

# A CRITICAL REVIEW OF THE SAFEGUARDING PROBLEM IN CONSTRUCTION PROCUREMENT: UNPICKING THE COHERENT CURRENT MODEL

Christine Pasquire<sup>1</sup>, Saad Sarhan<sup>2</sup>, and Andrew King<sup>3</sup>

## ABSTRACT

The construction industry has, over a long period, been criticised for its short term "hit-and-run" relationships which are focused on win-lose situations and poor performance. Despite the wide recognition of these problems the industry persistently resists the radical change demanded of it. This paper attempts to investigate why this might be the case by reviewing prevailing safeguarding practices within the current commercial systems and structures through literature review and industry observation. 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 and provides the basic information for preparing a route to the radical change required to move to lean methodologies.

## KEYWORDS:

Waste; Procurement; Contracts; Opportunism; Transaction Cost Economics.

## INTRODUCTION

During his presentation at the IGLC20<sup>4</sup> Industry Day in San Diego in 2012, Gregory Howell the then president of the Lean Construction Institute, referred to the

---

<sup>1</sup> Professor of Lean Project Management, Head of the Centre for Lean Projects, School of Architecture Design and the Built Environment, Nottingham Trent University, Nottingham NG1 4BU, Tel: +44 (0)115 848 2095, [christine.pasquire@ntu.ac.uk](mailto:christine.pasquire@ntu.ac.uk)

<sup>2</sup> PhD Student, MSc Civil Engineer, Centre for Lean Projects, School of Architecture Design and the Built Environment, Nottingham Trent University, United Kingdom, Nottingham NG1 4BU, Tel: +44 (0)7961757059, [sarhan\\_com@hotmail.com](mailto:sarhan_com@hotmail.com) or [saad.sarhan2012@my.ntu.ac.uk](mailto:saad.sarhan2012@my.ntu.ac.uk)

<sup>3</sup> PhD, Programme Leader for MSc Quantity Surveying, Centre for Lean Projects, School of Architecture Design and the Built Environment, Nottingham Trent University, Nottingham NG1 4BU, Tel: +44 (0)115 848 2511, [andrew.king@ntu.ac.uk](mailto:andrew.king@ntu.ac.uk)

<sup>4</sup> International Group for Lean Construction [www.iglc.net](http://www.iglc.net)

prevailing construction approach as a “very coherent model” when explaining the barriers to lean implementation. Yet the performance of the industry has been widely criticised, often regarded as confrontational, risk averse, and lacking trust and capacity for innovation and improvement (Zaghloul and Hartman, 2003; Eriksson and Laan, 2007; Eriksson *et al.*, 2008) all of which suggests that despite its apparent coherence, the current model is not very good. Why therefore is the model so coherent and so embedded? This paper uses Transaction Cost Economics to begin to explain the current inertia focusing particularly on the idea of self-interest (or safeguarding) and how this is a source of waste hitherto unacknowledged.

Waste in construction originally addressed physical waste but the discussion widened with the introduction of process waste identified in lean thinking. Both of these types of waste can be directly associated with production. In this we can say that production is about doing work of some sort and that this includes the production of design information and specification. This understanding of waste encourages the improvement of current processes rather than radical new system design. Does this go part way to explain why Liker (2004) and Spear & Bowen (2006) observe many lean implementations stalling and not achieving their full potential? A wider examination and conception of waste is needed and one aspect of this is the consideration of the organisational, commercial and institutional environments that surround the design and delivery of construction projects. The foundation for understanding waste begins with defining value which in turn enables non-value to be identified. Traditionally waste (non-value) has been identified as anything that consumes resources but adds no value – the constituents of value have similarly been widely discussed but again mostly from within the design and delivery processes. It is clear that some non-value is essential and that much of this is in the logistical and supporting structures surrounding project delivery. The understanding of value and non-value (waste) within the wider organisational, commercial and institutional environments is more difficult to conceptualise not least because it requires a critical evaluation of the activities of different professions (e.g. lawyers, accountants, human resource managers, quantity surveyors and so on) and varying organisational cultures/structures/systems/behaviours.

This evaluation also has to draw upon theory from disciplines outside both construction and manufacturing such as economics, law and sociology, if we are to begin to explain the phenomenon of coherence within the current construction project delivery approach. The current approach contains many inefficiencies that have been frequently attributed to factors such as fragmentation of the industry (Egan, 1998; Sarhan and Fox, 2013), adversarial hierarchy structure of construction projects (Ghassemi, and Becerik-Gerber, 2011), obsolete procurement methods (Eriksson and Laan, 2007), confusing and treacherous contractual arrangements (Hawkins, 2012; Cox, and Thompson, 1997), the highly competitive cost-driven environment (Bresnen and Marshall, 2000) and the sequential organisation of construction processes (Koskela, 2000). Due to the transient and discrete nature of many of the construction projects, clients and decision makers, in practice, tend to recognise these as risks and seek to protect their project-specific investments and assets, from exploitation and opportunism, through the deployment of formal contractual arrangements and governance mechanisms. 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 would accordingly be 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 and ultimately themselves. An example of this can be found in the inappropriate risk allocation in the use of disclaimer (exculpatory) clauses which can attract between 8% - 20% of the total project cost as contingency (Zaghloul and Hartman 2003). This is potentially an example of a contingency that clearly consumes resource without adding practical value and thus conforms to the archetypal definition of waste. However, in most cases, clients' main intentions are to control opportunism and utilise efficient governance of their transactions. But, arguably, they may not be aware of how their procurement decisions and arrangements may affect the likelihood of creating a cooperative environment (Eriksson *et al.*, 2008) and thus impact project performance and outcomes. 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 economising terms*" (p599, 608). Thus, transaction cost economics (TCE) seems to provide insights into why current practice seems to be coherent by explaining a model focused on managing contracts rather than managing production (i.e. the concepts of waste and flow as understood in lean thinking).

## **TRANSACTION COST ECONOMICS**

It is Coase's seminal article "The Nature of the Firm" (1937) which explicitly introduced the concept of transaction costs into economic analysis; and drew to our attention that there are transaction costs that had been assumed to be zero in prior theorizing. Oliver 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). In this approach the focus is on the transaction or "doing the deal" rather than "doing the work" and is typified by the frequent complaint from a variety of practitioners that re-tendering sub-contract packages in order to reduce cost usually causes costly knock-on problems. By riding roughshod over relationships the constant drive to reduce cost often has the opposite effect, causing margin slippage and increasing the likelihood of costly dispute as all parties seek to safeguard their financial position. 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).

The TCE framework is underpinned by the interaction between two fundamental assumptions of human behaviour (i.e. opportunism and bounded rationality) and two key dimensions of transactions (i.e. asset specificity and uncertainty). There is also a third behavioural assumption of risk neutrality and a third transactional dimension of

transaction frequency or relational exchange (Williamson, 1985). In this opportunism as "*self-interest seeking with guile*" (Williamson, 1985, p. 47) 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) adds to this and argues 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 actually has the potential to restrict value creation and decrease revenues for both parties in a relationship (Wathne and Heide, 2000); that is because considerable amounts of resources would then have to be spent on enforcing, monitoring and controlling functions instead of employing those resources for other 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). According to Dietrich (1994: 19), the concept of 'bounded rationality' in transactions is based on two principles. First, that there are limits on a human's 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' (Ting *et al.*, 2007) because they make it difficult to terminate a relationship and select other parties without acquiring losses. 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 and environmental transaction 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; 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 the transaction costs (Bradach and Eccles, 1989). This understanding underpins much of the accepted procurement theory and practice taught in Universities and recommended by professional institutions. 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). Having provided an explanation to the theory's constructs and main assumptions; next we discuss 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**

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 represents a simplified graphical representation of the governance problems and possible solutions.

According to Rindfleisch and Heide (1997), the basic premise of TC analysis is that if those 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). Williamson (1985) has augmented this conventional approach to transaction economising and introduced the concept of ‘relational contracting’ as a more positive and sustaining form of governance which solves governance problems through behavioural norms rather than potential sanctions (Ting *et al*, 2007).

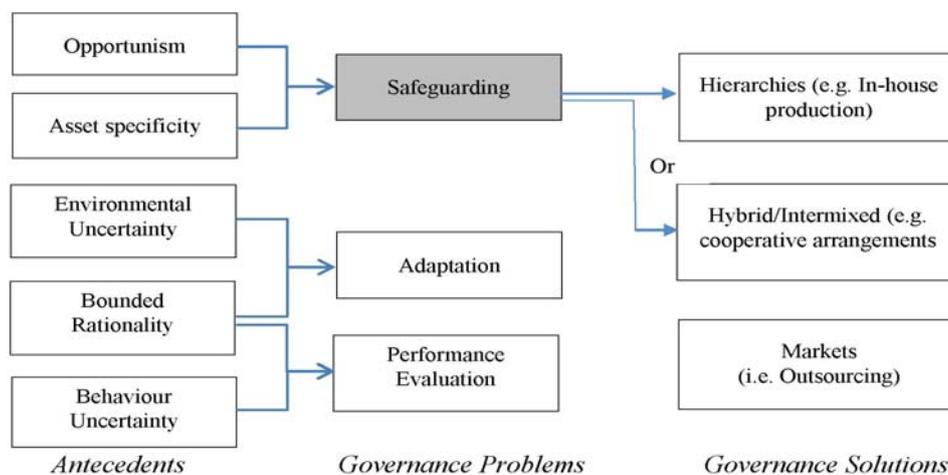


Figure 1: A basic model of transactional governance problems and solutions

In essence, TCE has the objective of total cost minimisation (Rindfleisch and Heide, 1997) and assumes that transactions will be governed by the institutional arrangements that are most efficient (Bradach and Eccles, 1989). 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.

Similarly, clients when deploying their procurement arrangements in general, and safeguarding techniques and approaches in specific, should therefore put into consideration the impact of their decisions on project-team’s performance and total costs. The situation in construction however does not confirm to this explanation as the numerous one-off construction clients and their decision makers attempt to implement a “buy-it” transaction in a “make-it” environment where a team comes together for a specific purpose (to deliver the project). The consistent failure of this approach to perform has created increasingly draconian and wasteful activity in order to safeguard parties from the failures. There are many safeguarding approaches used in construction procurement and these include the use of disclaimer clauses; conventional insurance arrangements; collateral warranties; performance bonds and cash retentions; lump sum pricing strategies. The discussion of imperfect safeguarding approaches used in construction must start with an examination of standard forms of contract.

## **STANDARD FORMS OF CONTRACT - AN IMPERFECT SAFEGUARDING APPROACH IN CONSTRUCTION**

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 responsibility 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 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 amendments made by clients are mostly related to payment issues and legal arrangements. Similarly, an exploratory study of 11 Swedish construction projects, by Osipova 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 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 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 leading to ambiguities and encouraging opportunistic behaviour. Additionally, 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.

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 summary, it seems that the problems of standard forms of contract outweigh its 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 focusses 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 in 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). A recent example of this in the UK occurred in signalling renewal contracts for London Underground reported by Connor (2015). The first project went significantly over budget and programme along with technical difficulties. The same team, technology and contract conditions were used on a second project which finished significantly ahead of schedule and under budget. The project team attributed this success to putting the contract in a drawer and concentrating on working together to solve problems. This experience certainly questions the usefulness of contracts in production and emphasises the divide between the creative, problem solving delivery process and the safeguarding commercial process as described by Sarhan *et al.* (2014). This separation was confirmed independently through discussions with a large engineering design consultancy beginning to engage with lean. Team meetings had revealed a significant difference in the understanding of purpose across the business – one of the most useful aspects of bringing people together from different departments within the organisation to have conversations around purpose was the resulting changed perceptions about the business. This also confirms that project design and delivery becomes effective when it comprises a set of conversation acts rather than relying on documented directives.

## **CONSTRUCTION PROCUREMENT**

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 problem 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. Thus, a debate exists in literature upon whether procurement arrangements should be adapted to support production system requirements or tailored to transactional characteristics.

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. Based on a comprehensive literature review various safeguarding approaches were identified (Table 1) and their impact on project performance and outcomes are analysed (Fig. 2).

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

<b>Conventional safeguarding approaches based on 'risk allocation' considerations</b>	<b>Less prevalent safeguarding approaches based on 'process flow' considerations</b>
Standard forms of contract	Relational contracting
Use of Disclaimer/Exculpatory clauses	Shared risks and rewards
Traditional insurance arrangements	Single project insurance
Collateral warranties	Latent defects insurance
Surety/Performance bonds	Pre-qualifications, direct negotiation, and IPD (e.g. Thomsen <i>et al.</i> , 2010) - thus, no need for the use of bonds
Lump sum and BoQ pricing systems	Collaborative costing e.g. TVD (See e.g. Zimina <i>et al.</i> , 2012)

The '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 2. 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.

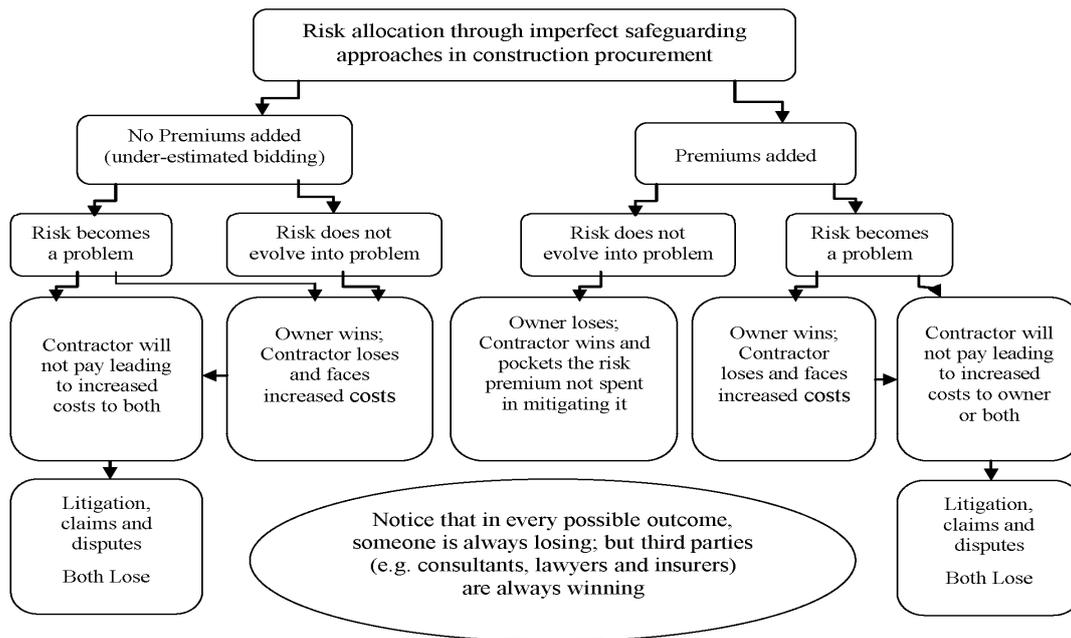


Figure 2: General potential impacts of the use of imperfect safeguarding approaches on project performance and outcomes - Modified from Zaghoul and Hartman (2003)

## CONCLUSION

Conventional safeguarding processes adopted by construction clients while deciding on their procurement options often complicate the problem rather than solve it. 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. 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). That steps are taken to avoid risk and minimise cost seems to satisfy the need for decision makers to be accountable regardless of the effect of these actions. This continuing adherence to imperfect conventional procurement procedures is also due to institutional pressure exerted from third parties (e.g. consultants, quantity surveyors, lawyers, insurance companies, banks) who may have a vested interest (i.e. social and/or economic motivations) for the wide-spread use of these inefficient procurement procedures. These factors combine to create the coherent current model for construction project delivery and their identification will help the development of new business models that embrace lean.

## REFERENCES

Bradach, J. and Eccles, R., 1989. Price, Authority and Trust: From Ideal Types to Plural Forms. *Annual Review of Sociology*, 15, pp. 97-118.

- Coase, R., 1937. The nature of the firm. *Economica*, 4(16), pp. 386–405.
- Cox, A. and Thompson, I., 1997. Fit for purpose contractual relations: determining a theoretical framework for construction projects. *European Journal of Purchasing and Supply Management*, 3(3), pp. 127-135.
- Egan, J., 1998. *Rethinking Construction: Report of the Construction Task Force*, London: HMSO.
- Eriksson, P. E., Nilsson, T., Atkin, B., 2008. Client perceptions of barriers to partnering. *Eng., Constr. and Arch. Manage.*, 15(6), pp. 527 – 539.
- Eriksson, P.E. and Laan, A., 2007. Procurement effects on trust and control in client-contractor relationships. *Eng., Constr. and Arch. Manage.*, 14(4), pp. 387 – 399.
- Hawkins, R., 2012., How to join the construction industry and survive. *Construction Research and Innovation*, 3(1), pp. 24-27.
- Laryea, S. and Hughes, W., 2009. Commercial reviews in the tender process of contractors. *Eng., Constr. and Arch. Manage*, 16(6), pp. 558-572.
- Love, P., Davis, P., Ellis, J., and Cheung, S., 2010. A systemic view of dispute causation. *Int. Journal of Managing Projects in Business*, 3(4), pp. 661-680.
- Love, P., Skitmore, M., and Earl, G., 1998. Selecting a suitable procurement method for a building project. *Constr. Management and Economics*, 16(2), pp. 221-233.
- North, D., 1994. Economic performance through time. *The American Economic Review*, 84(3), pp. 359-368.
- Rameezdeen, R and Rodrigo, A., 2013. Textual complexity of standard conditions used in the construction industry. *Constr. Econ. and Buildg.*, 13(1) pp. 1-12.
- Rameezdeen, R. and Rajapakse, C., 2007. Contract interpretation: the impact of readability, *Construction Management and Economics*, 25(7), pp. 729-737.
- Rindfleisch, A. and Heide, J., 1997. Transaction Cost Analysis: Past, Present, and Future Applications. *The Journal of Marketing*, 61(4), pp. 30-54
- Sarhan, S. and Fox, A., 2013. Barriers to Implementing Lean Construction in the UK Construction Industry. *The Built & Human Environment Review*, 6, pp. 1-17
- Sarhan, S., Pasquire, C., and King, A., 2014. Institutional waste within the construction industry: An outline. In: Kalsaas, B.T., Koskela, L. & Saurin, T.A., *22nd Annual Conference of the IGLC*, Norway, 25-27 Jun 2014, pp. 895-906
- Thomsen, C., Darrington, J., Dunne, D. and Lichtig, W., 2010. *Managing integrated project delivery*. CMAA, McLean, VA.
- Ting, S., Chen, C., & Bartholomew, D., 2007. An Integrated Study of Entrepreneurs' Opportunism. *J. of Business and Industrial Marketing*, 22(5), pp. 322-335.
- Williamson, O.E., 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press.
- Williamson, O.E., 1985. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, New York: The Free Press.
- Williamson, O.E., 2000. The new institutional economics: Taking stock, looking ahead. *Journal of Economics Literature*, 38(3). (Sep., 2000), pp. 595-613.
- Zaghloul, R. and Hartman, F., 2003. Construction contracts: the cost of mistrust. *International Journal of Project Management*, 21, pp. 419-424.
- Zimina , D., Ballard, G., and Pasquire, C., 2012. Target Value Design: Using Collaboration and a Lean Approach to Reduce Construction Cost. *Construction Management and Economics*, 30(5), pp. 383-398.