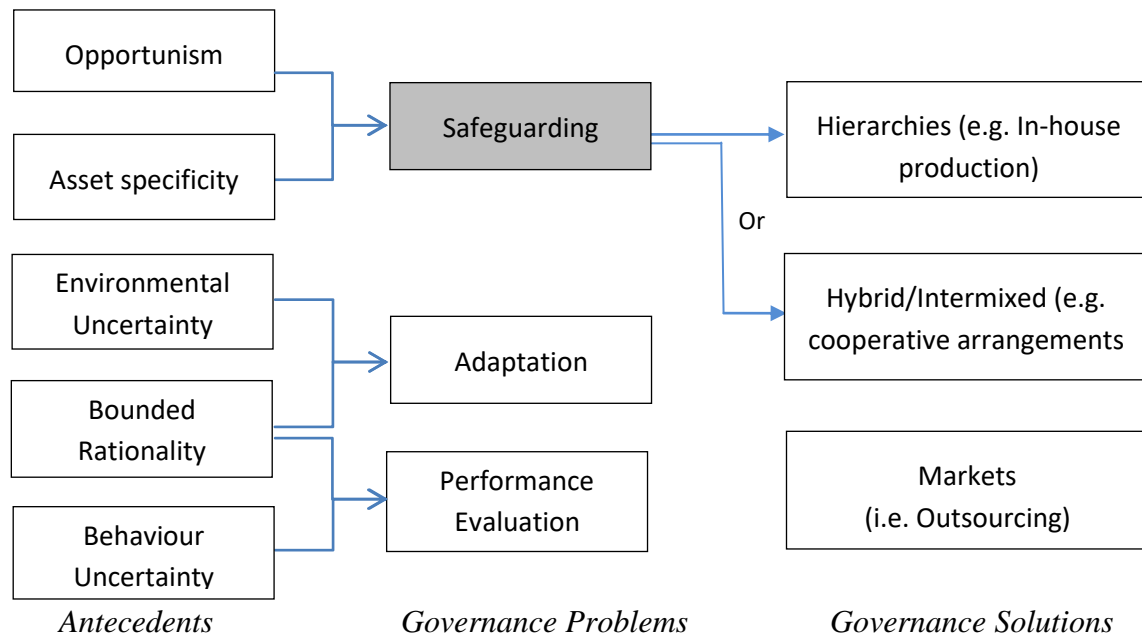


Figure 1: A conceptual model of transactional governance problems and solutions

Figure 2

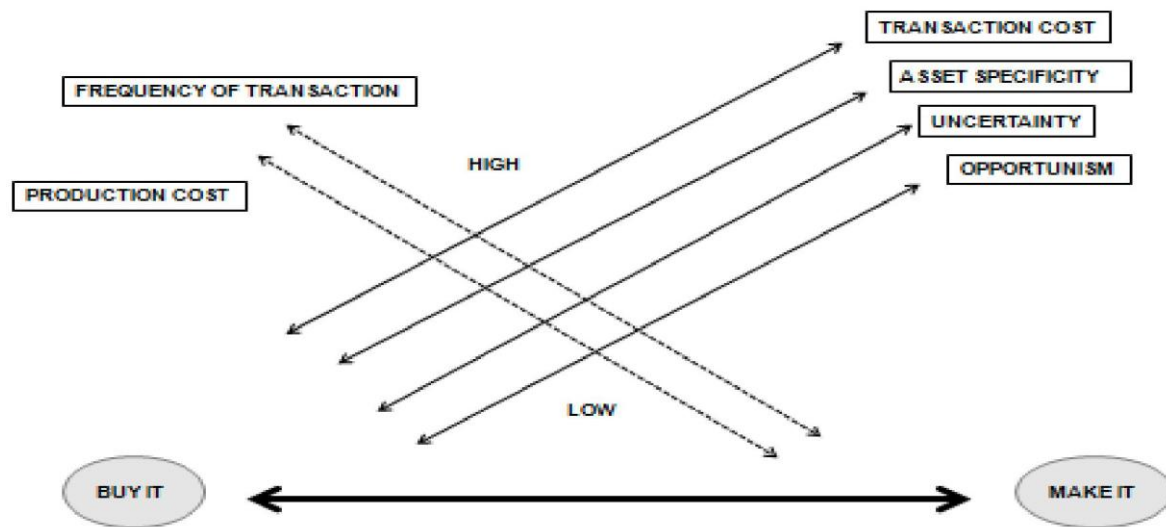


Figure 2. The “Buy or Make” decision factors

Figure 3

		Asset specificity		
		Low	Medium	High
Frequency	Occasional	<i>Type 1</i> Emphasis on price: high trust: low authority: low	<i>Type 3</i> Emphasis on price: medium trust: medium authority: medium	<i>Type 5</i> Emphasis on authority: high/medium trust: medium/high price: low
	Recurrent	<i>Type 2</i> Emphasis on price: high trust: medium authority: low	<i>Type 4</i> Emphasis on trust: high price: medium authority: low	<i>Type 6</i> Hierarchical production

Figure 4: Eriksson's (2006) TCE-based procurement model for governance choice

Figure 4

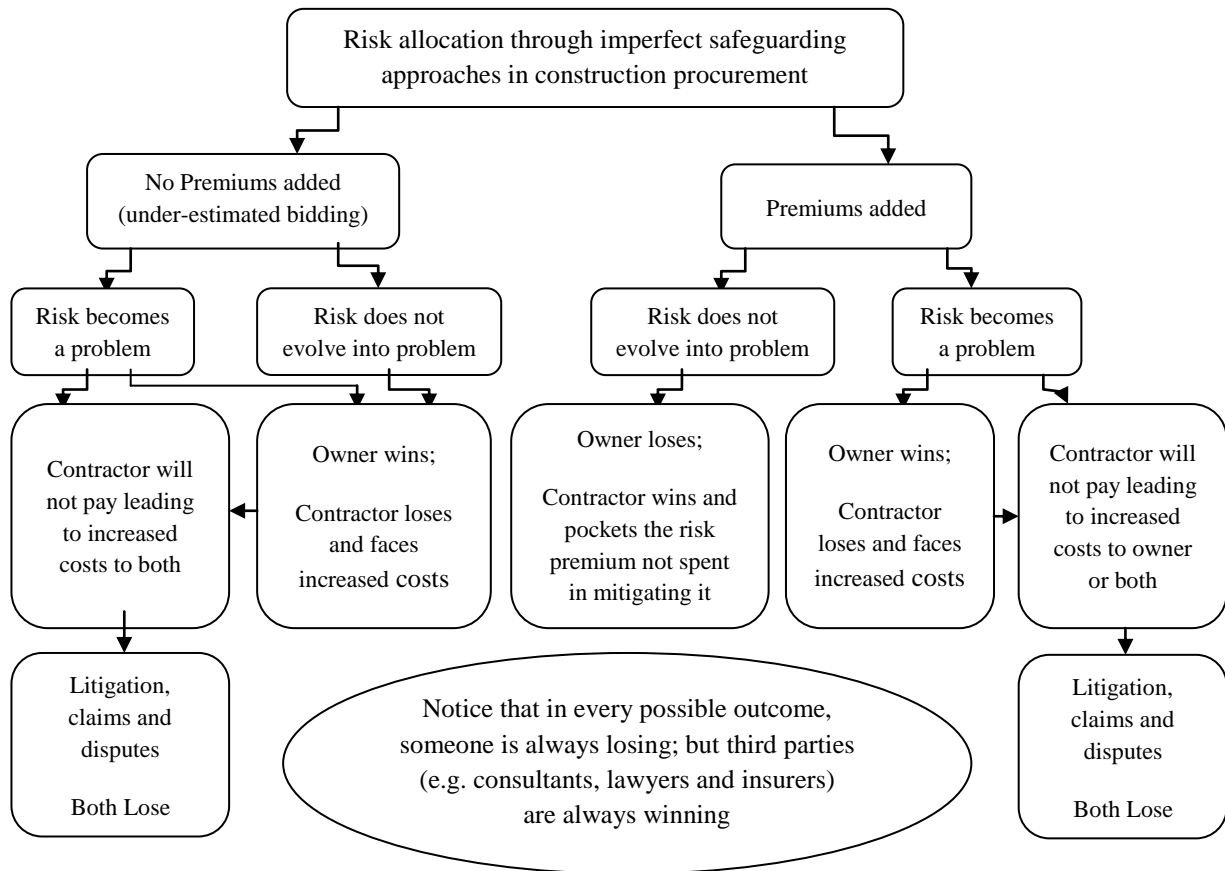


Figure 4: General potential impacts of the use of imperfect safeguarding approaches on project performance and outcomes -Modified from Zaghloul and Hartman (2003)

Figure 5

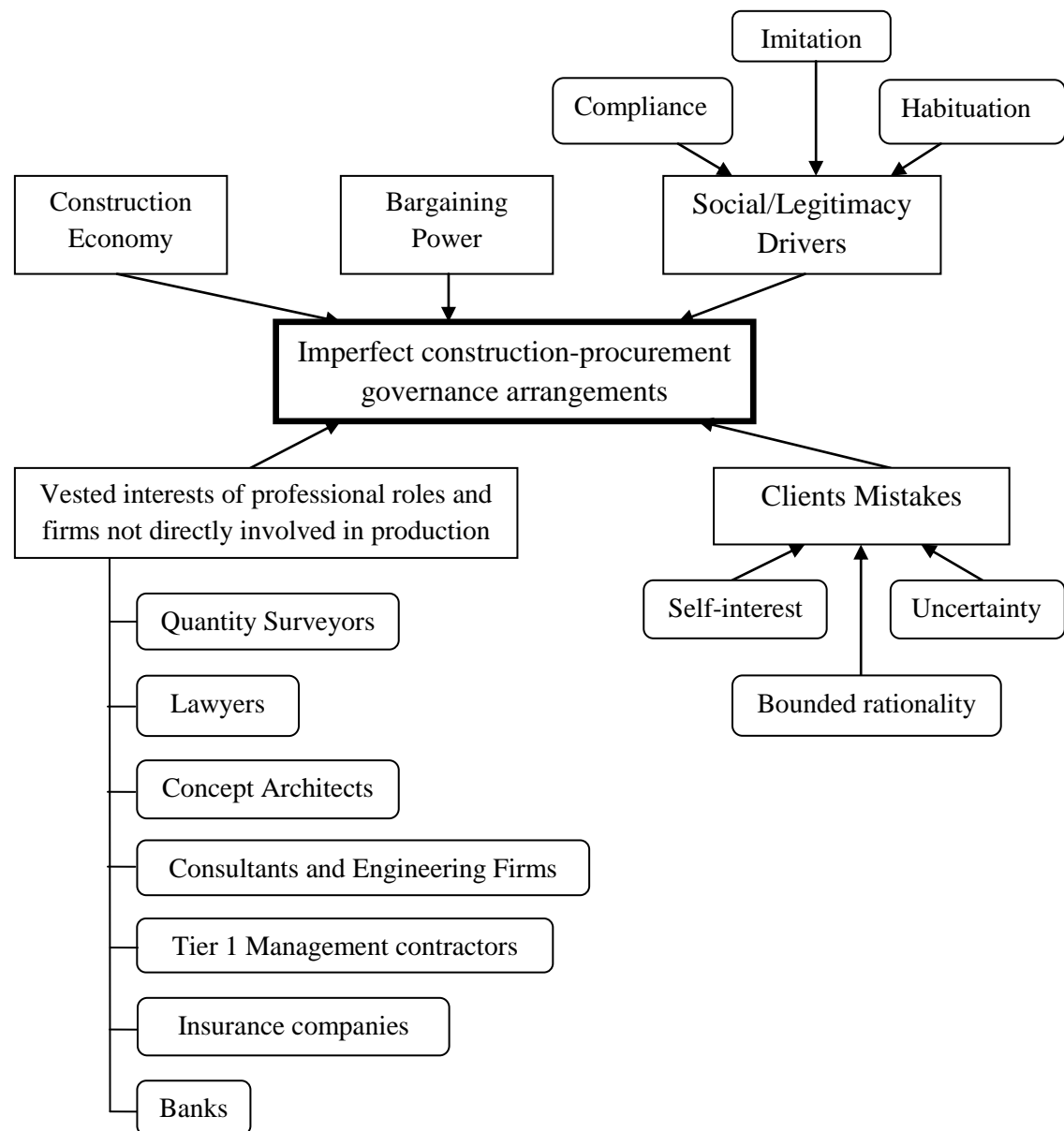


Figure 5: Institutional factors influencing the choice of imperfect procurement arrangements

Figure 6

Where do we start?

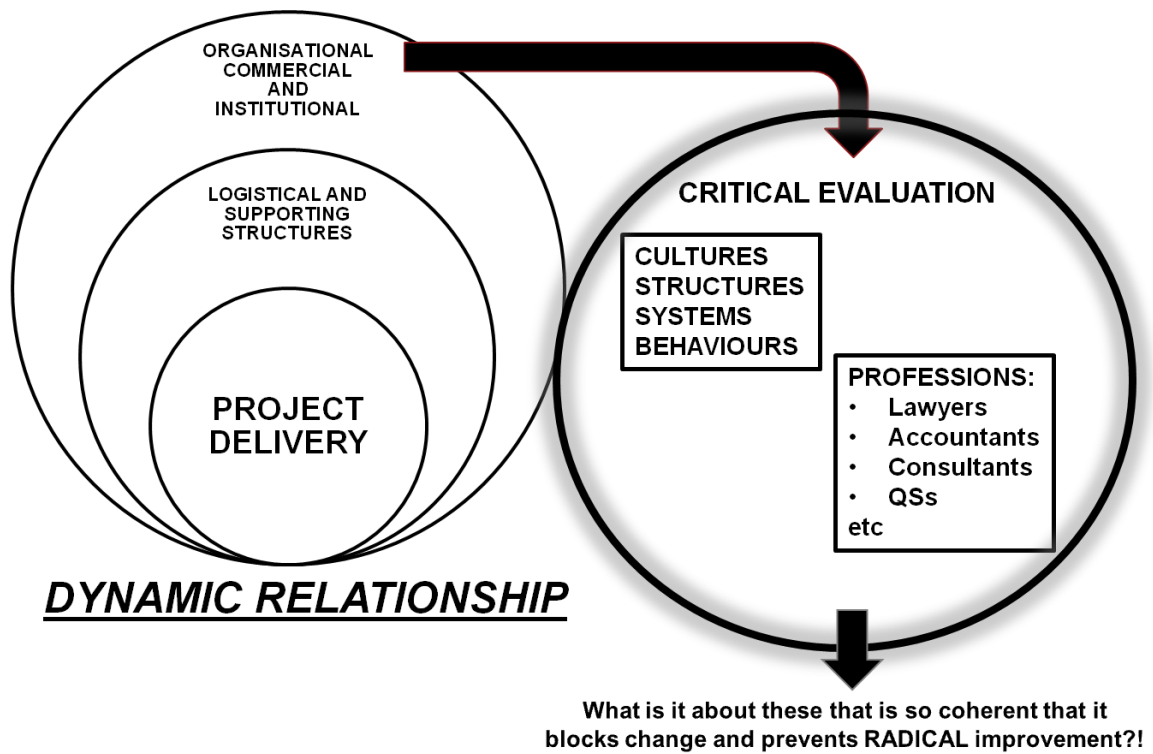


Figure 6: Proposed guide map for future studies

Figure 7

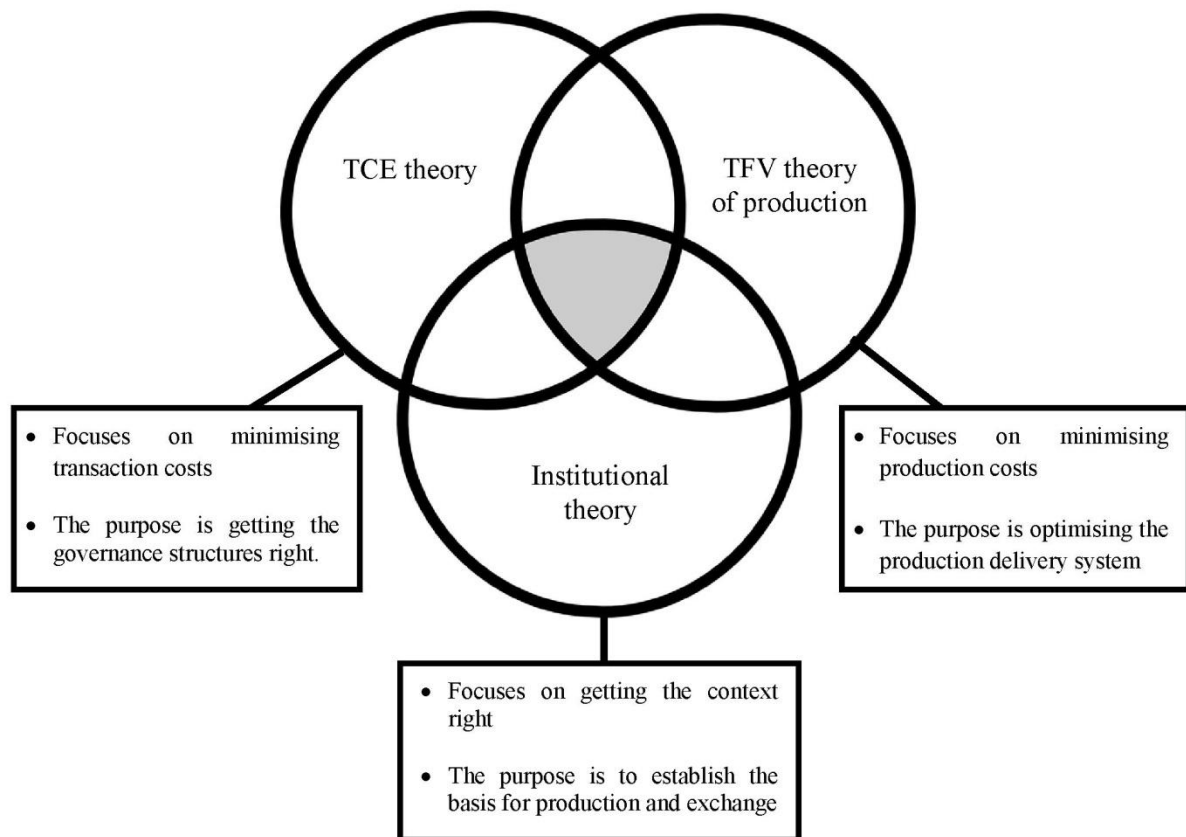


Figure 7: Proposed theoretical research framework for future studies