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ARE TIER 1 CONTRACTORS MAKING THEIR MONEY OUT OF WASTEFUL PROCUREMENT ARRANGEMENTS?

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ABSTRACT

The UK Government challenged construction to achieve 50% faster delivery and a 33% reduction of clients' capital costs by 2025 – prevailing business models won't meet these targets. Eliminating waste from construction design and delivery as advocated by lean ideals is therefore a necessary step towards these goals. However, waste understood simply as the improvement of current processes rather than fundamental system redesign will not be enough. Obtaining a better understanding and conceptualisation of waste in construction is therefore becoming more crucial. One aspect of this is to challenge the apparent coherence of prevailing procurement practices generated by the institutional, organisational, and commercial environments that surround the design and delivery of construction projects. This paper contributes to this by examining Tier 1 contractors and presents examples of practices that open debate on how to challenge prevailing procurement models for construction. Through literature review and interviews, the study discusses the factors influencing the 'Principal-Agent' relationship demonstrating how 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 (North, 1994). A radically different delivery model, where the client intends to eliminate the management fees and confrontational behaviours of their Tier 1 contractors is described.

KEYWORDS

Waste, procurement, business models, Tier-1 contractors, agency theory.

INTRODUCTION

The UK Government has created a set of challenging construction targets for 2025. These are: 33% lower costs, 50% faster delivery, 50% lower emissions, 50%

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improvement in exports (HM Government, 2013). Prevailing 'business as usual' approaches won't meet these targets. Obtaining a better understanding and conceptualisation of waste, as understood from a lean perspective, in construction is therefore becoming more crucial, in order to prepare the industry for the radical change demanded of it. Certainly, one aspect of this is the consideration of how the institutional, organisational, and commercial environments that surround the design and delivery of construction projects remain coherent even though they pre-dispose them to wasteful practice. (Pasquire et al., 2015). In an attempt to explain this phenomenon of coherence within the prevailing construction business models, this study looks at one aspect, the buyer-main supplier relationship. In particular, the study aims to reflect upon and stimulate debate on the functionality and production effectiveness of Tier 1 contractors (management contractors). This critical review draws upon Agency Theory and transaction cost economics (TCE), as they seem to provide insights into why conflict and adversarial relationships persist. The underlying premise is that if we can understand the cause of coherence and reveal the waste generated as a consequence then the adoption of lean construction may be more widespread. The paper presents a case study where the 'Principle – Agent' relationship is radically different and concludes by summarising the benefits and threats of removing Tier 1 contractors, proposing alternative procurement models that are deemed to be more efficient, based on the insights of UK industry experts.

METHODOLOGY

This study used semi-structured interviews to investigate problems and inefficiencies that persist in construction models and procurement practices. The study adopted a generic purposive sampling approach (Bryman, 2012), also known as judgment sampling. It is a non-random technique that does not demand a set number of participants (Etikan et al., 2016). Instead, it puts the research questions under investigation at the forefront of sampling considerations (Bryman, 2012). Through this approach, the researcher decides what needs to be known, and deliberately chooses suitable participants who can and are willing to provide the information by virtue of their knowledge or experience. Based on these considerations, the study initially targeted two industry experts with more than 20 years of relevant practical experience. Those experts then proposed other participants who have the experience relevant to this study's main research question. Overall, 6 sequential in-depth interviews were conducted with industry experts (3 senior consultants and 3 senior managers and directors working for leading contracting corporations in the UK), until the study reached a saturation state (Bryman (2012). Each interview lasted about an hour, where NVivo 10 qualitative data analysis software was used to facilitate the transcription and analysis of the collected data.

INEFFICIENCIES IN CONSTRUCTION MODELS AND PROCUREMENT PRACTICES

The construction industry is often regarded as confrontational, risk averse, and lacking trust and capacity for improvement (Rooke et al., 2003) frequently attributed to factors such as fragmentation of the industry, obsolete procurement methods, confusing and

treacherous contractual arrangements, the highly competitive cost-driven environment, and the sequential organisation of construction processes (Egan, 1998). Zimina and Pasquire (2011) argued that it is not unusual for construction organisations, because of competitive pressure, to rely on making their profits solely through commercial processes and manipulating roles with others, rather than improving production efficiency. Similarly, Chiang and Cheng (2010) identified that, due to the current highly competitive industry, contractors could only make profits if they concentrated their efforts on three issues: (1) procurement of building materials; (2) cash flow management with their downstream supply chain; and (3) planning for and applying for claims.

Other studies have highlighted associated problems and inefficiencies such as opportunistic subcontract procurement practices (Pasquire et al., 2015), the use of unfair or ambiguously amended subcontracts (Greenwood, 2001), and late payments especially in the UK construction culture (Leitch, 1994; Hughes et al., 2000). These practices although underpinned by the drive to reduce costs often have the opposite effect causing parties to safeguard their own financial position (Pasquire et al., 2015), causing margin slippage, adversarial relationships, and costly and time consuming disputes. Furthermore, clients don't realise the exclusion of subcontractors from most of the decisions on design and assessing contract periods and costs can trigger project value-loss (waste).

Wasteful procurement practices have become part of the institution of the construction industry — "the way it does business", creating a need to understand the characteristics, strategies and tactics that are more or less obedient to imperfect institutional and commercial pressures (Sarhan et al., 2014). Pasquire et al (2015) provide insights into the coherence of the current construction model by presenting a model focused on managing contracts rather than managing production. The current study provides empirical data around the critiques of the role and production effectiveness of Tier 1 contractors. This is based on selected responses of interviewees of this study as follows: "*All the work we do, we subcontract it to subcontractors....So we do the management of the scheme. We don't really do much work ourselves. There are elements of labour, but most of the work that we do is just management of subcontractors*" (Site Agent at a leading infrastructure group in the UK, January 2016). This was described in more depth by another interviewee from a different company: "*.. the main 'make-or-buy' decision goes to the buyer...We do not ourselves deliver very much at all. We rely on our supply chain to do much of that. They have the experts. We act as an integrator, our role is to getting all that effort together successfully delivered. But……when it comes to what actually happens out there in the field, most of the time we will not do it ourselves, we rely on our partners or supply-chain partners to do that for us*" (Head of Supply Chain, major UK construction & civil engineering contractor, November 2015).

AGENCY THEORY AND TRANSACTIONAL THEORY

Agency theory is a branch of transactional cost economics (TCE) that aims to devise efficient ways to constrain the opportunistic behaviour of agents (Walker and Wing, 1999). The focal point of Agency theory is the goal conflict inherent when individuals (or organisations) with different preferences, risk attitudes and division of labour engage in a cooperative effort (Eisenhardt, 1989). Hence, the unit of analysis is the

contract, the theory seeks to determine the most efficient contractual mechanism governing the principle-agent relationship. According to Eisenhardt (1989), TCE and Agency theory have similar dependent variables; hierarchies roughly respond to behaviour-based contracts while markets correspond to out-come based contracts (see Figure 1). The main difference between the two theories, however, is that Agency theory emphasis ex-ante incentive alignment and efficient risk bearing, while TCE is mainly concerned with governing ex-post stages of contract (Williamson, 2000). Table 1 summarises the similarities and contrasts between the fundamental assumptions of Agency theory and other Organisational theories.

Table 1: Comparison between agency theory's assumptions and other organisational theories (Eisenhardt, 1989)

Assumptions	**Theoretical Perspective**				
	Political	**Contingency**	**Organizational Control**	**TCE**	**Agency Theory**
Self-interest	X			X	X
Goal conflict	X			X	X
Bounded Rationality		X	X	X	X
Information asymmetry		X		X	X
Pre-eminence of efficiency		X	X	X	X
Risk aversion					X
Information as a commodity					X

Agency theory broadened risk-sharing literature by attempting to resolve two governance problems in the principal-agency relationship where one party (the principal) delegates work to another (the Agent) to perform the work (Eisenhardt, 1989), see Figure 1. At the heart of Principal-Agent theory is the trade-off between: (a) The cost of measuring behaviour; and (b) The cost of measuring outcomes and transferring risk to the agent. According to Walker and Wing (1999), these include both the cost of constraining the agent's behaviour (or of the agent's opportunistic behaviour if the cost of constraining it is higher) and the cost of loss in productivity and flexibility as a result of the constraint. In particular, the theory seeks to identify whether a behaviour orientated contract is more efficient that an outcome orientated contract. Outcome contracts are those that allow customers to pay only when specified outcomes are delivered, while behaviour-based contracts support process and social control. Agency theory conceptualizes information as a commodity that has a cost and can be purchased. Thus, the principal has two main options (Eisenhardt 1989). Firstly, to monitor and discover the agent's behaviour by investing in information systems (e.g. monitoring and reporting procedures, additional layers of management). Secondly, to contract on the outcomes of the agent's behaviour.

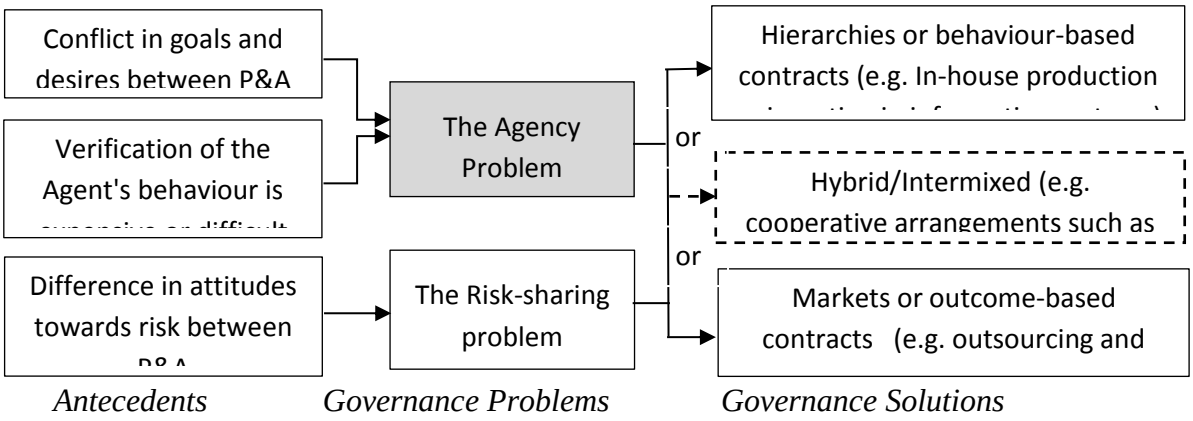

Figure 1: A simplified model of the Principal-Agency relationship problems

This contractual arrangement might motivate behaviour by co-aligning the agent's interests and incentives with those of the principal, but at the price of transferring risk to the agent. Based on the principles of the Agency theory and TCE, Figure 2 illustrates the variables influencing the principal's choice in the form of guiding propositions.

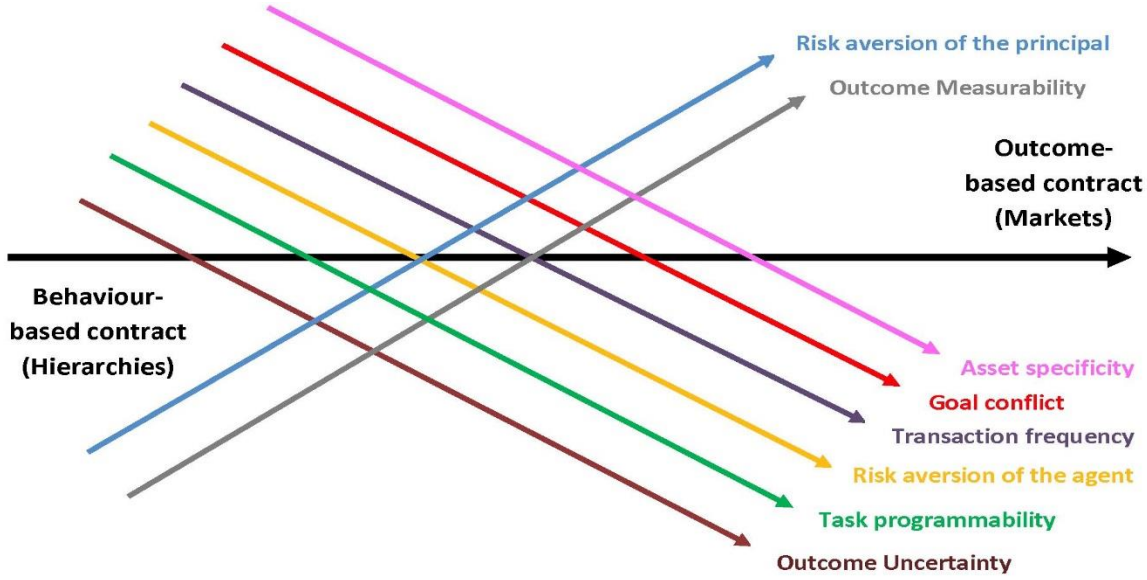

Figure 2: Conceptual model showing the relationship between transactional variables and governance arrangements [modified from Esienhardt (1989) and Paquire et al. (2015)]

THE INFLUENCE OF INSTITUTIONAL FORCES ON CONSTRUCTION PROCUREMENT MODELS

Construction procurement practices are shaped by institutional structures, beliefs and attitudes as well as project characteristics (Sarhan et al., 2014, Pasquire et al., 2015). For instance, unregulated public sector, regulated industry and private building sector practices can provide a contrast in institutional approaches to accountability, the desire

for cost transparency, and ways of achieving that through procurement strategies. Thus, it could be argued that construction models and procurement practices often mirror institutional factors. An example of this was identified during the data collection process of this study - *"The (UK) Highways Agency was held up as an exemplar of …improved efficiency in roads management and maintenance. So Local Authorities were then encouraged by Central Government to look at this model. The now limited number of contractors were pleased to extol the virtues of the Highways Agency's model to a local government market which they could also see turning into a market with a limited number of players able to deliver large, integrated service contracts. Local authorities often asked the market (contractors) what scale of efficiencies could be delivered if they were to let a single large integrated manage and maintain contract. The contractors usually came back with the same reply, "20%". There was never any real evidence for this. Twenty per cent seemed to be a figure all the authorities would like to achieve and the major contractors were happy to tell them they could achieve it. So the whole industry created a belief that integrated service contracts delivered by one (Tier 1) contractor with a chain of (Tier 2) suppliers was the most efficient form of delivery..."* (Fellow of the Institute of Civil Engineers (FICE), Senior Consultant, UK, January 17, 2016, E-mail message).

From the words above, it is clear that institutional forces (e.g. 'vested interests' and 'bargaining strength' of major industry players) can have an influence on shaping procurement practices. This argument is supported by North (1994) who stressed that the formal rules within institutions are (normally) created to serve the interests of those with the bargaining power to create those rules. In practical terms, this is also evidenced by the unilateral movement towards large integrated contracts seen in the UK highways sector described above. A change in the status of the Principal is causing new rules to be developed *"... now the Highways Agency has transmorphed into Highways England, a regulated, arms-length government company with greater accountability for costs and performance, Highways England is now recruiting greater procurement and commercial management staff. It is also fragmenting contracts in order to secure greater control and visibility of costs*" (FICE, Senior Consultant, UK, January 17, 2016, E-mail message).

LATE PAYMENT AND THE RESISTANCE TO PROJECT BANK ACCOUNTS

Late payment is a major problem (Proverbs et al., 2000), and a most institutionalised wasteful practice (Sarhan et al., 2014), in the UK construction culture in specific (Leitch, 1994; Hughes, 2000). Historically, it is has not been unusual for lower Tier suppliers, in an industry in which about 99% of businesses are SMEs, to have to wait for up to 100 days to receive payment (Cabinet Office, 2012); due to Tier 1 contractors creating profit from cash flow at the expense of their supply chain (Klein, 2015). This may lead to increased cash flow borrowing, poor performance and associated costs increasing the burden of risk on the supply chain (Leitch, 1994; Klein, 2015). According to the Cabinet Office (2012b), late and unfair payment practices cause 1% - 2.5% of wastage in the cost of projects attributed to factors such as: supply chain members' unnecessary overheads relating to debt chasing and administration, costly payment disputes which ultimately feed back into costs for the client, and potential insolvencies and costs of production losses due to lack of collaboration and trust.

Consequently, Project Bank Accounts (PBAs) were introduced in 2009 by the Cabinet Office in collaboration with public sector clients, as a means to enhancing cost

transparency and revolutionising the way members of construction supply chains get paid (Cabinet Office, 2012b; Biddell, 2015). In PBA, supply chain members, do not need to wait for higher Tier contractors to process payment; instead they receive it directly through a bank account specific to the project they are working on, allowing them to concentrate on production delivery (Cabinet Office, 2012b).

Highways England is now using PBAs on all its works, and The Northern Ireland Executive has mandated the use of PBAs, since January 2013, on all construction projects above £1m. Many contractors in the UK are acknowledging that PBAs create a greater collaborative effort along the supply chain. However, some are still battling against their implementation (Klein, 2015). For instance, some contractors argue that PBAs have led to complications with the construction industry tax scheme and VAT; however these claims were ruled-out by the tax authority (Klein, 2015). Klein reported that "*Willmott Dixon went public with their views on PBAs [claiming that:] where responsible payment terms are applied, PBAs are not necessary*" (Klein, 2015). They then criticized PBAs by professing that they are bureaucratic, costly, and onerous for the client. According to Wynne and Hansford (2014), many Tier 1 contractors claim a tedious administrative effort for the management of the multiple accounts in the system adding significant overhead to their businesses. Consequently lead contractors, relying on their bargaining power as major industry players, push for the use of other supply-chain payment arrangements to end the use of PBAs such as Early Payment Schemes and the Fair Payment Charter. However, Klein (2013) condemns the former for being unfair to subcontractors and for reinforcing traditional business models; while the latter can be criticised for its subjective language.

Hansford (ICE past President and former UK Government Chief Construction advisor) said about PBAs: "*Perhaps to a degree it was taking a sledgehammer to crack a nut. I don't regard them as being the panacea*" (Wynne and Hansford, 2014). Instead he suggested widespread adoption of the new charter would remove the need for project bank accounts (Hansford, cited in Wynne and Hansford, 2014). In contrast, Klein (2015) believes that "*if firms are paying responsibly they should not have any issue with PBAs*".

Having reviewed aspects of theory and practice surrounding Tier 1 contractors we now discussed a model that removes them from the construction process altogether.

LONDON UNDERGROUND'S STAKE DELIVERY MODE

With the ambition of cutting costs by 25%, London Underground's (LU's) senior management team decided to cut-out main contractors altogether (Tier 1 and 2). Working directly with specialist subcontractors, they used consultants to supervise the work on the £330m Station Stabilisation programme over a period of seven years (Morby, 2014). Using an apparent lean philosophy 'production leads, everything else enables', they focused their efforts on working more closely with those specialists who actually produce the work. The Stake Delivery Model is a Government Treasury trial project under its Infrastructure UK office (Morby, 2014), designed to deliver the efficiency improvements outlined in the McNulty Report (2011). According to Morby (2014) the Stake Delivery Model key principles include:

- Engaging with the trade contractors and specialists who actually do the work on-site,
- Simplifying contractual arrangements with LU taking most of the risk,
- Providing long term commitments to suppliers,
- Creating a 'one team' approach to project delivery.

BENEFITS AND THREATS OF CUTTING OUT TIER 1 CONTRACTORS

Having provided a brief overview of an emerging construction procurement and delivery model that aims to eliminate the costs of procuring the services of Tier 1 contractors, next we summarise the main benefits and threats of this model based on the insights of UK experts.

Table 2: Main benefits and threats of cutting out Tier 1 contractors

Main Benefits	Main Threats/Challenges
Getting rid of that sort of confrontational litigation that often occurs towards the end of projects	Requires appropriate commercial alignments and conversations at an early stage, to avoid double man-marking of trades under cost-reimbursement contracts.
Reduces overall cost as client now pays the subcontractors directly. Thus, eliminates perceived inflated costs due to 'margin on margin'. i.e. the Tier 1 contractor has a margin to make on top of the margins the Tier 2 suppliers make. Also transfers advantage of competition perceived to be locked into Tier 1 frameworks.	Increases client risk e.g. oversight management of the H&S issues - the client now becomes the Principal Contractor (under UK CDM Regs) and has the overall responsibility for safety. Also, client becomes responsible for managing the interfaces between activities carried out by different sub-contractors and the risk with the overall delays. Similarly, if there are gaps in the design or in the scope of the supply, there is no one for the client to blame other than themselves and thus the client has to pay for it.
Allows client to use smaller contractors creating innovative opportunities to value engineer and collaborate.	Few clients have competencies to manage the works/sub-contractors or have a good knowledge of construction activities/suppliers/the market. Client team will need to employ new people to build expertise which is time consuming and can be costly.

CONCLUSION AND RECOMMENDATIONS

The Principal-Agency relationship is a typical problem that is deeply institutionalised in our coherent construction business model (Pasquire *et al.*, 2015). Construction procurement models seem to be in contrast with the two options offered by Agency theory. They are mainly concerned with either: (1) contracting on the outcomes of the agent's behaviour; or (2) monitoring and controlling behaviour. Based on Figure (1), it appears that the first option (i.e. outcome based contracts) could be suitable for a commodity market; but it is definitely inappropriate for the nature of the construction industry that is characterised by its high levels of complexity and uncertainty. However, many construction decision makers still persist in adopting conventional procurement arrangements, which stand in contrast to out-come based contracts and increase

governance challenges; whilst the use of process and social-based contracts seem to be much less prevalent.

On the reasons for the coherence of the prevailing construction model, work by Pasquire et al.(2015) referred this to a model focused on managing contracts rather than managing production. This study supplements their work by shedding light on the influence of the bargaining power that can enable major industry players (e.g. Tier-1 contractors) to dictate the rules of the game – the way we do business. In this study, the main benefits and challenges of a radically different construction model, which aims to cut-off main contractors altogether, was discussed. Based on the opinions of UK industry experts who participated in this study, it appears that the threats/challenges of this model outweigh its benefits. Alternative approaches worth further investigation include: (1) Procuring Tier 1 management contractors to act as 'Management Agents' based on a small fee in relation to the total value of the product, but an incentive for minimising total product cost could be large in relation to that fee in order to encourage total cost minimisation; and (2) Procuring large Engineering firms based on a 'Design and Manage' responsibility. This approach provides actual producers (i.e. specialist suppliers) with more freedom to value engineer, and it eliminates the role of the Tier 1 main contractor's design coordinator who sits between the site-operations teams and the lead designer.

REFERENCES

Biddell, L. (2015) "Implementation of Project Bank Accounts across Highways England"; Available at: http://www.secgroup.org.uk/

Bryman, A. (2012) *'Social Research Methods'*, 4th Edition, Oxford University Press: NewYork

Cabinet Office (2012a) "Project Bank Accounts – Briefing document"; available at: https://www.gov.uk/government/publications/project-bank-accounts

Cabinet Office (2012b) "A-guide to Project Bank Accounts in-construction for government clients"; available at: https://www.gov.uk/

Chiang, Y. and Cheng, E. (2010) 'Construction loans and industry development: the case of Hong Kong', *Construction Management and Economics*, **28**(9), 959-969

Egan, J. (1998) *Rethinking Construction: Report of the Construction Task Force*, London:HMSO.

Eisenhardt, K. (1989). "Agency theory: An assessment and review." *Academy of Management Review*, 14(1), 57-74.

Etikan, I. Musa, S.A., Alkassim, R. (2016). "Comparison of Convenience Sampling and Purposive Sampling." *American Journal of Theoretical and Applied Statistics*, 5(1), pp. 1-4.

Greenwood, D. (2001) 'Subcontract procurement: are relationships changing?', *Construction Management and Economics*, **19**(1), 5-7

HM Government (2013). "Construction 2025 - Industrial Strategy: government and industry in partnership"; Available at: www.official-documents.gov.uk

Hughes , W., Hillebrandt, P., and Murdoch, J. (2000) 'The impact of contract duration on the cost of cash retention', *Construction Management and Economics*, **18**(1), 11-14

Klein, R. (2013). "Early payment schemes: The industry disease."; Available at: http://www.building.co.uk/

Klein, R. (2015) "PBAs: Tell it like it is"; Available at: www.building.co.uk
Leitch, J. (1994) Late pay only 'a British problem', Contract Journal, 31 March, 2.
Morby, A. (2014). "Main contractors dumped from £330m tube stations revamp"; Available at: www.constructionenquirer.com/
North, D. (1994). "Economic performance through time." *The American Economic Review*, 84(3), 359-368
Pasquire, C., Sarhan, S. & King, A. (2015). "A Critical Review of the Safeguarding Problem in Construction Procurement: Unpicking the Coherent Current Model." *Proceedings of the IGLC-23*, Perth, Australia, pp 309-318
Proverbs, D G, Holt, G D and Cheok, H Y (2000) Construction industry problems: the views of UK construction directors. *In:* Akintoye, A (Ed.), *16th Annual ARCOM Conference*, Glasgow Caledonian University, Vol. 1, 73-81.
Rooke, J., Seymour, D. and Fellows, R. (2003) 'The claims culture; A Taxonomy of attitudes in the industry', *Construction Management and Economics*, **21**(2), 167-174
Sarhan, S., Pasquire, *C. and King* A. (2014). "Institutional Waste within the Construction Industry: An outline. " *Proceedings of the IGLC-22*, Oslo, Norway, June, pp 895-906
Walker, A. and Wing, C. K. (1999). "The relationship between construction project management theory and transaction cost economics." *Engineering, Construction and Architectural Management*, (6)2, 166-176.
Williamson, O.E. (2000) The new institutional economics: Taking stock, looking ahead, *Journal of Economics Literature*, 38(3), (Sep., 2000), 595-613
Wynne, A. and Hansford, M. (2014) "Fair payment charter could spell end of project bank accounts." Available at: http://www.newcivilengineer.com/
Zimina, D. and Pasquire, C. (2011) 'Tracking the dependencies between companies commercial behaviour and their institutional environment', *Proc. IGLC-19*, Peru